Impact of Artificial Intelligence on Recruitment and Selection of Information Technology Companies

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Abstract: *Artificial Intelligence (AI) is one of the promising and compelling technologies nowadays which continuously transforms human lives and massively impacts almost all spheres of the business world. While AI is constructively indiscriminately flourishing in all fields, workforce management is not an exception to the rule. The primary purpose of this research is to critically analyze the impact that Artificial Intelligence (AI) is having on Human Resource management practices, more specifically on recruitment and Selection in organizations. The researcher has concentrated on four AI capabilities, namely Natural Language Processing, Machine Vision, Automation, and Augmentation, and their impact on the Recruitment and selection process. The researcher has collected primary data through an online survey from 141 IT employees regarding Chennai city. The researcher has also focused on external secondary data (articles and reports) to demonstrate some of the findings of the impact of AI capabilities on Recruitment and Selection. The study finds that AI technologies capabilities namely NLP, Machine Vision, Automation, and Augmentation have a significant impact on the Recruitment and Selection Process with potential positive outcomes such as time & cost-saving, accuracy, removes bias, reduced workload, increased efficiency, and candidate experience.*

Keywords: ***Artificial intelligence, Natural Language Processing, machine vision, Automation, augmentation, Human resource management practices, Recruitment & Selection.***

1. INTRODUCTION

Artificial Intelligence is a remarkable breakthrough in technology proliferation. Indeed, the term AI is not confined to just a single definition, but then it is defined and interpreted differently by different fields [1]**.** It is programmed in such a way that it can think and act like human beings (reasoning) do. This simple definition of AI mentioned above fits any machine or device that can think and behave like human intelligence while learning and solving a specific problem [2]. In other words, AI can be described as technologies that emulate natural intelligence, yet the term AI is much broader than it is complicated to explain what is meant by it, what value AI brings, and how it can be applied [3]**.**

The role of technologies in management has been recognized for quite some time**.** Innovation in management practices is inevitable and increasingly significant for organizations to attain a competitive edge and sustain rapid changes in the environment [4]**.** Present-day organizations deal with the massive size of data and information, and the organizations must transform themselves digitally and rely upon technology like AI [5]. Due to this reason, AI nowadays has become a mainstream component in the management of companies, which has not only changed the way people work but has wholly shifted the business models [6]. The Human Resources domain is not immune to this scenario, and it must also jump on the bandwagon of disruptive technologies or be disrupted [7] and [8].

To cope with competence and knowledge challenges associated with AI technologies, new strategic and [9] holistic human resource management are needed in organizations [10]. The purpose of man-machine collaboration in the HR department is not to put humans out of work; instead brings a radical functional shift in the way organizations recruit, learn & develop people and restructure daunting HR processes high-speed and easily. We are witnessing major repositioning and revolutionizing in worker's job nature and skillset required within organizations. AI acts as a significant player in transforming the HR functions, which have aided the HR people, employees, and organizations. AI technologies are being utilized by organizations to automate repetitive tasks and assist in complex strategic decisions swiftly and more accurately through predictive algorithms [11]. Only in recent days, an increased number of organizations are showing interest in applying AI technologies in HR

practices, such as Recruitment, Candidate Screening, and Selection [12]. Leading and well-established companies are already using AI technologies to enhance effective decision-making and provide predictive analytics to all the employees[13]. In simple words, AI-equipped organizations can sustain the ferocious competition in the market, and also, the organizations can enjoy operational excellence overall.

II. LITERATURE SURVEY

The researcher has made an effort to summarize various aspects of the study by reviewing existing literature. The relevant literature was selected and derived from popular search engines and databases like google scholar, Emerald, Science Direct, and Elsevier, in line with the research objective. These bibliographic sources referred to included research articles published in online journals, books, and reports related to AI capabilities, the impact of Artificial Intelligence technologies in the Recruitment and Selection process, and the future results of using AI in the recruitment selection process. The reviews pertain to both Indian and foreign authors.

A. ARTIFICIAL INTELLIGENCE CAPABILITIES

Natural Language Processing: Michael Zock has expressed that over the past 40 years, Researchers strived to construct technological tools that could talk, translate a document, answer a question, etc. that all of us perform daily, and the potential outcome is Natural language processing [14]. NLP is one of the challenging fields of AI that aims to automatically process natural (human) language in written form [15]. NLP enables the systems to understand and communicate in any natural language such as English and French [16]. NLP allows computers to learn a language not only from inbuilt knowledge; it can also acquire semantic and syntactic knowledge from external sources. NLP approach enables the system to learn and understand natural language like a human being does through experience [17]. When it comes to applying NLP in human resource management, NLP, combined with other AI technologies such as voice analysis, chatbots, and facial expressions, can be used in asynchronous video interviews to predict the future job performance of the applicants [18]. NLP capabilities enable AI to perform textual analysis [19] and automatic translation from one natural language into another one [20]. NLP techniques are the basic building blocks for designing and implementing user-centered communication and information systems [21].

Machine Vision

Computer vision is a subfield of AI which uses images, objects, and patterns to find solutions. Machine learning algorithms are the critical technology behind computer vision, which gives the computer the natural capability to sense and understand data in the form of images, graphic documents, and videos [22].

Floriana Esposito and Donato Malerba briefly discussed the interaction between two essential subfields of AI, Machine Learning and Computer Vision, and how one helps others. The computer vision system's primary task is to understand the scene that any image depicts and image processing, signal processing, and pattern recognition are essential tasks performed by computer vision [23]. The latest computer vision applications are object detection, object classification, and information extraction from various forms of data. Computer vision helps to detect human emotions (likes, dislikes, and confidence levels), which can help the management predict employee attrition in human resource management [24].

Automation & Augmentation

Automation is nothing but the ability of a system to perform a task automatically without any deviancy. In a more detailed way, Balfe et al. defined Automation as "the performance of tasks by machines rather than human operators often to decrease variability and increase efficiency" [25]. The term Automation is not only confined to industry and manufacturing. AI-powered software has automated several tasks performed by white-collar workers; AI software can retrieve information, handle inventories, translate complex documents, coordinate logistics, prepare business reports, and many more.

[26] explored both automation and augmentation concepts of Artificial Intelligence in the management domain. When humans collaborate with machines closely to perform a specific task, it is Augmentation. In contrast, when machines take over a human task entirely in their hands with zero human intervention, it is Automation to perform a task. It is argued that Augmentation and Automation cannot be separated from one another neatly; these two aspects of AI are interdependent. It is suggested that organizations can be benefited by embracing both Automation and Augmentation from a broader perspective[26]. From the management point of view, Automation can occur at various levels and for different purposes like gathering information, analyzing information, selecting an action, and finally implementing the action. In each category, the level of Automation varies; it may be low or high. So, it is essential to spot the different types and levels of automation present within a particular system[25]. The increased work-related use of AI, Automation, and cognitive computing for administrative and management tasks will increase people's needs. As the employees are the ones who communicate and interact with these disruptive technologies[27]. Automation technology may indeed substitute some jobs. However, the efficiency gained from Automation outweigh transition costs, and in several cases, Automation increases employment opportunities for workers who are not in competition directly [28].

Automation has a positive impact on the overall efficiency of organizations as capital costs replace labor costs. At the same time, Automation requires employee training to update themselves with new skills. The ultimate effect of mechanization was creating new jobs and improving existing jobs [29]. The Advancement of sophisticated AI automation technologies has undeniably put some low qualified jobs at risk for replacement and ensures necessary retraining to cope with the situation.

These days, Automation progressively changes, enhances, complements/substitutes the human workplace. [30] proposed to shift the concentration from management for Automation with minimal human work to augmented human-centered management with desirable roles for humans in organizations. AI augmentation is nothing but a combination of natural intelligence and machine intelligence to form an augmented intelligence. [31] indicated that augmented man-machine intelligence like wearables devices and intelligent driving vehicles have vast potential for future development in almost all fields.

IMPACT OF AI ON HRM PRACTICES/RECRUITMENT AND SELECTION

[32] found that AI is positively influencing workforce management in organizations. The study advocated added investment for AI technology implementation in HR functional areas to take HRM to the progressive level. [33] deliberated AI inference in HRM, specifically in the recruitment process. The research aimed to find whether AI is swapping human beings' role in the recruitment process in selected software companies in India. The study found that AI

replaces humans in the workplace positively. It is said that AI would be very beneficial in the beginning stages of the recruitment process; however, human intervention is better and recommended at the time of interview and salary package negotiation. Infusing AI in the recruitment process will bias-free and escalate the process's quality and speed.

Furthermore, man-machine collaboration can enable humans to perform their tasks with reduced human exertion, mistakes, and workload. [34] explored the present use of AI in the recruitment and selection of candidates(R&S). The research studied possible adoption levels and areas for AI technologies throughout the hiring process to be more specific. It is found that despite the escalated adoption of AI, organizations are exhibiting reluctance to invest in AI technologies for Recruitment and Selection. [35] examined the association between the effectiveness of HRM functions and AI usage in it. The HRM functions included in the study are recruitment, Selection, talent acquisition, and people analytics. The study revealed a significant association between the use of AI in HR functions and HRM functions' effectiveness.

Moreover, it is also found that the correlation between the effectiveness of HR functions and AI usage is substantial. In particular, it is stressed that while adapting appropriate AI programs in the recruitment and selection process may help organizations find suitable individuals. [36] attempted to explore the relationship between AI and HRM functions in selected IT companies in Delhi. The researchers used the multiple regression method to test the hypothesis and corroborated a positive relationship between AI and HRM functions. The study established that AI has significant importance in several HR functions, and its increased usage at the workplace would result in improved HR functional performance overall.

Furthermore, it is observed that AI simplifies routine jobs in HR with minimal human intervention. It is found that AI performs better than individuals by decreased turnover rate and enhanced talent retention. The growing dissemination of AI in human resources functions. The study attempted to identify the valuable contribution of AI in facilitating organization decision-making and understanding AI's significance in HRM functions. The study suggested that AI should be implemented as a supporting HR tool, preferably not to overrule. A collaborative approach is suggested so that an AI system cannot deliver solutions and results without the HR contributions [37]. AI technologies can transform the Recruitment and Selection of employees in the hospitality and tourism industry. However, it is suggested that due care must be taken to ensure that decisions made and insights gained are well-received to attain more influential organizations and employee outcomes[38]**.** AI in personnel management unfolds itself in primary three levels of management: individual job levels, managerial and organizational levels with a potentially positive outcome of enhanced organizational performance, better employee well-being, and lowered staff turnover rate [39]**.** AI-enabled recruiting has transformed from the point that it is nice-to-use to necessary-to-use context now. AI-enabled recruiting tools are mainly utilized across four key activities in the recruitment process: outreach, screening, assessment, and coordination. AI-powered recruitment systems can make the process of job application optimistic and smooth, even for candidates who are not selected by organizations[40]. AI is one of the pertinent state-of-the-art technologies that can significantly impact the performance of the employees[41]**.**

POTENTIAL OUTCOME OF AI IN RECRUITMENT AND SELECTION PROCESS.

[42]examined employees' attitudes in an organization towards introducing AI in their work processes. It is found that using AI in their work processes boosted the work processes' speed and efficiency. The study found that employees who tried the new AI technology in their work were optimistic about AI and indicated that it is easy to use, highly productive, and robust. On the other hand, employees who had not used AI were not sure that AI might improve their ability to do their work efficiently [42]. [43] together analyzed how the latest technology like AI has influenced the recruitment process. It is indicated that technology-enabled recruitment transforms the conventional hiring process into a time & space-independent, collaborative hiring process. The study observed that substantial changes are noted in the sequence and divisibility of the leading recruitment process. It is stated that the technology-based recruitment and selection process requires a competent and experienced HR team along with two unquestionable benefits, which are reduced costs and length of time of the process[43]**.** In the recruitment and selection process, a broad range of AI, intelligent tools can be used to judge and find the best suitable candidate for the organization. AI can eliminate discrimination, emotional factors, prejudice and, screen resumes and quickly match the right candidates AI-enabled systems can instantly connect and identify patterns that would be time-consuming and difficult for an individual to find out. AI predictive intelligence enables HR people to collect, represent, and analyze data in any form quickly and allows them to become proactive and more strategic with their HR activities[37]**.** Through means of AI-enabled recruitment process, both the organization and the employees can better utilize time. AI enables HR professionals to eliminate low-value, strenuous jobs, increasing efficiency and accuracy and putting personnel at ease [44]. AI technologies would upsurge the innovation capacity of human resources and result in enhanced productivity. Fact, HR departments should plan to invest in disruptive technologies that facilitate talent acquisition and employee engagement [45]**.** The AI-enabled HR system has made it feasible for organizations to decrease the overall costs, reduce hassles, improve efficiency, remove bias, save time, and lower employee turnover[46]**.**

III. CONCEPTUAL MODEL

It is widely accepted that AI has the potential to automate various tasks of the recruitment process. In the opinion of many AI experts and researchers, it is asserted that AI technologies positively impact the recruitment and selection process with potential outcomes. The following are the perceived outcomes of using AI in the recruitment and selection process based upon the literature review.

- Time-saving
- Cost-saving
- Removes Bias
- Accuracy
- Increased efficiency
- Better candidate experience
- Reduced workload

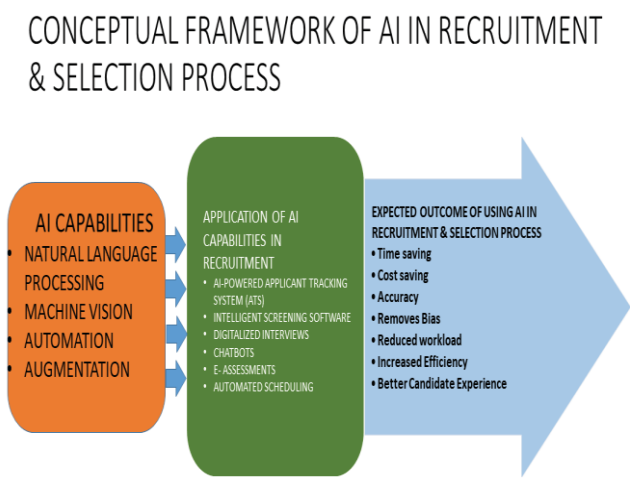


Diagram Source: Own

IV. OBJECTIVES & HYPOTHESIS DEVELOPMENT

Research Question

The research question addressed as follows

RQ: Do AI capabilities (Natural language processing, Machine vision, Automation, and Augmentation) have an impact on the Recruitment and Selection process in selected IT companies in Chennai city?

The research aims to contribute to have an understanding of the impact of AI technologies on the Recruitment and Selection process and also to know the potential outcomes of using AI in the Recruitment and Selection Process.

OBJECTIVES OF THE STUDY

To know the impact of AI capabilities on Recruitment and Selection in Selected IT companies in Chennai city.

STATEMENT OF HYPOTHESIS

(H1): The factor of AI, i.e., NLP, has an impact on Recruitment and Selection.

(H2): The factor of AI, i.e., Machine vision, impacts recruitment and Selection.

(H3): The factor of AI, i.e., Automation, has an impact on Recruitment and Selection.

(H4): The factor of AI, i.e., Augmentation, impacts recruitment and Selection.

V. METHODOLOGY

This research is constructed on both primary and secondary data derived from the respondents and secondary sources like an online open-access journal, reports, and relevant research articles. Moreover, used key words like (TITLE-ABS-KEY (artificial AND intelligence) AND TITLE-ABS-KEY (recruitment) AND TITLE-ABS-KEY (selection) AND TITLE-ABS-KEY (information AND technology AND companies)) to search related articles in Scopus and Emerald and Elsevier databases to get relevant information & not to miss updated information related to selected topic.

The primary data is collected from the employees of selected IT companies in Chennai city. Based on the literature review, the researcher developed a well-structured questionnaire that consists of parts, namely, Personal and organizational details of employees. Secondly, Artificial Intelligence and HR variables in Likert's five-point scale with selection options ranging from strongly agree to strongly disagree. The questionnaire pre-tested for relevancy, understandability, and clarity of the questions. The final questionnaire prepared after addressing the pre-test stage issues was circulated among HR professionals in various IT companies across Chennai city. The online questionnaire link circulated via personal contact, Twitter, and LinkedIn from May 2020 to November 2020. Out of all the responses received, only 141 were filled completely and correctly, considered for further analysis.

V1. RESULTS AND DISCUSSION

Table 1

Demographic Profile of Respondents

Demographic Profile	Frequency	Percent
Gender		
Male	69	48.9
Female	72	51.1
Total	141	100.0
Age (Years)		
22-25 yrs	67	47.5
26-30 yrs	34	24.1
31- 40 yrs	17	12.1
Above 40 yrs	23	16.3
Total	**141**	**100.0**
Marital Status		
Single	106	75.2
Married	35	24.8
Total	141	100.0
Educational qualification		
UG	36	25.5
PG	48	34.0
Professional	57	40.4
Total	141	100.0
Income (per month)		
Less than Rs 25,000	56	39.7
Rs 25,001- Rs 50,000	51	36.2
Rs 50,001- Rs 75,000	21	14.9
above Rs 75,000	13	9.2
Total	**141**	**100.0**
Designation		
Administrator	28	19.9
Business and Program Analyst	22	15.6
software engineer	38	27.0
Project and HR Manager	9	6.4
Managing Director	11	7.8
Others	33	23.4
Total	**141**	**100.0**
< 2 years	49	34.8
2-5 years	55	39.0
6-10 years	21	14.9
11-15 years	13	9.2
Above15 years	3	2.1
Total	**141**	**100.0**

Table 1 exhibits the frequency results of the Demographic Profile of Respondents. Out of 141 respondents, most 51.1% of the respondents are male, and 48.9% of the respondents are female. Regarding the age classification, the majority, 47.5%, are in the age group between 22-25 years. The results also indicate that 75.2% of the respondents are single category, and 24.8% of them are married. Regarding monthly income, the majority, 39.7%, of the respondent's monthly income, is

up to Rs.25 000, and 36.2% of the respondent's monthly income between Rs 25,001- Rs 50,000.

STRUCTURAL EQUATION MODELING

The structural equation modeling (SEM) using AMOS 21 version software was used in the study for testing the impact of AI technologies capabilities on the Recruitment and Selection Process.

HYPOTHESIS 1 (H1): There is an impact of Natural Language Processing on Recruitment and Selection.

HYPOTHESIS 2 (H2): There is an impact of Machine vision on Recruitment and Selection. **HYPOTHESIS 3 (H3):** There is an impact of Automation on Recruitment and Selection. **HYPOTHESIS 4 (H4):** There is an impact of Augmentation on Recruitment and Selection.

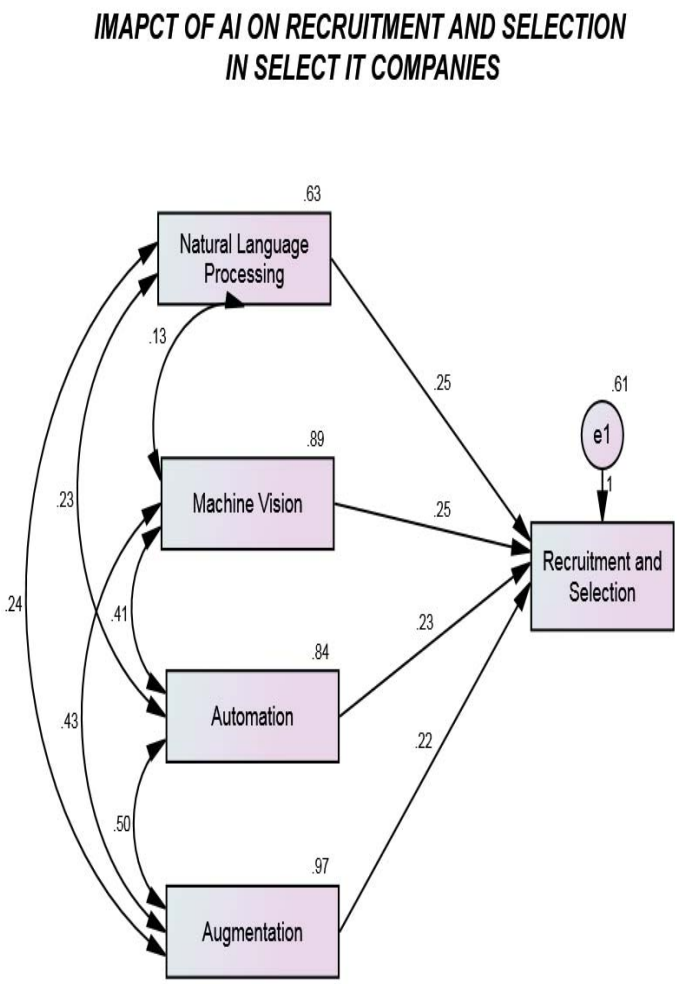
Table 2
Model Results

Parameter	CMIN	p	CMIN/DF	GFI	AGFI	CFI	RMSEA
Outcome	471.21	.000	1.80	0.94	0.92	0.95	0.003

Table 3
Model Regression Weights

		Factors of AI	Estimate	S.E.	C.R.	P	Decision
RS	<---	NLP	.253	.089	2.848	.004**	H1: Accepted
RS	<---	MV	.250	.082	3.029	.002**	H2: Accepted
RS	<---	Automation	.233	.093	2.510	.012**	H3: Accepted
RS	<---	Augmentation	.224	.085	2.634	.008**	H4: Accepted

RS: Recruitment and Selection; NLP: Natural Language Processing; MV: Machine vision



Figure

A. DISCUSSIONS

H1: There is an impact of Natural Language Processing on Recruitment and Selection

H1 is supported by the study results, suggesting that Natural Language Processing has a significant impact on the Recruitment and Selection Process in the select IT companies in Chennai city. The present study outcome supports that AI has changed the recruitment industry's landscape, the role of AI in the recruitment and selection process, whether AI can help eliminate unconscious bias during the recruitment and selection process [47].

H2: There is an impact of Machine vision on Recruitment and Selection

H2 is supported by the study results, suggesting that Machine Vision has a significant impact on the Recruitment and Selection Process in the select IT companies in Chennai city. The present paper's results support that the implementation of AI can make the sourcing and screening processes can get even more autonomous and intelligent. There are great potentials for IT companies and staffing companies working together and designing better-integrated products and services[48].

H3: There is an impact of Automation on Recruitment and Selection

H3 is supported by the study results, suggesting that Automation has a significant impact on the Recruitment and Selection Process in the select IT companies in Chennai city. The significance of picture impacts in online enlisting and determination becomes amplified while considering. The Automation of HR processes and activities can boost the overall efficiency and professional improvement of HR professionals in the organization[49].

H4: There is an impact of Augmentation on Recruitment and Selection

H4 is supported by the study results, suggesting that Augmentation has a significant impact on the Recruitment and Selection Process in the select IT companies in Chennai city. The model results support that Automation can perform a specific task. It is argued that Augmentation and Automation cannot be separated from one another neatly; these two aspects of AI are interdependent. It is suggested that organizations can be benefited by embracing both Automation and Augmentation from a broader perspective[26]

VII. CONCLUSION: The current study conducted on the impact of Artificial Intelligence technologies on the Recruitment and Selection process made a study on key AI capabilities and their influence on the recruitment and selection process, and potential outcomes of applying AI capabilities in the Recruitment and Selection Process. The recruiters revealed that utilizing AI technologies in the recruitment process can speed up the recruitment process and cost-effective. Applying AI technologies in the recruitment process can enhance the recruitment process's quality with a high accuracy level and reduced human bias. The application of AI in the recruitment process can make it possible for the recruiter to get the right candidate with the right skill set for the right job with ease. Overall, the implementation of AI technologies in the recruitment process can reduce the workload for recruiters with enhanced candidate experience. It is suggested that the companies (recruiters) learn to join hands with AI technologies; they can train AI technologies to be extensions of their teams and not replace them.

VIII. FURTHER RESEARCH DIRECTIONS: The study demonstrated the impact of AI technologies only on the Recruitment and Selection process. This study can extend by concentrating on other HRM practices like Training and Development or Performance management. The present study was done in Chennai-based IT companies having 141 samples from among the HR professionals. This study can extend by having more sample sizes from other metropolitan cities like Delhi, Bangalore, and others.

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