



## Artificial Intelligence Applications in the recruitment process opportunities and challenges

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### Abstract

Technology has long played an important role in the recruitment industry, helping to save costs while increasing efficiency (Okolie, 2017, Singh, 2003). Recruitment, as it currently exists, is just 16% effective, according to the US Department of Labor (ClearFit, n.d.). If it is like this, then implementing AI could allow for substantial enhancements to be made. Bullhorn (2018) claims that these preliminary enhancements will have an impact on finding and screening of applicants during the initial phases of the recruiting process.

Two different types of studies were conducted to determine how much of an effect AI could have on the hiring process. Five specialists in distinct areas of hiring and AI were interviewed using semi-structured interviews. Experts in the subject of AI in HRM were observed at a roundtable discussion to identify and dissect the most pressing issues and topics of discussion.

At the end of this study, a novel approach to hiring is proposed. This method allows human resources teams to optimize the efficiency and efficacy of talent acquisition despite integrating substantial technological and structural innovation in the recruiting process.

**Keywords:** Candidates, Employers, Technology, Human Resources, Recruitment, Artificial Intelligence

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## 1. Introduction

### 1.1. The Problem & Opportunity

Historically, technological advancements have allowed recruiters to handle more applicants while providing a better experience for both job seekers and businesses (Okolie, 2017 & Singh, 2003). The fact that AI is being called "game-changing for HR" (May, 2016, p.6) hints at the fact that it may have both good and bad effects. The most recent change in the recruiting sector was the advent of the internet, which enabled global e-recruitment techniques and led to an increase in applications for opportunities around the world (Okolie et al, 2017). Candidates who preferred to keep their personal and professional lives distinct expressed concern over the trend of companies getting a broad range of information points from increasingly personal sources, like social media (Quast, 2012).

While the idea of artificial intelligence has been around for decades, it is only in recent years that it has begun to take shape in the actual world. Previous examples of AI with cognitive abilities on par with humans, such as IBM's Watson, have demonstrated the technology's promise (IBM, 2016). The rapid advancement of AI-related technologies has had far-reaching consequences across a variety of sectors, as it has the potential to complement and even replace a wide range of manual and cognitively-focused roles (Campolo et al, 2017). This helps businesses get rid of work that is boring, monotonous, or rife with room for error owing to ambiguity (Singh, 2017). It's impossible to do any of this without data, and between 2013 and 2015, more data was created than by all of humanity in all of history before to that time (Marr, 2015).

## 2. Literature Review

### 2.1 Introduction

To far, there is a dearth of scholarly work that dissects the precise impact that AI will have on the staffing sector. This analysis will be holistic in nature, with the goal of gaining fresh insights on the topic at hand (Saunders et al, 2016). Both professional sources and academic literature have been consulted to broaden the scope of this review. The first reason is because the field of AI is extremely dynamic, which has led to the academic literature falling behind. Second, human resources are an area rarely studied in universities, making professional reports more appropriate for the topic. Thematic analysis was performed to assemble a qualitative assessment of these resources. These ideas are drawn from discussions in the research literature about the potential effects of AI on the recruitment process, both for job seekers and for businesses.

Artificial intelligence is applied based on the level of intelligence that the company requires. Due to AI's capacity for self-learning, organizations make sure that access is restricted to only what is necessary and not to sensitive areas that would allow them to completely control a process and create a network environment that would be difficult for employees to understand and use for organizational operations (Haenlein and Kaplan, 2019). In order to determine the user's emotional state, natural language processing (NLP) recognizes the speech, repeats it with the same pitch and tone, and hears differences in the words. Determine the user's level of stress and take the appropriate interactive actions to reduce that level and provide a stress-free working environment. Moreover, the terms are also translated from one language to another. Classification, translation, response, and speech production are more divisions of NLP.

The modernization of functioning brought about by technological advancements in the communications sector that efficiently assess hiring criteria like speed, quality, and cost advantage and evaluate employees based on their potential and abilities has changed how humans and machines perceive and interact with one another (Vardarlier and Zafer, 2020).

These are:

- Technicalities and Opportunities
- Bias and Inclusion
- Risks and Limitations

## 2.2 Technicalities and Opportunities

The anticipated economic impact and notable characteristics of AI technologies are discussed in King et al.(2017) 's research paper. In their analysis of Deep Learning's effects, King et al. (2017) highlight the role played by three foundational technologies: Machine Vision, Natural Language Processing, and Object Identification. It's not just that robots can process data sets more quickly; they can also detect patterns in extremely vast data sets that people would have trouble connecting. LeCun et al. (2015) emphasise the importance of Natural Language Processing (NLP) to Deep Learning. With the availability of large data, the rate at which Deep Learning can process the information its creators have given it is increasing at a staggering rate. According to Frey et al. (2013), "Affective Computing" ideas have advanced to the point where they include social intelligence on par with that of humans into computer systems. Because of this, social duties like negotiating, persuading, and caring can be performed in real time, which is why more than 85% of participants to a recent poll on the use of AI in recruiting think that evaluation centers, interview scheduling, finding applicants, and finally on-boarding new staff may all be computerized (Pröhm et al, 2017). As a result, businesses are retooling drastically to take advantage of the early adopters' competitive edge and keep up with the rapid development of AI (Chitkara et al., 2017; CognitionX, 2017).

## 2.3 Bias and Inclusion

According to Campolo et al. (2017), who take a critical approach to analysing AI's economic and social effects, the fact that ML systems are utilising current data points to make judgments could lead to transmitting and perpetuating ethnic and gender-based prejudice. However, Wishkirchen et al. (2017) argue that adopting AI for hiring purposes will eliminate bias because it will only consider objective data and not take into account candidates' subjective experiences or opinions. Video analysis systems are one example of a new type of employment tool that uses data rather than gut instinct to promote inclusion and diversity by reducing the influence of implicit bias (Poitevin et al, 2017 & PwC, 2017).

## 2.4 Risks and Limitations

Raviproflu (2017) gives serious thought to AI's potential impact on HR, but he also notes that several obstacles stand in the way of its widespread use at the moment. For one, AI systems need access to vast quantities of high-quality data in order to function; second, the psychological profiles of job applicants are notoriously difficult to decode. Unless data is used, AI is just a theory, as Yano (2017) points out. There is a concern that businesses would choose cheaper, less valid data sets that are not representative of the general population in order to train AI programmes, as noted by Campolo et al. (2017) in light of the trend toward protecting data sets. If the data is accurate, as Bafaro et al. (2017) describe, an ML software may need to look at several years' worth of succession information before it can properly identify success variables. Even though Wishkirchen et al. (2017) is in favour of using AI in the hiring process, they do acknowledge that these systems are not perfect. Another data challenge is the General Data Protection Regulation (GDPR), which will have significant effects on the human resources industry as an estimated 80% of businesses are not in compliance with the rules (Chaker, 2018). Yet, according to IBM (2016), the advantages of AI much outweigh the drawbacks that have been discussed. Raviproflu (2017) echoes this

sentiment, arguing that advanced AI systems are still far from having human-like communication skills. In agreement with this view is the conclusion drawn by Tandon et al. (2017), namely that the impact of AI will not lead to complete automation of the procedure.

## 2.5 Conceptual Framework

The format of the literature review provides a clue that three main ideas underpin this study. These are broken down into "Risks and Limitations," "Bias and Inclusion," and "last Technicalities and Opportunities." Both the "Risks and Limitations" and the "Technicalities and Opportunities" sections might have room for the issue of "Bias and Inclusion." However, this subfield has been split apart because the literature in it is so divisive, with proponents and detractors holding almost equal numbers of words.

There appears to be a wealth of information available in AI-specific scholarly literature detailing the nuts and bolts of AI. Therefore, the fundamentals of the technology will not be a focus of any primary research, which will instead look at its potential uses, advantages, and benefits in the context of the hiring process. Since there is substantial disagreement among professional and academic sources in the remaining categories, these themes will form the focus of this investigation.

- Theme no 1: Risk and Limitations
- Theme no 2: Bias and Inclusion
- Theme no 3: Opportunity

## 3. Research Methods and Data Collection

Three study strategies were employed to elucidate the effects of AI on the recruitment process from the perspectives of both companies and job seekers. The following are the ones that stand out.

Methodology for Research	Audience Intended	Considering the Theme
Discussions and Interviews	Professional Recruiters and Individuals Trained in AI	Theme 1 Theme 2 Theme 3
Analysis of Observed Events	Specialists in Artificial Intelligence and Human Resources	Theme 1 Theme 2 Theme 3

### 3.1 Interviews

Each and every one of the interviews was only half-structured. This opened the door for exploration into new directions within the field, ultimately leading to the discovery of connections between AI and the hiring process that had not been previously explored. This provided a fresh perspective on three highly contentious issues in the current literature. The purpose of this exploratory study was to better understand the market as a whole. Every participant gave their informed consent after being given information about the interviews and the research project topic (Bradburn et al, 2004). Every participant in this study verbally consented to their participation. Semi-structured interviews have drawbacks, the most significant of which being that the lack of framework permits the interviewer to inject their own biases. When evaluating potential sources of bias, it is important to take into account the authors' and interviewees' familiarity with the recruitment sector. This may have an impact on the interviewer's ability to ask impromptu questions. We took special precautions to avoid asking leading questions that can influence respondents before they even respond

(Bradburn et al, 2004). The questionnaires were not identical across groups, but they did cover similar ground and were designed to allow respondents to provide answers that were appropriate to their area of expertise. Following the completion of the transcripts, a final assessment of the answers to questions was conducted to prevent bias; any questions that could have influenced the respondent's choice of answer were removed from consideration according to ABDELHAY, S. M. (2022).

we interviewed a group of "Recruitment Experts," who shared their extensive knowledge of the hiring process and suggestions for how AI could improve it. All of the people who filled out the recruitment form were upper-level employees, guaranteeing that the advice given was well-grounded in real-world practice. Large-scale graduate recruitment specialists and experts in filling executive-level positions were among the available options. This was helpful in pointing out the areas where AI still needs to interact with humans in the recruitment sector. Out of the nine responses, four have knowledge in this field.

### 3.2 Observation

Cognition X, a think tank specializing in the effects of AI on human resources, used an event it organized as the second research approach. The event started with two keynote speeches and then moved into a free-flowing discussion on the material presented. The group knew the author's research agenda as participants-as-observers. However, the author's involvement was valid because to prior experiences in the recruiting business and a preceding literature analysis that showed AI's anticipated impact (Saunders et al, 2012).

A recording of the conversation was made, and then excerpts from the recording were selected and annotated to provide a commentary on the individual contributions of the many participants. Narrative presentation allows for the establishment of essential issues in the sector at the present time, as well as comparison to previous studies. A panel discussion with all respondents and interviews with two specialists in HR and AI formed the basis for this study's observations. Any concerns that were voiced were categorised as either affecting the "Employer Experience" or the "Candidate Experience." During the break, we solicited comments from attendees on why they came and what they wanted to know. These inquiries were documented as component of the results to identify major topics of interest and anxiety. Inquiries like these prompted deeper thought on the topic at hand.

For researchers, observational research is a powerful tool for gathering information and drawing conclusions that would have been difficult to ascertain using more traditional approaches like interviews (Lancaster, 2005). The unique contribution of this study was the identification of latent factors and overarching themes (Clark et al, 2009) that are currently being thought about by businesses in the UK with respect to the use of AI in human resources. The event in which the participant-as-observer study was conducted was held by CognitionX, a company that specialises in AI research for both the public and private sectors (CognitionX, 2018). It is true that observer bias is more likely to occur in unstructured research (Lancaster, 2005). This risk was reduced by recording and then analysing the observation's audio. This allowed for multiple re-runs of the incident to be viewed for objectivity and to make sure no details were overlooked. This event's prologue explained the historical background of Cognition X and pointed out certain underlying tendencies.

## 4. Findings and Results

### 4.1 Interviews

four specialists were interviewed for this study. Rene Bolier, CEO of the data management platform OnRecruit, AI and Machine Learning may be used to automate and enhance the decision-making processes within the recruiting industry. The second specialist is Ilamaram Elangkathir who is Factory GM or in

US they call as Plant Manager. The third one is Ms. Aisha Al Jahoori, who is HR specialist in Umm Al Quwain University, the fourth one is Suresh Chandra and last one is Joshi Jignyasu.

Coding was utilized to analyze the recorded conversations. Due to the varied results from the interviews, the three themes of "Risk and Limitations," "Bias and Inclusion," and "Opportunity" that emerged from the literature research were examined but ultimately not implemented. These rules are based on the source material and reflect the original concepts. As a result of this system of classification, the examination of beliefs and information is now more tractable (Mills et al, 2014).

With respect to these interviews, the relevant codes and topical concerns are:

Code	Discussion	Theme Considerations
Constraints and Impediments	What's holding back AI's effect on hiring?	Theme 1
Data	The current state of the industry in terms of data quantity, quality, and accessibility.	Theme 1 Theme 3
Bias and Inclusion	The issue of whether or not the use of AI will mitigate existing biases is discussed.	Theme 2
CV Value	The subject of whether or not the most recognisable entity in the procedure is still necessary is being discussed.	Theme 3

## 4.2 Limitations and Barriers

Aisha Al Jahoori pointed out that AI can analyze data and replicate repetitive tasks to help recruiters, but it cannot take their place in fact, rather than replacing jobs in recruiting, AI is poised to give staffing and recruiting professionals more time to do the parts of their jobs that require human decision-making.

Suresh Chandra indicated that After implementation and being used for a while, when program designers moved on or left the company, the original logic used to write the learning was hard to decipher. For example, the resume matching system seemed to favor male candidates, but we were never able to understand why. We suspected it was because male candidates were more aggressive in selling their accomplishments using more elaborate terms.

Ilamran Elangkathir suggested that - Manufacturing is expecting quality and skillful people to manage the AI or niche processes where our human talent skill in this area is very limited. Most AI experts have migrated to other countries for better salary and benefits.

This really affects the recruitment process for most of the manufacturing or MNC. Either AI experts looking for a higher salary in the high end industry in most of the country. Human talent is unable to cope with AI skills where robust processes require much

Mr Kugan said that One of the main barriers to implementing AI is **the availability of data**. Data is often siloed or inconsistent and of poor quality, all of which presents challenges for businesses looking to create value from AI at scale. Another key roadblock to AI adoption is the **skills shortage** and the availability of technical staff with the experience and training necessary to effectively deploy and operate AI solutions Rahim, N. F. A., Sarkawi, M. N., Jaaffar, A. R., Shamsuddin, J., Salamzadeh, Y., & Abdelhay, S. M. (2022).



### 4.3 Bias and Inclusion

Aisha contends that A well-trained, data-centric model can effectively eliminate human bias. Although AI mimics and potentially amplifies human prejudice, when used correctly, it can help to eliminate unconscious bias and make data-driven decisions. AI tools use data points to source and evaluate candidates. Again my point of view will be different from other people but this is what I do believe

Surah said that The performance management system seemed to disadvantage small groups when calculating diversity ratios – especially when there a small number of people in one gender or race category. Again not fully understanding how the system was coded or was learning it was difficult to understand why

Ilamaran Elangkathir referred that Of course AI affects the recruitment process in bias and inclusion where the number of humans will be reduced and even need to hire certain people they have to compete with at least minimum 50% of the AI knowledge .These create a lot of

bias and inclusion should be considered compulsory to those who been hired or recruited for certain process with AI intervention. This is not so easy and it comes with certain prices and experience in AI knowledge.

Mr Kugan commented that AI to influence **Bias & Inclusion** in the recruitment in this three ways:

1. by promoting equal access to work opportunities;
2. assisting HR technicians and managers in making more equitable decisions;
3. by developing more diverse and inclusive work environments.

### 4.4 CV Value

For "virtually all roles," according to Bradshaw, "the CV is dead." Yet "the CV will linger at senior levels." While Hutchinson admits they've "lost their worth," he maintains that they're valuable for demonstrating "attention to detail." To counter this, Gray argues that "the ability to construct a CV... is a skill in itself" and that, from the candidate's perspective, relying solely on a CV is a "poor probability strategy," and that, from the employer's perspective, "you are probably missing out on some of the talent." According to Bolier, "reviews, testing, and situational assessments are going to be a lot more prevalent," all of which verify the details listed in the resume. Boiler also highlights how the value of a CV is decreasing in project-based, contract positions. In a similar vein, Lee implied as much when he said, "we are already seeing the allocation of labour using AI in the task economy," a setting in which culture has almost no role. Like Bradshaw, Firth thinks the CV is a bad tool for finding employment, but "it was the best we had at the time." Firth thinks that in the future, the curriculum vitae won't be a paper at all, but rather a short film. Maguire agrees that a resume is useful, but he adds that "it depends what industry sector you're looking at."

### 4.5 Opportunity

Aisha proposed that in regards of the AI in opportunity it can analyze data and replicate repetitive tasks to help recruiters, but it cannot take their place. In fact, rather than replacing jobs in recruiting, AI is poised to give staffing and recruiting professionals more time to do the parts of their jobs that require human decision-making

Suresh Chandra commented that In recruiting we had a system that could sort through resumes and identify key words to match them to open jobs that were posted within the company. That enables hiring managers to reach external candidates faster based on the system being able to match external candidates faster based on resume keywords like “Bios Engineer”, “Java programming”, “International Taxation

experience” etc. The performance management system would also provide tools to measure diversity between gender and race to ensure rewards and promotion were equitably distributed.

Ilamran Elangkathir concluded that If the industry has AI concepts/technology in their process, there is a huge opportunity for people who want to learn and add value to this area. I personally believe those who like to contribute and learn AI will benefit in the industry and this recruitment process

will benefit a lot of humans to become human talented as this is going to be the next milestone in most of the industry especially in MNC . It requires computer science, troubleshooting skills, problem solving and planning recommended by Abdelhay, S. M., Korany, H., & Elsayy, M. (2022).

Mr Kugan said that in simple words, recruitment can be understood as a process of searching and hiring the eligible candidate for the job. Over the years, companies have been facing many issues during the recruitment process and now with the integration of AI in the recruitment industries, companies can now quickly and easily hire candidates. For example, when a company posts information about new job vacancies their inbox gets flooded with job seeker’s applications. It becomes nearly impossible for companies to respond to each applicant and in this scenario, Artificial Intelligence becomes a solution that would be hugely valuable for companies

## 5. Results and Discussion

### 5.1 AI Barriers

All of the interviewers and the roundtable participants agreed that high-volume graduate roles are in a position where AI might automate a large piece of the process, if not the whole thing. According to Raphael (2016), Unilever has used this for its graduate programme with great success, cutting down on hiring time from four months to two. However, the survey results presented in this research reveal that potential employees strongly favour personal, in-person interviews. Lee argued that this finding stemmed from a problem with the way the data was collected, but it appears to be more of a cultural issue than Lee initially thought. An overwhelming majority of respondents to our candidate poll emphasised the significance of being treated with respect. Applicants feel devalued when the application process is automated, they say. This may cause some of the best candidates to self-filter out of the selection process before a recruiter ever gets a chance to evaluate them (Resource Solutions, 2017).

Review articles investigate the feasibility of implementation while taking into account barriers and influencing factors. They also represent the process's accuracy and authenticity. Artificial intelligence is the ability of computers to acquire human-like thought processes and automate human work, thereby increasing speed and accuracy (Geetha and Bhanu, 2018). By interacting with candidates, virtual assistants efficiently connect with them and evaluate them (R Vedapradha, R Hariharan, and Rajan Shivakami) (2019). A combination of AI and natural language technology improves human-computer interaction and automates the resume screening process, saving time during the recruitment process. Companies look for cost-effective and time-saving solutions when hiring. AI is almost everywhere in the economy (D S Rawat, general manager - ASSOCHAM, Robotics and artificial intelligence, 2017). The digital hiring process is improved by artificial intelligence, and chatbots are useful for conducting interviews and determining a candidate's compatibility.



## 5.2 AI Biases

Bias and exclusion are further areas of concern. The current body of literature predicts a bright future in which AI eradicates unconscious bias (Poitevin et al, 2017 & Randstad, 2018 & Wishkirchen et al, 2017 ). However, the increasing sophistication of AI means that it can now take into account not just a candidate's intelligence, but also their personality and social traits, in order to determine role fit, which has unintentionally given rise to new diversity challenges (Bradshaw & the roundtable discussion). In addition, technologically enhanced procedures can be discriminatory towards seniors who are uneasy with online procedures (Maguire). As indicated above, data sets play a significant role in this problem, but as Firth and West highlight, the resulting social streamlining is extremely risky. Because it raises diversity concerns and because corporate culture is increasingly important to success in today's tight labour market.

## 5.3 AI Opportunities

Intelligence augmentation, as proposed by Makridakis (2018) and Corless et al., looks to be the primary opportunity at the moment (2017). Synergy between the AI and the humans is achieved by their combined efforts. The process as a whole will be affected by the gradual, incremental change (Lee). Recruiters need not be concerned about AI; the technology is still in its infancy and poses minimal threat to human employment at this time. Because of the pressure to cut costs and increase productivity, some staffing agencies will inevitably try to find replacements for current employees suggested by Mohamed, S. M. (2022) . However, this will only be useful for a limited portion of the recruiting industry because to the overwhelming need from candidates for human connection before either accepting or rejecting a job offer.

## 5.4 The conclusion

This study shows that the application of human-computer interface and artificial intelligence improves the recruitment process and increases efficiency. AI helps eliminate major challenges such as bias, discrimination and personal preferences of recruiters and helps achieve equality by automating the hiring process to find the right person for the job.

By treating everyone the same way and accelerating During our interview process, AI questions are not really vet through or asked as this is one of the element in Industry 4.0 or automation resolution. Example, I am going to start an automation process where labor intervention is very minimum or eliminated but fully depending on one of the AI element of other elements since we are talking on AI. During this interview process we will tap on the potential candidate's capability in understanding on Industry 4.0 where AI is one of the element compare to other elements as mention above.

We don't go very specific on AI but we will explore their skill, potential of thinking process, experience, exposure and understanding on how AI will able to add value to the automation process that we are going to do. From this we will know this or that person has vast knowledge in AI where we can hire and provide them more in-depth training during the installation of the equipment with the vendors. I don't think all AI concepts is same for all equipment's, but it varies from process to process or equipment to equipment depending on what the manufacturing is expecting based on their process.

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