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### **RECRUITMENT IN THE ERA OF INDUSTRY 4.0: USE OF ARTIFICIAL INTELLIGENCE IN RECRUITMENT AND ITS IMPACT**

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#### **ABSTRACT**

With the fourth industrial revolution at its onset, a new tug of war has started between firms, organizations, and industries that have started to compete in the labor market for the most suitable, talented, and dynamic candidates in the era of technological advancements. Industrial revolution 4.0 components like big data, cloud computing, and Artificial Intelligence (AI) have redesigned, redefined, and automated various tasks of the HR manager especially in talent acquisition. The purpose of the paper is to review the use of AI applications in the recruitment process. It also explores the current usage of AI for the recruitment of high-performing candidates most efficiently and effectively. It highlights various AI tools and applications being used by existing businesses in the recruitment process. The paper will identify the impact of using AI and the benefits of digital recruitment over traditional recruitment. The study is completely based on a literature review analysis of many theoretical frameworks, conceptual papers, peer-reviewed journals, and websites.

The paper concludes that AI has the capabilities to enhance the quality of the recruitment process by matching the most suitable candidates for the job specifications. It can improve the overall quality of the recruitment process by deleting the lengthy and repetitive tasks done by HR during the recruitment & selection process. However, many jobs related to the administrative tasks of HR will no longer exist and will be taken over by machines.

## **INTRODUCTION**

The industry evolution started in the 18<sup>th</sup> century and has seen three revolutions until now. The fourth industrial revolution is also known as industry 4.0 is now in full effect. Technology advancements have reshaped and transform various business processes. Various technological advancements in industry 4.0 include big data, cloud computing, Internet of Things (IoT), cyber security, nanotechnology, robotics, and AI. These technological advancements made certain traditional jobs obsolete and created more new jobs. AI is one of the technological advancements of industry 4.0 where machines reproduce human intelligence-driven processes. The term Artificial Intelligence was first coined by John McCarthy (1950). AI was used by 61% of businesses (Dyble, 2020) and it valued at trillion \$ by 2018 (Albert, 2019). Now, AI is the new truth of the business world. Organizations need to redefine and update themselves to remain competitive in the global market. One of the business areas that AI has impacted is Human Resource Management. The new vocabulary of HRM was created under industry 4.0 (Bondarouk and Brewster, 2016). HRM performs different crucial activities to an organization which involves recruitment, selection, and hiring, training, development, and talent acquisition for the development of an organization (Nawaz, 2019). Human resources are the most valuable resources in an organization in times of changing the needs of job markets. Innovations in technology have made tasks more challenging for HR managers to identify, attract, acquire, and retain talented candidates to their organizations. To attract and capture the pool of talents, HR needs to develop its tasks related to the recruitment process. AI helps the HR managers to perform their recruitment process more efficiently with the intelligent data-driven decision. As per one of the research done by Bian & Co., 87% of HR executives agree that digital technologies will change the functioning of core HR (Heric M, 2018)]. It helps in screening and better matching the available skills of the candidates to the job openings and leads to better talent acquisition in a faster and accurate way. It increases productivity, reduction in cost, better HR services by eradicating human errors, and biases. But it requires the organizations to train the employees to handle these machines or software intended for their tasks. Volvo, a leading Swedish luxury car company, got outstanding recognition during the Brussels Motor show through the showcase of their AI embedded car used to interview the candidates for the post of service technicians (Vedapradha et al., 2019; Usak et al., 2019). It has reduced manpower and created some ambiguity between manpower and machine power (Geetha R. and Bhanu D., 2018; Sulaiman et al., 2020; Ul-Hameed et al., 2019). This paper will highlight the impact of AI on the HR recruitment and selection process.

## **HUMAN RESOURCE MANAGEMENT**

One of the most valuable resources of an organization is its human resource. Human resource management is concerned with human resources. A well-hired human resource can act as a competitive advantage for the firm. HRM deals with tasks of identifying, acquiring, and developing a workforce that can help in achieving the organization's goals, mission, and vision in the most desirable way. With the evolution of HRM over the decades, numerous definitions have been developed and put forward by various researchers over time. The common HR practices performed by all the organizations are recruitment & selection, training & development, and other activities related to retaining skilled, loyal, and motivated employees in an organization. Among all HRM practices, the most challenging is identifying and acquiring the candidates whose skills match the desired set of skills required to perform in a specific job. Maximum time and attention are paid to the recruitment process due to the risk of poor recruitment which can lead to high cost and wastage of time (Hmoud B & Laszlo V, 2019; Shabbir et al., 2019; Siddiqi et al., 2019; Shahid et al., 2019).

### **TRADITIONAL RECRUITMENT PROCESS**

Edwin B. Flippo defined Recruitment is defined as searching and identifying potential employees and encouraging them to apply for the job in the organizations. It is one of the most crucial processes of HR functions in holding the accountability of hiring the correct candidate for a positive impact on the organization. An error at this step can lead to financial and economic losses. Researchers have suggested frequent evaluation of recruitment activities to improve the overall quality of the recruitment process (Carlson K.D. et. al., 2002). Early recruitment activities of an organization have a potential impact on the recruitment process and impact the attitude of the prospective candidates to apply for the job. Traditional recruitment activities were not resolute on any model. Mostly recruitment activities were based on either employer or potential candidates' view (Acikgoz, 2019). Certain common steps were identified among all recruiters while performing the recruitment process. Various common steps being followed in traditional recruitment are:

1. Identifying the vacancy.
2. Preparing Job description and desired personal skills.
3. Identifying the sources of qualified applicants and screening the pool of candidates.
4. Shortlisting and conducting interviews.
5. Decision making and hiring the most suitable candidate.

These lengthy processes include repetitiveness of tasks, high cost, human error, and biases. But still, it is being argued and critiqued that there is no particular way to ensure the best hire. It all depends on the situation and environmental analyses (Breugh, J.A., 2009). A recruitment model was introduced that can improve the employment process in four phases by (Breugh, J.A., 2008) as shown in Table 1.

**Table 1. Breugh Recruitment Process Model**

Step 1	Establish recruitment objectives
Step 2	Develop a recruitment strategy

Step 3	Carry out recruitment activities
Step 4	Evaluate recruitment results

Other recruitment models have also presented indifference to the Breugh recruitment process model. These were more detailed and broke down into further shorter steps. They were:

1. 11 steps macro-level recruitment process map by Thebe and Van Der Waldt (Thebe, TP. & Van der Waldt, G., 2014).
2. 12 steps recruitment process model given by (Muller and Baum Mueller, J.R & Baum, B., 2011).

These models reflect both views of the traditional recruitment process. But over time, HR professionals have argued that traditional processes are time-consuming, complicated, affected by biases, racism, and are unable to identify fake information provided by the applicant (Beattie, G. & Johnson, P., 2012). According to HR professionals, AI-based applications can bypass these biases based on human unconsciousness. AI with its enhanced quality can screen the large pool of candidate applications in a much faster and efficient way than the traditional recruitment way.

## DIGITAL RECRUITMENT–USAGE OF AI IN RECRUITMENT

The digital world of industry 4.0 has reshaped the recruitment and various other HR processes with the help of technologies like employee resource planning (IoT), big data analysis, cloud computing, and the newly added AI. AI has been defined as application as software and/or hardware system which can think like human and make data-driven intelligent decision (Lucci S. and Kopec D., 2015). We are already using various AI-enabled applications like speech and face recognition, learning, and problem-solving but its application in HRM is in the initial stages. AI is completely redefining the relationship between employer and applicant. AI tools like Chatbot provides the candidates with a new and improved experience with the employers. Other AI imbued applications can also automate the process of candidate assessment, scheduling the interview, reference checking, and sending job offers to the selected candidates. At present only 10% of the companies are using AI in high context and 36% of organizations are expected to make full use of AI in the coming future (Harver, 2020). The topmost popular AI recruitment platforms used by various companies were researched and listed by (Select Software Reviews, 2020) as of September 2020 as shown in Table 2.

**Table 2. Top AI Platforms with their applications in Recruitment**

Top AI Recruitment Platforms	Application usage in Recruitment	Companies using AI Tools in Recruitment
Fetcher <a href="http://www.fetcher.ai">www.fetcher.ai</a>	Uses AI with humans in the circle creates an internal team to monitor the database, and provides the source of diverse and qualified candidates in no time. Uses automated email	Sony Music, Velcro, Maersk, Getty images, Drone deploy, Lyft

	center, robust analytical dashboard, team tracking, and individual performance metric.	
XOR <a href="http://www.xor.ai">www.xor.ai</a>	Excellent Recruiting Chabot as a modern communication tool, XOR connect, XOR apply, XOR video, and live chats in career fairs.	McDonald's, Exxon, Manpower, MolGroup, MARS
Hiretual <a href="http://www.hiretual.com">www.hiretual.com</a>	AI-powered talented data system, AI sourcing, real-time data to match the workflow, powerful diversity hiring.	Nike, Intel, continental, Ceridian, Novo Nordisk, Wayfair
Eightfold <a href="http://www.eightfold.ai">www.eightfold.ai</a>	AI-powered talent management, acquisition, development, and diversity platform. Automatically update the information from organization ATS, HRIS, and CRM. Deep Learning technologies to evaluate internal and external candidates.	Fortune500, Tata Communications, Nutanix, Dolby, Booking.com, Dexcom, Micron, Netapp, Bayer
Pymetrics <a href="http://www.pymetrics.ai">www.pymetrics.ai</a>	Uses behavioral science and assessment to erase all human bias effects and audited AI technology with talent algorithms in the Pymetrics environment.	Colgate Palmolive, Kraft Heinz, Boston Consulting Group, McDonald's, PWC
Textio <a href="http://www.textio.com">www.textio.com</a>	AI integrated writing platform free from gender, age, and ability biases, expanded language performance data insights.	McDonald's, Atos, Zillow Group, nestle, Atlas Sian, Micron
My interview <a href="http://www.myinterview.com">www.myinterview.com</a>	Could be integrated into HR System or used as a standalone product.	salesforce, greenhouse, zappier, pinpoint, formstack, Hubspot
Humanly <a href="http://www.humanly.io">www.humanly.io</a>	AI-powered chatbot, designed for mid-market companies, candidate screening, scanning, reference checks and follow up.	Swiss monkey, Inyore, Brady, Armoire, NexGent, Guide, The Klienbatch group
Paradox <a href="http://www.paradox.ai">www.paradox.ai</a>	Make job applications easier, fast, and mobile. Schedule interviews along with reminders in different languages. Reduce the administrative tasks.	Wendy's, go wireless, Disney, McDonalds, Unilever
Talkpush <a href="http://www.talkpush.com">www.talkpush.com</a>	Uses CRM supported communication tool (Chatbot) for both voice and chat, a customized pipeline for different roles.	Amazon, Walmart, McDonald's, [24]7. AI, iCollege, VXI, Adecco
AllyO <a href="http://www.allyo.com">www.allyo.com</a>	Integrate with an organization HR system, Scheduling interviews, robust security	G4S, The Andersons, Staples, Dave &

	system, analytical intelligence for talent acquisition.	Buster's, Fried Man Real estate
Loxo <a href="http://www.loxo.co">www.loxo.co</a>	AI recruitment automation software on CRM Platform using ATS with a database of 530 million people with their personal information, reduces time and cost.	Bank of America, Trinity Health, Lockheed Martin, Amazon, Randstad
Seekout <a href="http://www.seekout.io">www.seekout.io</a>	More searching capabilities than LinkedIn, act as talent market intelligent solution, Can integrate into Firm's ATS system.	Rover, VMware, Salesforce, X23, and me

## IMPACT OF AI IN RECRUITMENT

### BENEFITS OF AI IN RECRUITMENT

The implication of AI in the recruitment process has enabled HR professionals and recruiters to make their recruitment process flow more effective and automated by eliminating all time-consuming tasks. AI application has made HR processes smarter and efficient. Now, HR professionals can focus more on the strategic role of HRM. The integration of AI into the organization's HR system has led to an automatic update of big data of applicants. They can manage the database of millions of humans' resources with their details. Tools like plyometrics can help HR professionals to identify potential candidates for internal recruitments. Applications like humanly, AllyO can fasten the process of screening the applications. These soft wares through social media and online platforms, identify the candidates who match with the required skills in the Job and can send them the job openings at an organization. Applications like Seekout can automatically create a shortlist of candidates based on the job descriptions either from worldwide talent profiles available online or the firm's own ATS. Applications like Chatbot, talk push, and AllyO creates a new environment of communication for the applicants to experience more about the employer company. Auto-tech assessment and video-interview platforms can help in behavior assessment of the applicants in advance for better decision making. Through these AI tools, shortlisted candidates' interviews are scheduled automatically along with the reminders. AI tools can be used for referrals as they can dig into the organization all employees network in a moment. Using AI tools like Chatbot on the company's career website and social networks involve every visitor who may qualify as a prospective candidate. The most important feature of AI embedded tools like textio uses augmented writing tools for the job description to surpass any kind of business and is more inclusive in terms of diversity. This will add more transparency to the recruitment process.

### LIMITATIONS

Technologies are to support humans not replace humans. Apart from benefits retrieved from the application of AI in recruitment, certain limitations still exist. HR is all related to the management of humans. So, we cannot remove the human touch from the entire

recruitment process. Recruiters need to collect experience from candidates about various recruitment and hiring steps. Human qualities are irreplaceable like intuitiveness, empathy, and emotional understanding. AI applications are data-driven developed by programmers. Decisions made by AI embedded tools analyze and take decisions completely based on data and ignore human factors. But these data are also fed to machines by humans. So, there still exist the chances of human biasness in the insertion of the data. Also, while searching for various potential applicants, keywords limit the recruiter choice of pool. Applicants who are not familiar with ATS techniques, may not add the keywords to their CV to be selected by AI enabled tools. Recruiters may miss the ideal baby boomers applicants who have vast experience in their field but are not well versed to prepare their CV according to Application tracking system which is powered by AI. AI tools cannot replace human observations of body language during face to face interviews. Face expressions observed during the face to face interview still form a major part in decision making of selection procedures. For high paid jobs, psychological traits are difficult to be judged by AI. It is difficult for machine language to evaluate the human ability to quickly learn, level of motivation and determination skills. AI lacks the ability to analyze soft skills and emotional features. AI can be observed as a tool to simplify the process but replacing the human factor in most of the HR recruitment related activities is still questionable. It has reduced the manual involvement and bias factors related to human but gave birth to a big question, “Will AI take all levels of HR jobs and are your employees ready for it?” According to Global Human capital trends 2018, only 31% of the organizations are ready to implement and use AI in full swing. Still 69% of organizations need full training of their employees to improve their skills on proper usage of technology. It will increase their cost of training and most of the organizations are not ready to do it now. Even applicants don’t prefer to talk to machine during the whole process of recruitment and selection. Human interaction holds an important place during initial stages of HR recruitment process. Since machines are involved, candidates don’t get the opportunity to meet the future employees. But apart from these limitations, the future of AI in HR stands inevitable.

## CONCLUSION

AI software was developed to make computers (robots) think logically and function like humans in terms of decision making. HRM has also witnessed the efficiency and benefits of AI technology especially in the recruitment and hiring processes. In the era of industry 4.0, the adaptability of AI in the recruitment process has rapidly increased in the last two decades. Traditional recruitment still exists but most of its recruitment areas have been digitalized using AI tools and applications. It has resulted in saving cost and time, automation of various processes, and effective and efficient decision making. The usage of AI has improved the quality of the whole hiring process including recruitment. Now, HR professionals have time to look into more strategic HR areas. Still, a major challenge exists in terms of the organization's readiness for these new technologies in terms of training of the employees and concern over the loss of certain administrative jobs due to the automation of tasks.

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