How Far Have We Come With The Study Of Artificial Intelligence For Recruitment Process

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Abstract: This paper aims to review applications of artificial intelligence (AI) in the recruitment process and their practical implications as reported by the systemic review of 7 referred articles, 5 magazines articles and 20 websites viewpoints of the topic and related areas were considered. The study findings contribute to a more holistic view of the topic and related area's and thus complement the study of AI based recruitment process. The study may not have taken a complete coverage of all articles in the area of artificial intelligence role in recruitment process. Yet, based on the selection on the chosen research methodology it seems reasonable to assume that the review process covered a large published in web portals / reports / academic journals. As per the best of author knowledge, there is no systematic literature review on artificial intelligence role in recruitment process has previously been published in academic journals and biased on selected papers a number of research questions are planned aimed at guiding and suggest some promising avenues for future research.

Keywords: artificial intelligence, recruitment process, candidate communication, sourcing of candidates, human bias. **Article classification –** Literature review.

1. Introduction

The present article reviews research on artificial intelligence (AI) for recruitment process by having the aim to establish better understanding and suggest for future research directions. In the era of fourth industrial revolution and digitalization has forayed to an organization are looking for bright, talented, multi skills human resources in their workforce to meet the competition in the global market. The first the artificial intelligence introduced by (Mccarthy, 1956) it is open the new opportunities to the organizations. According to (Dimple Agarwal, Josh Bersin, Gaurav Lahiri, Jeff Schwartz, 2018) artificial intelligence applications such as problem solving, one data driven function, streamline the automate recruitment process in human resources. The future work will be more priority across the market, the both employers and employees are to think about knowledge, skills & attributes to stay active in the market for sustainable for the in future and at present industry thinking to have artificial intelligence harness to make use in recruitment process. By taking of previous studies into account, the study of artificial intelligence discussed in the previous years, the recruitment industry now a days closer to adopt artificial intelligence into the process of recruitment. In fact, there are many studies claim on AI role on recruitment process (Upadhyay & Khandelwal, 2018), (Bullhorn, 2018), (Paradox, 2018). By having this background, the author aim is to draw interest to the field of hiring process to which very limited literature has been addressed, which is on strategic point of view, this is very important in the recruitment process.

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Indeed, the author believed that when successful recruitment strategies are to establish in organizational success. Thus, insights into recruitment process related issues will progress to improve recruitment strategies which in turn assist a more competent & effective talent allocator. On this evidence of systematic, paper discussed how extant literature has addressed on artificial intelligence role on recruitment process so far. The result of the review, the promising areas has been developed in field of artificial intelligence and recruitment process. In the next step more insights into the methodology process chosen for to identify extant research of artificial intelligence and recruitment. After manual observation, which are items are observed in manual observation are presented. This is highlighted the promising future research avenues and the paper terminated with concludes, theory and practices.

2. Methodology of the literature

The paper adopted a systemic literature to prepare what has been studied in the previous in the filed of artificial intelligence and recruitment process. To do systematic review, the present study has been consider the following methodology adopted by (Jesson, Matheson, & Lacey, 2011) was implemented to serve the aim of the study. The process of methodology is based on six principles 1) Mapping the filed through a scoping review; 2) Comprehensive search; 3) Quality assessment; 4) Data extraction; 5) Synthesis, and finally 6) Write-up. The study was directed as follow. First, the research plan designed with having a interest in research questions and by involving of very key specific words and prepared a set of exclusion and inclusion standards. The present situation to establishing the current knowledge on artificial intelligence recruitment process and other related areas to have necessary to have a avenues for future research. The adopted following questions for the study 1) Which studies have been conducted that focused on Al recruitment process? 2) What were the main findings of these studies? and the study chosen to use various keywords to select very relevant studies, such as artificial intelligence, human resources, talent acquisition, recruitment trends, recruitment process and recruitment industry. The study followed inclusion criteria: peer-reviewed, emerald, sage, English language Business Source Premier, Springer link and Taylor and Francis databases, ABI/Inform Collection, Grey literature such as reports and non-academic research, other language than English, and other databases than emerald,

ABI/Inform Collection, Springer link and Grey literature were excluded. In the next step, the spreadsheet established consisting of key phases, which are connected to the aim. Items are as follow authors name, publication year, aim & objective, theoretical framework or perspective, methods, main findings, journal name and website name. Second, required, related topics were presented the databases emerald, ABI/Inform Collection, Springer link and Grey literature were accessed, and started searching by using mentioned above specific keywords. It was observed title keywords, keywords of the abstract, the literature review added and included until 15th May 2019. These is constructed by using keywords and different numbers of hits were produced. In the third step abstract, papers contents were scanned manually and if it is relevant, to do that articles are read carefully and seen that it should be in the scope of the interest. This action draw the final number of the papers as 7 referred, 5 magazines and 20 websites articles, which fulfilled the criteria and were then analyzed. For the next step, 34 papers were selected to read and relevant data entered in the spreadsheet for the research purpose. Fifth, research themes are identified, the identified themes discussed with colleague and topic investigation. Finally the review process was dedicated to start wiring findings of the study.

3. Results

The study results covered both qualitative and quantitative insights of the artificial intelligence recruitment process, were presented.

3.1 Date of publication

For the study 34 papers were taken for analysis, the oldest publication is from 2009 and most recent is from 2019. In detail of the reviewing papers involved in study is that 2009 (with 1 paper) 2016 (with 2 papers) 2017 (with 11 papers) 2018 (with 19 papers) and 2019 with 01 paper. In the recent years the areas of research increased in the following items effective screening and communication of the candidate, bias elimination. In other words, the coverage of paper talking provide holistic view and short history of the topic.

3.2 Journal / website of publication

The selected journals and websites that have published on artificial intelligence recruitment process are assigned primality to the field of human resource management and management information systems and enterprise resource planning. The publications published in the following journals, websites, and magazines, Journals as fellows Strategic HR Review, Journal of Information Technology Teaching Cases, International Journal of Mechanical Engineering and Technology, Canadian HR Reporter and International Journal of Technology, Management and Applied Sciences, the magazines following added SourceMedia, Questex, LLC, Newstex, Bennett, Coleman & Company Limited and finally websites as follows https://www.forbes.com, https://www.theglobeandmail.com, https://www.talentlyft.com, https://www.zoho.com, https://www.digitalhrtech.com

https://news.efinancialcareers.com, https://www.forbes.com, https://www.bloomberg.com, https://www.gattacaplc.com/, https://www.icims.com, https://www.shrm.org, http://www.yoh.com, https://www.cio.com, https://silo.ai/, https://thenextweb.com, https://harver.com, https://www.peoplematters.in, https://www.randstad.com,

https://www.benefitnews.com, https://chiefexecutive.net. The largest number of articles published in the websites, (20 in numbers).

3.3 Research aim / objectives

For the research, there are several ways to contribute to the field or domain or specialization. For instance, some of them show interest in developing a domain / field to contribute for the future development. In the matter of findings the research aim/objectives directs that the most of the papers had primarily an exploratory and focusing on development, it is showing clearly such as "to explore", "to develop", "to gain improve understanding", The topic has been studied in short period and the situation is clear that time has come to consolidate the body of the knowledge in the area of recruitment process by emerging of artificial intelligence. (Geetha, 2018) aimed to review usage and importance of artificial intelligence in recruitment process. (Raviprolu, 2017) proposed the role, advantages and challenges of artificial intelligence, additionally, revealed that by implementation of artificial intelligence may gain quick problem solving, identification of team capabilities within the team in recruitment process.

3.4 Theoretical perspective/framework

The most of the authors is silence about the theoretical lense (s) used to study artificial intelligence influence on recruitment process (Leong, 2017) discussed on artificial intelligence usefulness in recruitment process including tracking of application, performance reviews, onboarding, compensation and career management. (Min, 2017) offered advantages of Al in recruitment process such as quality job post, wide range of source of applications, screening applications and in decreasing of unconscious bias.

3.5 Research methods

Table 1 explained about the research methods used in the review articles and different types papers are included for the study, here the study secondary data (2 papers), survey based (2 papers) and majority of the papers from conceptual (30 papers), in that there are 4 papers from commentary, 21 papers from the conceptual based and theoretical papers are 05 papers. The study noted that only four papers in longitudinal approaches, even there is quite small number of papers this is promising and hopefully in the near future more longitudinal approaches can be found as the study of artificial intelligence based recruitment process. The most of the researchers found that artificial intelligence uses and benefits in the recruitment process and it is promising approach as the researchers approach topic 1) with various uses and benefits 2) many of the researchers also used various combinations of functions of recruitment process.

Table 1: Reviewed articles research methods

Research methods	Number of papers
Secondary data	02
Survey	02
Conceptual papers	30 04 21 05

Themes of interest

The papers studied are classified and assigned as following xxx broad themes: Theory development Awareness Raising and Other types of issues with artificial intelligence in recruitment process (Table 2).

4. Some avenues for future development

In the part discussed some concrete "food for thought" for researchers that are interested in conducting research in Al recruitment process and thus contributing to the sub functions / area's development (Table 3).

5. Conclusion.

The paper was established to understand the existing body of the knowledge regarding artificial intelligence role in recruitment process, what are the benefits, usages, how it is enhancing the quality in talent pool, relationship, matching, sourcing of candidates, new hire boarding, development, employee relations, hr compliances, scheduling, unbiased. Against the backdrop the quality of talent is required to sustain of the organization in the competitive environment for both private and public organizations so that AI applications specifically very useful in recruitment strategies. Thus, this present paper reviewed extant research work on Al recruitment process. Therefore, the systematic literature review was conducted to do so. By having finalized number of the papers xxx through this designed the current knowledge of recruitment process and its related sub functions were established. This will useful in holistic view of the topic and it is helpful in the study of AI recruitment process in general. The papers review results is useful to have research questions, it could provide more information & understanding in the concept of the Al role in recruitment process. Moreover, a number other sub functions are spell out to address more to understand on Al recruitment process and it will be automatically highlighted. The present study embedded with associated for both theory & practice, when comes to the theoretical point of view, these paper given detailed discussion on the study of AI recruitment process, however it shows that, Al role in recruitment process, how it is cater other areas of recruitment process. In addition, the previous literature reviews brought together closer and considered artificial intelligence impact in recruitment process and its other area's of such as screening candidate, building relationship, quality of hiring, scheduling, unbiased decisions, saving time, effort and money and so on. In practical pint of view, finding provided progressive step for the recruitment industry some useful innovative thoughts to have a recruitment strategy that facilitate quality hiring, better talent pool, to perform a positive outcomes of recruitment process. The study concludes, the

author of the present paper strongly feels that AI based recruitment process is a productive phase in improving in theory and practices. At the end, the author comprehended that, the study has a limitation, why because the chosen area of the field of the papers of AI and recruitment process. Yet, it is acceptable reason that the predict that the process covered most of the papers, which are available. The author offered some further research directions, which are not comprehensive, but represent some possible further actions.

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Thoma	Author (c) and authors of interest
Theme	Author (s) and subject of interest (Chris Collins, 2018) made attention to have a broader approach to managing a huge number of
	applications, talent pool, communication with candidate and employee turnover.
	(Tresha Moreland, 2017) highlighted the human process importance than artificial intelligence in build
	personal relationship.
	(Malini Goyal, 2017) emphasized that artificial intelligence will enhance the read and resume match for
	advertised job.
	(Alistair Cox, 2018) underlined AI will helpful in cv screening, in job description, candidate
	communication.
	Levit, A. (2017) stressed recruitment industry by using AI will get predictive analytics, talent networks, candidate bias elimination.
	Majumder, S.(2016) Ampurna majumder accentuated that AI influence recruitment in developing in
	efficient screening, communication, reaching time, prediction and leaning abilities.
	Savar, A. (2017) discussed that AI transform in the human bias, assessment, relation with existing
	employees.
	Min, J. A. (2016) highlighted the following trends in recruitment, algorithm, machine learning, natural
	language process, people/predictive / sentiment analytics.
	Heilmann, C. (2018) draw the attention on profile, public information, digital video technology is
	establishes the screening of the candidate.
	Attfield, P. (2018) by using of AI the recruitment industry can introduce build resume assessment tools and even it is possible to integrate into smartphone application.
	Lee, E. (2018) pointed AI usefulness in identifying the right candidate.
	Anz. (2018) discussed recruitment industry selecting best and unbiased to have recruitment decisions
	through AI.
Awareness Raising	Forbes Coaches Council. (2018) discussed assessment, engagement, initial screening, targeted skill
	candidates can be get through AI in recruitment process.
	Jones, H. (2018) Al transform repetitive tasks like screening, searching and sourcing and provide lot of
	money and time save.
	Sayfullina, L. (2018) highlighted about the soft skills, hard skills and AI recruiters. Dickson, B. (2017) emphasized on application tracking system.
	Sharon (2017) All will enhance the quality search and analyze data to have quality direction to select
	tech talent.
	Shanmugam, A. (2018) discussed why recruiters need Al because to get benefits in reduce bias, time
	effective & candidate experience.
	Filho, O.G. (2018) draw the attention regards to onboarding & training process, building relationship
	between candidates and recruiters.
	Greenfield, R. and Griffin,G.(2018)Al promises unbiased in identification of talent people.
	Goncalves, C. (2018) discussed regard to the recruitment should be consumer based, it will be
	possible with embracing of artificial intelligence. BasuMallick, C. (2018) discussed artificial intelligence application in recruitment process, how it will
	help in candidate hiring.
	Min, J.A. (2018) discussed postings of the job, sourcing candidate, rediscovery, candidate resume
	screening and messaging in the recruitment process.
	(Gupta, Fernandes, & Jain, 2018) emphasized AI branches of robotics process automation, cognitive
	insights, cognitive engagement take more significant.
	(Nawaz, 2019) draw attention AI robotics process automation proposed to have model, that model
	should have social intelligence, relationship building, critical thinking, and emotional intelligence to
	meet quality hiring. (Cox. 2017) stands on three keys areas that fairer condidate personing, heat fit if condidate personing.
	(Cox, 2017)stands on three keys areas that fairer candidate screening, best fit if candidate, secure future talent pool.
Theory development	(Kok, Boers, Kosters, Putten, & Poel, 2009) offer the definition, trends, techniques and cases regard to
	artificial intelligence.
	Agarwal, A.(2017) focused on the skill gap, right work for the right person to show profitability and
	profitability.
	Melder, B. (2018) offer quality hiring, integration analytics, unbiased decisions.
	Zielinski, D. (2017) offer promising future on AI assistance, video interviewing, data drives effective to
	make more visual of recruitment process.
	(Preuss, 2017) offer future model for recruiters to take control of automation of Al.
	Neelie. (2018) address related to the Al powered Chatbots, candidate relationship, job advert, no
a	cheating via video and removing bias.
Other types of issues	Jess (2017) offer promising future avenues to develop better understanding artificial intelligence in HR
with artificial intelligence in recruitment process	recruitment process.
in recruitment process	Blogger,G. (2018) stressed AI technology raise the quality of the job advert, screening, remove tedious
	tasks, identification emotional intelligence of the candidate.

TABLE 2: THEMES DISCUSSED IN THE PAPERS REVIEWED.

Topic	Suggestions	Research questions
Methodology	 Application of different worldviews / theoretical perspective to study recruitment process in the age artificial intelligence. 	 What are suitable worldviews for studying AI based recruitment process?
Level of analysis	 Multilevel approaches to the process of recruitment and their sub functions and to know their consequences. 	Which are the methods suitable to study on Al based recruitment process?
Consequences of artificial intelligence activities in recruitment process	 Required large number of studies in theory, empirical based, amining to make use of various applications of Al for hiring process. 	type of recruitment functions?Should we do something to protect ethical issues in the organization.
Digitalization / digital transformation and robotics automation process.	Addressing Al recruitment process in the era of digitalization.	transformation and robotics

TABLE 3: PROPOSALS FOR FURTHER RESEARCH