

Designing Ethically Responsible AI-HRM Tools for Recruitment: A Systematic Literature Review

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ABSTRACT,

This thesis explores the ethical concerns regarding the use of AI in HRM recruitment and provides recommendations for ensuring the design of ethically responsible AI recruitment tools. The study highlights that AI recruitment tools could provide biased and discriminatory outcomes, thus emphasizing the need for designing unbiased and fair AI recruitment systems. The research has been conducted through a systematic literature review of nineteen existing studies. Two expert interviews were conducted afterwards to provide an additional source of information to support the findings from the literature review. The results of this study show that the implementation of AI in recruitment bring forth significant ethical issues concerning discrimination and bias, and further discusses how stakeholder cooperation, human supervision, and a design-framework can minimize these issues in regards to two stages of AI design: 1) Development and 2) Post-Development. The study finally provides practical recommendations to organizations in order to design ethically responsible, unbiased, and fair AI recruitment tools.

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Keywords

AI, HR, AI Recruitment, Ethical AI, Stakeholder Cooperation, AI Recruitment Bias, Mitigating Bias in AI Recruitment

1. INTRODUCTION

The continuous, exponential growth of technology has been transforming the entire world at a rapid pace for years on end and the corporate environment is no exception. Businesses have had to continuously adapt to an ever-changing digital world, and we have now gotten to a point where machines themselves are capable of performing high level tasks otherwise done by humans (Enholm et al, 2021). The use of artificial intelligence has seen a significant rise in recent years, from “simple” virtual assistants like Siri to multimodal models capable of providing an entire section of code to create a fully functioning website (OpenAI, 2023).

As such, businesses are investing more time and money in artificial intelligence year after year. Microsoft has recently announced a multibillion-dollar investment into OpenAI to accelerate breakthroughs in artificial intelligence (Capoot, 2023). Every single department in every single business is being affected by the exponential improvement of artificial intelligence, and HRM is an especially interesting department to look at.

As Artificial Intelligence is transforming the world around us, companies are looking increasingly to apply AI in recruitment and selection activities (Hunkenschroer & Luetge, 2022; Köchling et al. 2021). The benefits of using these AI algorithms in recruitment are plentiful, as HR processes become more effective and efficient as a result of reducing time-consuming activities (Oswal et al, 2020; Fernández-Martínez & Fernández, 2020; Mozelius et al. 2022). These algorithms can be used to filter resumes, screen applicants and review application videos, which can allow HR managers to focus on other activities instead (Hunkenschroer & Luetge, 2022; Albert, 2019). AI can use facial and speech recognition in order to rank applicants and ultimately select the optimal candidate. By using these recognition tools, AI is able to determine information about personality traits, mood, and emotions (Johansson & Herranen, 2019).

Nevertheless, alongside advantages come certain disadvantages that could cause serious problems. One of the driving forces behind the use of AI in recruitment is the supposed objective assessment of candidates, but is artificial intelligence truly objective and unbiased? A study from Cambridge University argues that unbiased AI algorithms are still unconsciously biased, even if it is stated that they remove gender and race from the systems (Drage & Mackereth, 2022). Furthermore, back in 2018 Amazon removed an AI recruitment system that portrayed bias against women as it seemingly taught itself that male candidates were preferable (Dastin, 2018). It has even been shown that people from underrepresented ethnicities and genders have a lower chance of being invited to interviews as a result of AI video-analysis (Köchling et al. 2022). Building on the issues with AI video-analysis, a study by Fernández-Martínez et al. (2020) shows that the AI software can easily detect race in images, and it cannot control the discriminatory outcomes of the recruitment process. While ethical issues are clearly present in AI recruitment tools, there is a significant lack of knowledge and research conducted around the design of these tools in an ethically responsible manner (Hunkenschroer and Luetge, 2022; Mujtaba & Mahapatra, 2019), which signifies the importance of this study.

Research that has been conducted with a focus on designing fair AI systems for HRM underline the importance of stakeholder cooperation in the design process. Studies by Ahn (2022),

Soleimani et al. (2022) and Miller (2022) have shown that cooperation between AI designers and HR managers is vital to design fair AI-HRM tools for recruitment. As such, stakeholder involvement and co-creation between HR managers and AI designers will be one of the main focus points in the literature review conducted.

The findings previous research and studies, (Hunkenschroer & Luetge, 2022 & Köchling et al, 2022), underline how important it is to research the design of ethically responsible artificial intelligence HRM tools for recruitment. The purpose of this study is to research and answer the question: *How can we ensure that AI-HRM tools for recruitment are ethically responsible regarding bias, discrimination, and fairness?*

This study contributes to current literature by providing a systematic literature review around the topic of ethically responsible AI-HRM tools for recruitment, focused on how we can ensure that these tools are ethically responsible. As seen by the current literature available, ethical issues connected to AI-HRM tools are of concern and this research will address the urgent need for unbiased and fair AI recruitment tools. As stated by Hunkenschroer & Luetge (2022), there is a lack of research on the topic of ethical AI in recruitment. As current literature mostly investigates if AI assessment tools contain ethical concerns and what these ethical concerns are, this study will research how we can go about minimizing these ethical concerns. This particular research could prove helpful to organizations that are planning on implementing, or already have implemented AI recruitment tools.

Practically, this study contributes to the field by providing recommendations on designing ethical AI recruitment tools. This will prove useful to AI designers and HR managers as it offers practical guidance and insights to design AI recruitment tools that are ethically sound. Furthermore, AI recruitment tools have the potential to increase efficiency and effectiveness in the hiring process, but if these tools were to be biased and discriminatory it could lead to ineffective decision-making and negative consequences. By implementing the recommendations provided in this study, businesses will be able to promote fairer and more inclusive recruiting processes while ensuring AI technology is used responsibly to support the hiring process.

The study will be organized as followed. Firstly, a small section about ethical AI will be discussed in order to gain an understanding of what ethical AI means. Secondly, the methodology of this study will present the design of the research (e.g., data collection, data analysis and interpretation). Afterwards, a comprehensive systematic literature review will be presented followed by a discussion (theoretical and practical implications and limitations) and a conclusion.

2. ETHICAL AI

Before diving into the analysis of the literature related to the design of ethically responsible AI-HRM tools for recruitment, it is crucial to start off by defining what ethical AI really means. Thus, this short preliminary chapter will focus on defining ethics related to recruitment tools.

One of the most crucial ethical concerns is the guarantee of fairness since AI tools that are utilized in HRM should be designed to circumvent existing biases in the algorithmic data (European Commission, 2019). The definition of fairness can be divided into two different streams. The first stream is related to algorithmic bias and algorithmic discrimination against

certain groups of people based on gender, race etc. Meanwhile, the second stream focuses on the perceived fairness of AI management in HRM (Ahn, 2022). Continuing from this point onwards, the focus in this research will be on the first stream of fairness, related to algorithmic bias and discrimination. As this research has its focus on AI recruitment, the purpose is to research how to design AI recruitment tools that mitigate the algorithmic bias and discrimination that could be present in these systems. As such, the research conducted to design ethically responsible AI-HRM tools for recruitment will focus on the first stream of fairness as discussed by Ahn (2022). Building on the definition of fairness, it is important to know how to investigate the AI algorithms in order to properly assess the amount of fairness these tools display. A study by Mujtaba & Mahapatra (2019) discusses various concepts of fairness and summarizes them in five core definitions: Demographic parity, accuracy parity, predictive rate parity, individual fairness and counterfactual fairness. For the purpose of this research, we will focus on a few specific core definitions derived from the study by Mujtaba & Mahapatra (2019) that are useful in answering the research question. Demographic parity is concerned with equal acceptance rates of different groups (f.e. different ethnicities), while individual fairness states that individuals with similar features should receive similar outcomes regardless of their group. Lastly, counterfactual fairness is defined by transparency where the algorithms provide explanations for the decisions made by the model (Mujtaba & Mahapatra, 2019; Manyika et al, 2019). By being able to receive these explanations, it would be possible to discover the biases in these algorithms.

3. METHODOLOGY AND DATA

3.1 Research design

The purpose of this study was to provide an analysis and discussion around current available literature related to the ethical design of AI-HRM recruitment systems. Because of the scope and complexity of the study, it was deemed necessary to conduct a thorough systematic literature review (SLR) in order to gain all knowledge and information necessary to answer the research question properly. “A systematic literature review aims to identify all evidence that fits the pre-specified inclusion criteria to answer a particular research question or hypothesis” (Snyder, 2019). As such, for this research the papers that were selected had to include specific keywords and criteria in order to qualify for the review (see chapter 3.3). The papers that were selected through screening them against the selection criteria were analyzed in-depth and the relevant findings of those papers incorporated into the results section of this study.

3.2 Data collection

For the systematic literature review, Scopus was used as sources of data. Scopus was chosen for its peer-reviewed papers and high-quality documents. Meanwhile, Google Scholar was used as well for its large amount of data available to increase the amount of literature that could be selected. The keywords that were used for the first search consisted of “AI” AND “HR”. To receive papers that were relevant to ethical design of AI, the keywords “ethic” and “design” were incorporated in the search. These keywords were combined with “AI” and “HR”. Further searches included more keywords, “recruit”, “hiring”, “stakeholder”, “bias”, “discriminat” were all used to find the largest amount of relevant studies. “recruit” was used as a keyword, since it allows for results around “recruiting” and “recruitment” simultaneously. Similarly, “ethic” and “discriminat” was used to obtain results around “ethics”, “ethical”, “discrimination”, “discriminate” and

“discriminating”.

Furthermore, some sources that were found and collected did not derive from any database, but through studies that have been read and analyzed for the literature review. Thus, some studies were collected through reference searching.

3.3 Inclusion criteria

The articles that were chosen for the literature review needed to contain specific criteria to be included. Since the topic of artificial intelligence and technology as a whole is constantly evolving, the papers that were selected had to be recent (Enholm et al, 2021). Thus, only papers from 2018 and onwards were selected for analysis. Furthermore, the articles had to be written in English and since the purpose of this study was to research how to minimize ethical concerns within AI recruitment with a focus on stakeholder cooperation, one of the following topics had to be included in the selected studies: AI recruitment tools, ethical design of AI, stakeholder cooperation in AI-HRM, ethical concerns with AI-HRM or mitigating bias in AI recruitment.

3.4 Data extraction

The initial searches with the relevant keywords (Ch. 3.2) and the published date set at 2018 and onwards resulted in 632 documents through Scopus and 17.100 results in Google Scholar. Because of the incredibly large amount of results in Google Scholar, Scopus was used first to find and select literature. Google Scholar was used as an addition to Scopus, if the amount of literature found through Scopus alone was not sufficient. The first step after the initial search was to remove all duplicates, which was done by exporting the documents to Excel through Scopus and identifying the duplicates there. In total, 38 duplicates were found and 594 documents remained. Through Google Scholar, 8 more articles were found to be relevant and were included in the screening. Thus, the abstracts of 602 articles were compared and reviewed according to the inclusion criteria mentioned in chapter 3.3. If the abstract was approved according to the inclusion criteria, the remaining sections of the paper were read, and compared once again to the criteria. The studies that remained after the full screening were 19. As said before, reference searching was utilized to find more relevant studies which resulted in an additional 3 articles found. The total amount of studies eventually used in the systematic literature review thus amounted up to 22 studies total. The analysis of the papers was used to develop a literature matrix (see appendix). The selection process of the articles is represented in Figure 1 in the form of a PRISMA flowchart. A PRISMA flowchart is “used to depict the flow of information through the different phases of a systematic review” (PRISMA, n.d.).

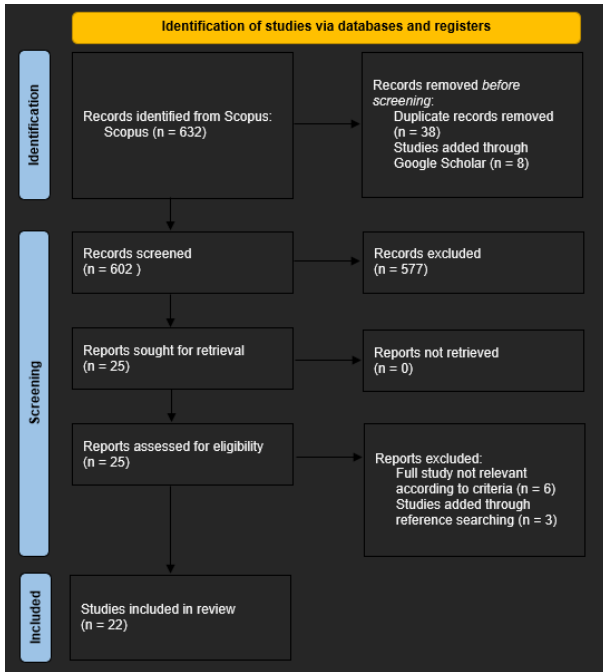


Figure 1: Visualizing the article selection process (PRISMA Flowchart)

3.5 Additional expert interviews

Due to the limited amount of papers found through the selection process, it was deemed beneficial to gain more knowledge about the topic through expert interviews with HR professionals or AI designers. These interviews, thus, functioned as an additional source of information to reinforce the available literature with expert knowledge.

A semi-structured method with open questions was employed to gather relevant information related to the research topic. In a semi-structured interview, the interviewees are able to elaborate and speak openly to the questions provided which is beneficial to researchers that want to focus on a specific aspect in-depth (Alsaawi, 2014). Since this study focused on the ethical design of AI recruitment tools, it was deemed beneficial to the research to conduct a semi-structured interview. For the interview, a pre-designed questionnaire modeled after the research question served as the foundation for the interviews (See appendix). The interviews were conducted and recorded through Microsoft Teams. To ensure that the purpose of the interviews was understood, the interviewees were orally informed with an introduction to the research.

The interviewees were selected by non-probability, purposive sampling as a particular focus group was targeted (Soleimani et al, 2022). Two specific groups were selected, HR professionals and AI designers. For the HR professionals, it was required they either implemented AI-HRM systems before or were planning on implementing them in the future. As for the AI designers, it was required they have experience in developing AI-HRM tools. For both of these focus groups, the main requirement is their knowledge of AI in the field of HR. As mentioned before though, only HR professionals were interviewed. AI developers with expertise in implementing AI applications in HR were not found.

4. RESULTS

4.1 AI Recruitment and its ethical concerns

Even though AI-enabled recruitment tools could be incredibly efficient and beneficial to the field of HRM, the risks that are

associated with AI-HRM emphasize the need for a discussion about ethically responsible AI recruitment tools. The implementation and use of AI recruitment tools raise some significant ethical issues concerning discrimination and bias, as per the first stream of fairness discussed by Ahn (2022). As discussed shortly in the introduction of the study, there are various areas in which AI can be utilized in the sphere of recruitment. In general, there are four main methods in which AI is being used for recruitment: Outreach, screening, assessment, and facilitation (Hunkenschroer & Luetge, 2022; Bhatt, Oswal et al, 2020; Black & Esch, 2020; Johansson & Herranen, 2019). This section will dive into each of these applications and discuss the ethical concerns associated with them.

4.1.1 Outreach

Outreach is the stage in the recruitment process where the detection and attraction of applicants occur (Hunkenschroer & Luetge, 2022). In this area of recruitment, AI can be leveraged to advertise job openings, notify people that are looking for jobs, and recommend candidates to recruiters (Bogen, 2019; Hunkenschroer & Luetge, 2022; Black & Esch, 2020; Li et al, 2021). But, although the usage of AI in the outreach stage of recruitment sounds beneficial to the field of HR, it brings forth ethical issues that might go unnoticed. Because, oftentimes, these AI systems in the outreach stage do not predict who will be the most successful in a specific role, but who will be most likely to press on the job advertisement and this can cause the AI systems to, potentially, reinforce gender and racial stereotypes (Bogen, 2019). As certain jobs are oftentimes accepted more often by a specific gender, the AI algorithm could reinforce this by only showing the job advertisements to the gender that would normally be more present in that occupation (Bogen, 2019; Black & Esch, 2020).

4.1.2 Screening

In the screening stage, AI systems can be used to filter resumes and candidates to create a list of the most promising applicants (Hunkenschroer & Luetge, 2022; Fernández-Martínez & Fernández, 2020; Bogen, 2019). Currently there are the “old” tools that simply scan resumes for certain keywords, but the newer and more innovative systems are capable of using machine learning to make predictions based on historical screening decisions (Bogen, 2019). But this newer method of using historical data is where the issue lies. Because if the historical data is biased, the screening decisions made by the AI tool will simply also be biased (Bogen, 2019; Figueroa-Armijos et al, 2022; IBM, 2018; Black & Esch, 2020). Another function AI tools in the screening sphere can perform is the prediction of whether or not a candidate will be successful on the job or not. Basically, the AI system can predict a candidates’ future job performance by analyzing signals related to productivity or laziness (Hunkenschroer & Luetge, 2022; Black & Esch, 2020; Bogen, 2019). But, evaluation of performance can be subjective and if an organization’s evaluation of performance is clouded by sexism, racism or other forms of bias, the algorithms that are trained on this data will once again be biased themselves (Bogen, 2019).

4.1.3 Assessment

One of the most innovative AI recruitment systems are the assessment tools which can use facial and audio recognition to identify and evaluate candidates (Hunkenschroer & Luetge, 2022; Fernández-Martínez & Fernández, 2020; Köchling et al, 2021; Johansson & Herranen, 2019). Even though these tools sound compelling to implement, they can have an adverse negative effect. With the use of facial recognition, these video-

analysis tools exhibit a possible tendency to contain biases related to gender and race (Fernández-Martínez & Fernández, 2020; Köchling et al, 2021). Furthermore, they have even been shown to be imprecise (Fernández-Martínez & Fernández, 2020). These tools have been shown to misidentify various ethnicities on a sexual orientation basis, as a result of certain languages sounding more feminine, or masculine, with the use of voice analysis. What's more, certain ethnicities could be discriminated against, simply because the expressiveness of the face differs between cultures and races (Fernández-Martínez & Fernández, 2020).

4.1.4 Facilitation

Lastly, AI can be used to take over the administrative tasks related to the recruitment process (Hunkenschroer & Luetge, 2022; Black & Esch, 2020; Chen, 2023). AI used in the facilitation stage are utilized as a way to make the job application process a smoother and more positive experience (Black & Esch, 2020). Examples of AI usage in this stage of recruitment are assistants powered by AI technology to communicate with potential applicants and answer any questions they might have about the entire recruitment process (Hunkenschroer & Luetge, 2022). Furthermore, AI can be used to automatically sort through a LinkedIn page and fill out an application form based on a profile (Black & Esch, 2020 & Chen, 2023). Ultimately though, the usage of AI in this stage of recruitment does not pose any real ethical concerns related to the first stream of fairness discussed by Ahn (2022) since it is only used for administrative tasks (Black & Esch, 2020).

4.1.5 Human Biases in AI Recruitment

Even though AI tools are technically objective, they are still created by human programmers who could have extended their own ideologies and inherent biases into the design of these tools (Figueroa-Armijos et al, 2022). This statement can also be corroborated by interviewee #1:

"It is inevitable that people that are creating the artificial intelligence are inherently creating bias, conscious and unconscious." – Interviewee 1

It even appears that that AI algorithms have issues performing when it has to predict new or "rare" outcomes (Figueroa-Armijos et al, 2022). This means that certain candidates could be discriminated against, simply because they deviate from the previous HR decision pathways. Furthermore, AI recruitment tools are designed with historical data that could be inherently biased and unfair, thus resulting in the same discrimination issues that were present before AI recruiting (Figueroa-Armijos et al, 2022; IBM, 2018; Bogen, 2019; Manyika et al, 2019). A report by IBM (2018) also speaks about the presence of biases in AI recruitment tools. The report argues that "bad" data results in unfair treatment. Certain data could contain racial, gender and ideological biases that would result in unfair treatment and discriminatory decisions. "Our AI systems are only as good as the data we put into them" (IBM, 2018). It is safe to say that AI recruitment systems have incredible potential and could be very beneficial to the field of Human Resources, but there is still a tremendous amount of doubt, uncertainty and ethical concerns associated with these tools.

4.2 Mitigating Bias in AI Recruitment

AI recruitment tools offer various benefits like faster application processes and even reduced discrimination as long as certain mechanics are set in place (Chen, 2023; Mozelius et

al, 2022). In order to avoid possible bias present in AI recruitment systems, there is a high need for AI governance (Chen, 2023; Bankins, 2021). The decisions that have been made by the AI recruitment tools, thus, should not be the absolute final decision carried out. HR professionals would need to make the final decision based on the results from these recruitment tools, as to ensure the avoidance of possible bias (Chen, 2023 & Mozelius et al, 2022). Interviewee #2 further backs up this reasoning, but also argues that the human evaluation requires understanding of how to evaluate:

"The results should be evaluated, but the human being should also understand how to evaluate it. So, it's not only looking into "Do I agree?", but also "Why do I agree?". Which questions should I ask to the technology?" – Interviewee 2

The expertise provided by the interviewee on this topic and the questions that need to be asked about the AI systems will be further discussed from existing literature later on in this paragraph. Building upon the topic of human supervision, AI-supported recruitment could make hiring more inclusive as compared to human recruitment which has resulted in exclusion. But, although AI-supported recruitment could have a positive impact on diversity and inclusion, AI could amplify human biases and even introduce new ones (Kelan, 2023; Figueroa-Armijos et al, 2022; Black & Esch, 2020; Mujtaba & Mahapatra, 2019; Manyika et al, 2019). In order to move towards algorithmic inclusion in the recruitment process it is vital to conduct assessments, audit AI regularly for potential discriminatory effects and to refresh them on a consistent basis (Kelan, 2023).

Going into more detail regarding human control, a decision-making framework for the development and application of ethical AI in HRM should be followed by organizations planning on implementing such tools (Bankins, 2021; Figueroa-Armijos et al, 2022). By discussing three vital components, this framework can be created: Organizational governance, ethical task-technology fit and human control (Bankins, 2021). Firstly, organizations should have proper leadership in place that monitors, sets and adapts parameters for AI and oversees data collection in order to ensure ethical AI deployment (Bankins, 2021). Furthermore, the use of AI for a specific task should meet five ethical principles of fairness, reliability, safety, privacy and security (Bankins, 2021; Hunkenschroer & Luetge, 2022). The method to assess the ethical task-technology fit should be done by asking three questions. Whether or not the utilization of the AI is reliable and appropriate for a task, whether or not the use of AI facilitates fairness in task completion and whether or not the output of the AI models is explainable for the specific task (Bankins, 2021). Lastly, there is a high need for organizational value-setting in regard to guidance on how employees should interact with and rely on the AI (Bankins, 2021; Bhatt, 2022).

To add on this, the development of responsible and ethically sound AI recruitment tools is derived from the AI systems themselves and the development of an ethical framework is essential in order minimize the bias that could be present in those systems (IBM, 2018; Figueroa-Armijos et al, 2022). An ethical framework would work as to guide the design and development of AI in order to eliminate the bias that is present from those systems. IBM (2018) proposes a three-level rating system that can evaluate and determine the fairness of AI systems. These three levels are whether or not the system is biased, if it inherits the bias properties of its training or it contains the potential to introduce new biases regardless of fair or unfair data. With the use of this three-level rating system, the end-user of the AI can determine the fairness and

trustworthiness of the tools based on these three levels (IBM, 2018). All in all, though, according to interviewee #1 it seems that solving the issues of bias present in AI recruitment tools is impossible:

“It’s a real problem, it’s not going to be a simple solution, there is no solution. We are just going to have to be diligent in making sure that it does not become problematic.” – Interviewee 1

All the methods discussed above can be used to minimize the present bias, but completely solving it seems like a far-off possibility.

4.3 Stakeholder Cooperation

From the previous section and the review of literature it has become clear that humans play a large role in the design of ethically responsible AI tools, this section will focus on how humans can work together to ensure these tools to be ethically responsible. Because the development of AI tools is a very technical field in its core, there are many studies to be found that research the development of these tools from a technical viewpoint. Nevertheless, studies that are concerned about the interactions between stakeholders and how these stakeholders can work together to design ethically responsible AI tools do exist.

People vary, opinions vary, and thus ethical principles can be completely different person to person (Ahn, 2022). Because of this, the only way to find an optimum in fairness is through discussion and co-creation between all people that are affected by the AI systems (Ahn, 2022; Charlwood & Guenole, 2020; Soleimani et al, 2022). Initial workshops should be conducted where all HR professionals and AI designers come together to discuss their opinions and perspectives around the AI recruitment tools (Ahn, 2022; Soleimani et al, 2022; Kelan, 2023). Building on the idea of designing fair AI systems through collaboration between stakeholders, there are three stages in which AI developers and HR managers are able to share their knowledge with each other (Figure 2). The conceptual model (Figure 2) is a useful asset that could be used as a basis for researching the interactions between stakeholders and the design of fair and unbiased AI recruitment tools. Since the research of this study revolves around minimizing bias and discrimination in AI recruitment tools, all of these stages are equally as important. But, since the pre-development stage is incredibly technical as it revolves around the development of datasets and coding (Soleimani et al, 2022), this study will focus on the development and post-development stages. As a whole, the development stage is concerned with knowledge sharing between AI developers and HR managers in order to design ethically responsible AI recruitment tools (Soleimani et al, 2022). The knowledge of HR managers in relation to job functions and criteria could help AI developers in regards to the labeling of data and the training of algorithms in the development stage (Soleimani et al, 2022; Miller, 2022; Charlwood & Guenole, 2020). Furthermore, as discussed in chapter 4.2, mitigating bias in AI recruitment tools goes further than simply AI development and requires human supervision and control. (Kelan, 2023; Chen, 2023; Mozelius et al, 2022). So, the post-development stage is equally as important as the development stage since it is based around the feedback and evaluation of the AI tools where human supervision is key (Soleimani et al, 2022; Chen, 2023; Kelan, 2023). In this stage, HR managers would be able to assess the AI systems concerning bias and fairness based on their own expertise. The decision-making framework developed by Bankins (2021), or the three-level rating system by IBM (2018) could even be leveraged to

assist the HR managers in properly evaluating the AI tools. Knowledge sharing between HR managers and AI developers is crucial in all stages in order to design ethically responsible AI assessment tools, which is why it is important to utilize stakeholder cooperation as a method to minimize bias and discrimination. As Soleimani et al (2022) states, “Bias is a really complex concept, and it cannot be solved technically. It has to be solved through communication and collaboration” (p. 22).

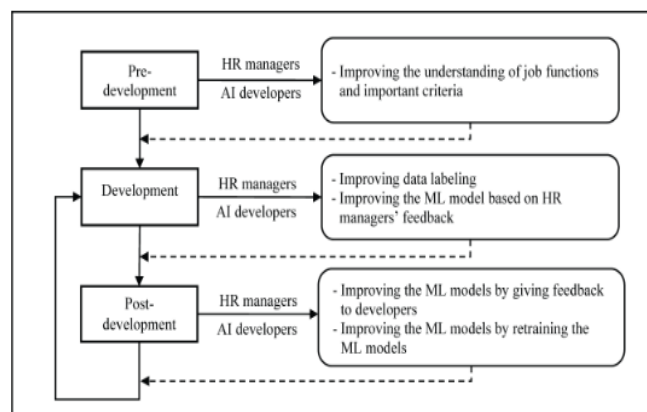


Figure 2: Knowledge sharing between AI developers and HR managers in the three stages of AI development (Soleimani et al, 2022, p. 12)

Designing and developing AI systems for hiring is a very technical task, one that needs professionals that are able to code such systems, but the programmers are not the only crucial stakeholders that should be involved in the overall design. It is essential that domain knowledge and specific industry expertise is present in the design of AI recruitment systems (Charlwood & Guenole, 2020; Soleimani et al, 2022; Miller, 2022). Experienced professionals have to combine their efforts with those who develop AI systems so that both parties can efficiently share knowledge with each other (Charlwood & Guenole, 2020; Ahn, 2022). The HR professionals share their expertise with the AI developers, while simultaneously gaining an immediate understanding of the AI systems that would be put into place. Apart from HR professionals cooperating with AI developers, all stakeholders that will be affected in any way by the AI would need to be involved if the AI systems were to be fair and ethical (Charlwood & Guenole, 2020). Additionally, one interview resulted in similar findings:

“What’s going to have to happen, is there is going to have to be a regular cadence of conversation between stakeholders where people are identifying when there are issues to address. Which means they are going to have to get together frequently and talk about it.” – Interviewee 1

5. DISCUSSION

5.1 Theoretical implications

The goal of this study was to research how we can ensure that the AI tools used for recruitment were to be ethically responsible, unbiased, and fair. Following the set goal, the study focused on minimizing bias and discrimination in AI recruitment tools as per the first stream of fairness discussed by Ahn (2022). Based on the systematic literature review and the additional expertise provided by the expert interviews, it has become clear that a complete solution to the issue of bias and discrimination within AI recruitment tools is a seemingly

impossible task. However, even though a solution is a farfetched concept, the idea of minimizing bias and discrimination is more likely to be possible. In order to discuss this topic properly the development stage and the post-development stage, discussed by Soleimani et al (2022), have been used as a foundation to recommend the methods that will help in ensuring ethically responsible AI recruitment tools. These two stages will be leveraged in the recommendations, because it helps paint a much clearer picture of the steps that could be taken to minimize bias and discrimination in AI recruitment tools. Furthermore, chapter 4.1 in the results section focuses on the diverse ways AI can be leveraged for recruitment: Outreach, screening, assessment, and facilitation (Hunkenschroer & Luetge, 2022; Black & Esch, 2020; Oswal et al, 2020; Johansson & Herranen, 2019). Since the research focuses on minimizing bias in AI recruitment tools, the following discussion and recommendations can be applied to any of these AI systems. Since all of these AI tools are based on code and historical data, there is no need for recommending different plans of action for each of these tools (Chen, 2023; Hunkenschroer & Luetge, 2022). However, as discussed in chapter 4.1.4, leveraging AI for facilitation does not pose any ethical concerns regarding bias and discrimination and thus can be omitted from the following recommendations (Black & Esch, 2020).

5.1.1 Development

Firstly, it has become clear that stakeholder involvement and cooperation is key to ensuring ethically responsible AI-HRM tools for recruitment (Ahn, 2022; Charlwood & Guenole, 2020; Soleimani et al, 2022; Miller, 2022). Designing and maintaining AI recruitment tools that portray a minimal amount of bias can only be done by involving HR managers and AI designers in the design process as to ensure all relevant expertise is utilized to its fullest extent (Charlwood & Guenole, 2020). Leveraging this concept of stakeholder cooperation makes sure that the design of AI recruitment tools is being overseen by multiple individuals and groups with varying skills and perspectives. Having too few individuals, with similar skillsets and expertise, on board to design AI recruitment tools can easily result in AI systems that mimic inherent biases from these individuals (Figueroa-Armijos et al, 2022; Kelan, 2023 & IBM, 2018). Involving AI designers and HR managers in the design process would work as a method to ensure that no one individual is able to, intentionally or unintentionally, transfer their own ideologies and biases onto these AI systems (Soleimani et al, 2022; Ahn, 2022). Although stakeholder cooperation is a first step to minimizing bias, it should not be the only method used. Before implementing the AI recruitment systems, it is important to set standards and guidelines for the use of these systems. Once the design process has been finalized and the AI tool is ready to be deployed, it is crucial to compare the system to a set of questions to evaluate its use and fairness (Bankins, 2021 & IBM, 2018). As discussed in chapter 4.2, interviewee #2 argued that the people who evaluate the AI systems need to understand what questions to ask. The two different sets of three questions developed by Bankins (2021) and IBM (2018) have been used as a foundation to create a new set of questions to evaluate the first stream of fairness as discussed by Ahn (2022) and the concepts of fairness discussed by Mujtaba & Mahapatra (2019).

Question 1 (Demographic Parity): Does the AI system show equal acceptance rates across different groups (ethnicity, gender, sexual orientation)?

Question 2 (Individual Fairness): Does the AI system show

consistent results across similar individuals that are from a different group (ethnicity, gender, sexual orientation)?

Question 3 (Counterfactual Fairness): Are the outputs of the AI system explainable for the task it performs?

Lastly, when these questions can all be answered with “YES” the last step in the prevention phase can be performed. In order to ensure ethical and proper use of the implemented AI recruitment tools, user guidelines need to be developed and published (Bankins, 2021). These guidelines will outline how employees should use and rely on the AI tool.

5.1.2 Post-Development

Even if the methods in the development stage seemed to have had successful results, the process should not stop there (Soleimani et al, 2022). Monitoring and evaluating the AI systems on a regular basis is important to make sure that the steps that were made in the prevention stage end up working in reality (Kelan, 2023; Chen, 2023; Bankins, 2021; Mozelius et al, 2022). The post-development phase could be seen as even more important than the development phase, as a full eradication of bias and discrimination in AI recruitment tools seem to be unlikely. First of all, a leadership team that oversees and evaluates the AI tool regularly should be instated to monitor the performance of the AI system (Bankins, 2021; Chen, 2023; Kelan, 2023). The monitoring of the AI systems should be done by evaluating these systems against the questions outlined above in 5.1.1. The reasoning behind this, is that even though the AI system might have passed those questions at first and did not seem biased, that does not mean those systems cannot introduce biases later on. AI systems could still create and introduce new biases themselves, which shows how important it is that constant evaluation is conducted. (Manyika et al, 2019; Drage & Mackereth, 2022). Furthermore, because of the need for stakeholder cooperation and the sharing of knowledge between these stakeholders, the evaluation and monitoring of AI recruitment tools should be conducted by a diverse leadership team consisting of various stakeholders with varying expertise (Charlwood & Guenole, 2020; Soleimani et al, 2022). According to the expert interviews, stakeholders need to come together regularly in order to evaluate the AI tools by sharing different perspectives and skillsets. Lastly, human control and decision making is still extremely vital in the usage of AI recruitment tools (Chen, 2023; Mozelius et al, 2022). The decisions made by the AI tools should not immediately be accepted without second thought, but should be evaluated and approved by humans. The entire post-development stage revolves around evaluating and assessing the AI recruitment tools while they are being used, and knowledge sharing between the HR managers and AI developers is still extremely vital (Chen, 2023; Soleimani et al, 2022). The results of the evaluations by the HR managers that use the AI tools, thus, need to be shared with the AI designers that develop them. The feedback given by the HR managers is incredibly important as it can assist the AI designers in improving the algorithms constantly (Soleimani et al, 2022). Using the methods discussed in the development and post-development stages should help in minimizing bias and discrimination in AI recruitment tools. But, once again, a complete solution to the issue of bias and discrimination is unfortunately not likely.

5.2 Practical implications

In order to successfully involve all stakeholders in the design of AI recruitment tools, it should be discussed how organizations

can go about doing this. Firstly, the relevant stakeholders should attend workshop sessions in regard to the design of the AI tools where they are able to share their knowledge, specific expertise and personal perspectives. The idea of utilizing workshops to design ethically responsible AI tools for recruitment are based on the studies by Ahn (2022) and Soleimani et al (2022) and the expert interviews, from which it was clear that such workshops are needed in the design of AI systems. These workshops would function as an event where all stakeholders can share their knowledge and perspectives in order to develop a design framework where all relevant ethical considerations are incorporated. These workshops are recommended to be held weekly until the AI tools are ready to be implemented, since constant evaluation is a necessity to ensure these tools to be unbiased and fair (Kelan, 2023; Chen, 2023; Soleimani et al, 2022; Bankins, 2021). The workshops should include the HR managers and AI designers, while also including some employees that could bring in an outside perspective. According to Charlwood & Guenole (2020), it can be beneficial to receive perspectives from individuals who are not necessarily experts in the field, but are nonetheless affected by the implementation of AI recruitment tools. Secondly, in order to evaluate the AI tools according to the questions provided in 5.1.1 it is important to run a minimum of 100 tests as to increase the accuracy of the results (Mujtaba & Mahapatra, 2019). Apart from the number of test it is also crucial to test individuals from different groups against each other, since the tests would revolve around equal acceptance rates and consistent results across genders, ethnicities or sexual orientation. For the first question, individuals from different groups need to be tested in the AI recruitment tools in order to get a result that can answer the question. For the second question, on the other hand, it is important to test results based on individuals that are very similar while only differing in their group (ethnicity, gender, sexual orientation). During the post-development phase, monitoring and evaluating the AI recruitment tools against the questions proposed in 5.1.1 should be done on a weekly basis, just as the workshops that were conducted in the development stage. The diverse leadership team composed of differing stakeholders would have to come together and evaluate the AI tools in these consistent, regular intervals (Kelan, 2023; Chen, 2023; Mozelius et al, 2022). Lastly, the human control should be done by varying individuals or groups and not just by one person. As discussed before, confiding in one individual or group can result in the transfer of inherent biases those individuals or groups portray (Bogen, 2019; Figueroa-Armijos et al, 2022; IBM, 2018; Black & Esch, 2020). Thus, it is important to regularly change the individual or group that is tasked with controlling the decisions that the AI recruitment tool makes.

5.3 Limitations

The research on the design of ethically responsible AI tools for recruitment has provided important considerations and recommendations. However, the research was not without any limitations. Firstly, since the field of AI and recruitment technology is relatively new and rapidly evolving (Hunkenschroer & Luetge, 2022) this research could become outdated as technology and new practices develop over time. It is vital for researchers and professionals in the field of HR and AI to stay up to date with the newest developments in order to adapt their design framework accordingly. Secondly, while this study recommends a plan of action to ensure the design of ethically responsible AI recruitment tools, implementing these steps might pose challenges in the real world. Limitations in

resources and the willingness of stakeholders to participate in workshops could provide issues for organizations as this study does not address implementation challenges organizations might face. Furthermore, these results of this study may be specific to the context in which the research was conducted. Whether or not the recommendations would be effective might vary across organizations or cultures. Lastly, since the topic of AI in recruitment is fairly novel, only a limited amount of literature was able to be found and deemed relevant to the research. Because of this, the additional expert interviews were necessary to collect further information about the topic of ethically responsible AI-HRM tools for recruitment. However, since only two expert interviews were conducted, it is important to state that further research needs to be conducted to validate the findings of this study.

6. CONCLUSION

This goal of this research was to answer the research question of “*How can we ensure that AI-HRM tools for recruitment are ethically responsible regarding bias, discrimination, and fairness?*” The systematic literature review that was conducted shed light on the ethical concerns associated with the use of AI in recruitment. The findings of the literature review clearly highlight the potential presence of bias and discrimination in AI-HRM tools for recruitment, which emphasized the need for research to be conducted on how to minimize these biases. It is clear that completely solving the issue of bias and discrimination is almost impossible, but the findings indicate that some methods can be used to minimize these biases. Stakeholder cooperation, human supervision, and sticking to a comprehensive decision-making framework should help organizations in minimizing bias and discrimination in AI recruitment tools. This study contributes to existing literature by filling the gap in research around ethical AI in recruitment and provides practical recommendations to organizations to design fair and unbiased AI recruitment tools.

7. REFERENCES

- *Ahn, Daehwan. (2022). Designing Fair AI in Human Resource Management: Understanding Tensions Surrounding Algorithmic Evaluation and Envisioning Stakeholder-Centered Solutions. 10.1145/3491102.3517672.
- Albert, E.T. (2019), "AI in talent acquisition: a review of AI-applications used in recruitment and selection", *Strategic HR Review*, Vol. 18 No. 5, pp. 215-221. <https://doi.org/10.1108/SHR-04-2019-0024>
- Alsaawi, A. (2014). A Critical Review of Qualitative Interviews. *European Journal of Business and Social Sciences*, Vol. 3, No. 4, pp 149-156. <http://dx.doi.org/10.2139/ssrn.2819536>
- *Bankins, S. The ethical use of artificial intelligence in human resource management: a decision-making framework. *Ethics Inf Technol* **23**, 841–854 (2021). <https://doi.org.ezproxy2.utwente.nl/10.1007/s10676-021-09619-6>
- *Bhatt, P. (2022). AI adoption in the hiring process – important criteria and extent of AI adoption.
- *Black, J & Esch, P. (2020). AI-enabled recruiting: What is it and how should a manager use it? *Business Horizons*, Vol. 63 No 2, pp. 215-226. <https://doi.org/10.1016/j.bushor.2019.12.001>
- *Bogen, M. (2019). All the Ways Hiring Algorithms Can Introduce Bias. *Harvard Business Review*. [All the Ways Hiring Algorithms Can Introduce Bias \(hbr.org\)](https://hbr.org/all-the-ways-hiring-algorithms-can-introduce-bias)
- Capoot, A. (2023, January 23). Microsoft announces new multibillion-dollar investment in ChatGPT-maker OpenAI. Retrieved from CNBC: <https://www.cnn.com/2023/01/23/microsoft-announces-multibillion-dollar-investment-in-chatgpt-maker-openai.html>
- *Charlwood, A & Guenole, N. (2022). Can HR adapt to the paradoxes of artificial intelligence. *Human Resource Management Journal*. <https://doi.org.ezproxy2.utwente.nl/10.1111/1748-8583.12433>
- *Chen, Z. Collaboration among recruiters and artificial intelligence: removing human prejudices in employment. *Cogn Tech Work* **25**, 135–149 (2023). <https://doi.org.ezproxy2.utwente.nl/10.1007/s10111-022-00716-0>
- Dastin, J. (2018, October 11). Amazon scraps AI recruiting tool that showed bias against women. Retrieved from Reuters: <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G>
- *Drage, E., Mackereth, K. Does AI Debias Recruitment? Race, Gender, and AI's "Eradication of Difference". *Philos. Technol.* **35**, 89 (2022). <https://doi.org/10.1007/s13347-022-00543-1>
- Enholm, I.M., Papagiannidis, E., Mikalef, P., Krogstie, J. (2021). Artificial Intelligence and Business Value: A Literature Review. *Information Systems Frontiers*.
- *Fernández-Martínez, C. & Fernández, A. (2020). AI and recruiting software: Ethical and legal implications. *Paladyn*, *Journal of Behavioral Robotics*, 11(1), 199-216. <https://doi.org/10.1515/pjbr-2020-0030>
- *Figueroa-Armijos, M., Clark, B.B. & da Motta Veiga, S.P. Ethical Perceptions of AI in Hiring and Organizational Trust: The Role of Performance Expectancy and Social Influence. *J Bus Ethics* (2022). <https://doi.org.ezproxy2.utwente.nl/10.1007/s10551-022-05166-2>
- *Hunkenschroer, Anna & Lütge, Christoph. (2022). Ethics of AI-Enabled Recruiting and Selection: A Review and Research Agenda. *Journal of Business Ethics*. 178. 10.1007/s10551-022-05049-6.
- *Johansson, J.V., & Herranen, S. (2019). The application of Artificial Intelligence (AI) in Human Resource Management: Current state of AI and its impact on the traditional recruitment process.
- *Kaur, G & Kaur, R. (2022). A Critical Review of Human Resource Functions Using AI Technologies. *AIP Conference Proceedings*, 2555, 020004. <https://doi.org.ezproxy2.utwente.nl/10.1063/5.0108980>
- *Kelan, E. (2023). Algorithmic inclusion: Shaping the predictive algorithms of artificial intelligence in hiring. *Human Resource Management Journal*. <https://doi.org.ezproxy2.utwente.nl/10.1111/1748-8583.12511>
- *Köchling, A., Riazy, S., Wehner, M.C. et al. Highly Accurate, But Still Discriminatory. *Bus Inf Syst Eng* **63**, 39–54 (2021). <https://doi.org/10.1007/s12599-020-00673-w>
- *Köchling, A., Wehner, M.C. & Warkocz, J. Can I show my skills? Affective responses to artificial intelligence in the recruitment process. *Rev Manag Sci* (2022). <https://doi.org/10.1007/s11846-021-00514-4>
- *Li, L., Lassiter, T., Oh, J., Lee, M.K. (2021). Algorithmic Hiring in Practice: Recruiter and HR Professional's Perspectives on AI Use in Hiring.
- *Manyika, J., Silberg, J., Presten, B. (2019). What Do We Do About the Biases in AI? *Harvard Business Review*. <https://hbr.org/2019/10/what-do-we-do-about-the-biases-in-ai>
- *Miller, G. J. (2022). Stakeholder roles in artificial intelligence projects. *Project Leadership and Society*, 3, 100068. <https://doi.org/10.1016/j.plas.2022.100068>
- *Mozelius, P., Jama, A., Castberg, A. (2022). Would you like to have your social skills assessed by a Softbot? AI-Supported Recruitment Processes. *Academic Conferences International*, Vol. 4 No. 1 (2022). <https://doi.org/10.34190/eciair.4.1.926>
- *Mujtaba, Dena & Mahapatra, Nihar. (2019). Ethical Considerations in AI-Based Recruitment. 1-7. 10.1109/ISTAS48451.2019.8937920.
- OpenAI. (2023, March 14). GPT-4. Retrieved from <https://openai.com/research/gpt-4>
- *Nidhi Oswal, Majdi Khaleeli, & Ayman Alarmoti. (2020). RECRUITMENT IN THE ERA OF INDUSTRY 4.0: USE OF

ARTIFICIAL INTELLIGENCE IN RECRUITMENT AND ITS IMPACT. PalArch's Journal of Archaeology of Egypt / Egyptology, 17(8), 39-47. Retrieved from <https://archives.palarch.nl/index.php/jae/article/view/1113>

Sankaran, V. (2023, March 14). Microsoft lays off team responsible for ethical AI development. Retrieved from Independent: <https://www.independent.co.uk/tech/microsoft-layoff-ai-ethics-team-b2300237.html>

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of Business Research, Vol. 104, pp. 333-339. <https://doi.org/10.1016/j.jbusres.2019.07.039>

*Soleimani, M., Intezari, A., & Pauleen, D. J. (2022). Mitigating Cognitive Biases in Developing AI-Assisted Recruitment Systems: A Knowledge-Sharing Approach. International Journal of Knowledge Management (IJKM), 18(1), 1-18. <http://doi.org/10.4018/IJKM.290022>

European Commission. (2019, April 8). Ethics Guidelines for trustworthy AI. Retrieved from <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>

8. APPENDIX

8.1 Literature Matrix (Literature used in the SLR)

Author	Research Title	Methodology	Ethical Concerns in AI-HRM	AI Recruitment Tools	Mitigating Bias in AI Recruitment	Stakeholder Cooperation	Most Important Findings
Ahn (2022)	Designing Fair AI in Human Resource Management: Understanding Tensions Surrounding Algorithmic Evaluation and Envisioning Stakeholder-Centered Solutions	Stakeholder-centered participatory workshops (employees, employers/hr, teams, AI/business experts) Interviews	Y	N	N	Y	Five major tensions surrounding use of AI in HRM: Perspectives on fairness, accuracy of AI, transparency of algorithms and decision process, interpreting of AI decisions, trade-off between inhumanity and productivity The two streams of fairness Promote harmony between stakeholders > only way to design fair AI for HRM
Bankins (2021)	The ethical use of artificial intelligence in human resource management: a decision-making framework	Construction of decision-making framework: Literature review	Y	Y	Y	Y	Decision-making framework to support ethical AI in HRM: - Assessing task-technology fit with key questions - organizational value-setting
Bhatt (2022)	AI adoption in the hiring process – important criteria and extent of AI adoption	This research explores three studies to explore criteria for AI adoption decisions Two multi criteria decision-making techniques	N	Y	N	N	Methods in how AI can be used in recruitment: sourcing, screening Information security and return on investment two most important criteria for AI adoption

Black & Esch (2020)	AI-enabled recruiting: What is it and how should a manager use it?	Literature review	Y	Y	Y	N	Challenges of AI-based hiring in regard to historical data and bias, privacy, providing transparency. Trade-offs between benefits and risks with AI recruitment
Bogen (2019)	All the Ways Hiring Algorithms Can Introduce Bias	Literature review	Y	Y	N	N	Ethical concerns, bias surrounding the specific ways AI can be used in recruitment.
Charlwood & Guenole (2022)	Can HR adapt to the paradoxes of artificial intelligence	Literature review	N	Y	N	Y	Stakeholder cooperation is essential to designing fair AI recruitment systems
Chen (2023)	Collaboration among recruiters and artificial intelligence: removing human prejudices in employment	Semi-structured interviews with three target groups: recruiters, managers, applicants.	Y	Y	Y	Y	Different type of AI applications in recruitment Perceptions from stakeholders in regard to ai recruitment Addressing concerns around fairness, privacy, cost issues Recommendations for implementing AI recruitment
Drage & Mackereth (2022)	Does AI Debias Recruitment? Race, Gender, and AI's "Eradication of Difference".	Analysis of marketing and promotional materials / statements by companies Literature review	Y	Y	Y	N	AI doesn't really debias recruitment AI systems are still biased even if you think gender or race is removed from the equation

Fernández-Martínez & Fernández (2020)	AI and recruiting software: Ethical and legal implications	Literature review	Y	Y	Y	Y	Ethical and legal implications to using AI in the field of HR Pros and cons of video / image analysis in recruitment Bias and discrimination with AI recruitment
Figueroa-Armijos et al (2022)	Ethical Perceptions of AI in Hiring and Organizational Trust: The Role of Performance Expectancy and Social Influence	Collection of primary data from 300 individuals with recent hiring experience Exploratory factor analysis, confirmatory factor analysis to investigate factor structure of hiring models Structural equation modeling to test hypothesis	Y	Y	N	N	AI recruitment tools can be biased through the historical data used to train them > biased historical data results in biased AI recruitment systems
Hunkenschroer & Luetge (2022)	Ethics of AI-Enabled Recruiting and Selection: A Review and Research Agenda	Systematic literature review	Y	Y	N	N	Different ways AI is being used in recruitment: Outreach, screening, assessment and facilitation Mapping of ethical considerations regarding AI recruitment
Johansson & Herranen (2019)	The application of Artificial Intelligence (AI) in Human Resource Management: Current state of AI and its impact on the traditional recruitment process	Literature review Online questionnaires Interviews	Y	Y	Y	N	Four main themes identified: effectiveness in recruitment process, applications of ai in recruitment, benefits and the challenges of ai, human error and bias

		Thematic analysis of the data					
Kaur, G & Kaur, R (2022)	A Critical Review on Analysis of Human Resource Functions Using AI Technologies	Review based descriptive study from secondary data Literature review	N	Y	N	N	AI can positively impact HR, discusses various applications of AI in HR (recruitment, performance management, rewards management, employee engagement etc.) AI brings transparency, cost-effectiveness and decisions driven by objective data Focuses mostly on the benefits of AI in HR and not really on the downsides. Good study to understand the upsides relative to the studies that discuss the downsides
Kelan (2023)	Algorithmic inclusion: Shaping the predictive algorithms of artificial intelligence in hiring	Literature review	Y	Y	Y	N	Recommendations to minimize bias in AI recruitment systems: Conduct assessments, audit ai regularly and refresh ai systems on a regular basis
Köchling et al (2021)	Highly Accurate, But Still Discriminatory	Analysis of pre-existing data of 10,000 video clips of individuals through algorithms	Y	Y	N	N	Algorithmic decision making through AI recruitment can lead to discriminatory outcomes if the dataset is unbalanced.

							Warns organizations that implementing AI video analysis could result in biased outcomes
Li et al (2021)	Algorithmic Hiring in Practice: Recruiter and HR Professional's Perspectives on AI Use in Hiring	Interviews with 26 participants. Thematic analysis to code responses from interviews	Y	Y	Y	Y	Applications of AI software in recruitment Concerns regarding AI in recruitment Understanding of implications and limitations of using AI in recruitment
Manyika et al (2019)	What Do We Do About the Biases in AI?	Report (based on literature)	Y	Y	Y	N	Bias in AI recruitment Defining fairness: Counterfactual fairness Steps to mitigate bias in AI recruitment
Miller (2022)	Stakeholder roles in artificial intelligence projects	Systematic literature review with thematic analysis	N	N	N	Y	Inclusive stakeholder approach is needed for ethical, morally sound and sustainable systems in AI Provides guidance for stakeholders in AI projects
Mozelius et al (2022)	Would you like to have your social skills assessed by a Softbot? AI-Supported Recruitment Processes	Qualitative review with semi-structured interviews	Y	Y	Y	N	The study recommends a hybrid solution where the AI recruitment tool works in tandem with humans. AI recruitment needs to be more transparent and explainable and

		<p>Purposive and snowballing sampling techniques > 6 interviewees</p> <p>Data analysis done through thematic analysis</p>					should be used as a support tool instead of a decision-making tool
Mujtaba & Mahapatra (2019)	Ethical Considerations in AI-Based Recruitment	Literature review	Y	Y	Y	N	<p>Biased data results in biased AI recruitment tools</p> <p>Definitions of fairness: Demographic parity, accuracy parity, predictive rate parity, individual fairness and counterfactual fairness</p>
Oswal et al (2020)	RECRUITMENT IN THE ERA OF INDUSTRY 4.0: USE OF ARTIFICIAL INTELLIGENCE IN RECRUITMENT AND ITS IMPACT	Literature review of theoretical frameworks, conceptual papers, peer-reviewed journals and websites	N	Y	N	N	<p>This study dives into the ways AI can be used in recruitment and the benefits it brings</p> <p>Does not talk about the ethical concerns or the bias present in these systems</p>
Soleimani et al (2022)	Mitigating Cognitive Biases in Developing AI-Assisted Recruitment Systems: A Knowledge-Sharing Approach	Exploratory research design > interviews with 35 HR managers and AI developers	Y	Y	Y	Y	<p>Stakeholder cooperation is key to designing fair AI systems for recruitment</p> <p>3 stages of AI development: pre-development, development and post-development</p>

8.2 Interview Questions

Question 1: What is your educational background

Question 2: What are some AI projects that you have completed or are working on?

Question 3: In your opinion, what are the biggest ethical concerns related to implementing AI in the field of HR?

Question 4: Is there a way to minimize bias in AI recruitment tools and if so, how?

Question 5: According to some studies, ethically responsible AI can only be achieved by constant stakeholder cooperation. How do you think stakeholder cooperation can result in ethically responsible AI-HRM systems?

Question 6: What steps do you take to regularly monitor and evaluate the performance of AI systems used in HR processes to ensure they align with ethical standards?

Question 7: If an AI recruitment tool is implemented, should the outcomes of the tools be evaluated by human and why?

Question 8: In your opinion, what are the most important ethical values that should be implemented in AI recruitment tools?