

Application of artificial intelligence for recruitment in manufacturing industries

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Abstract: The recruitment process in manufacturing industries is automated to become open and inclusive to provide equal opportunity to the job seeker and the job opening in the organization. Online recruitment is an electronic process format to hire suitable candidates using electronic devices and other social media networks through the Internet, reaching a massive population of job seekers and hire the best available talent at a cost-effective mode compared to the conventional recruitment process. The changes in the recruitment landscape are exciting, with the need to transition for a sustainable economy, handling geopolitical volatility and environmental impact are organizational drivers of change for automation in the recruitment process. Advancements in artificial intelligence, machine learning, and natural user interfaces make it possible to automate knowledge-based tasks of human orientations. To help manufacturing organisations meet these challenges and recruit the best talent, artificial intelligence strategizes are used to develop a cognate recruitment process taking account of candidate's perspective and reaches specified candidates with auto-generated messages, and bonds the best-fit candidates for the organization, delivering quality, quantity and quick to fulfill the organizational requirement of manpower. This paper covers all recent and relevant literature reviews in human resource recruitment and the application of artificial intelligence to reduce the time and effort of the experts in handling the right manpower requirement.

Keywords: Artificial intelligence, Human Resources Management, Manpower, Manufacturing, Organisation Building, Recruitment

1. Introduction

While all the auto majors are focusing on having electric auto-piloted vehicles controlled by voice-based personal assistance. This vehicle market for EVs is the largest segment in the automotive industry, with the passenger car growing at a significant rate in emerging economies of the Asia Pacific region (MnM, 2019). These real-world stimuli ignite changes through disruptions as a big challenge for enterprises and strategy through value-creating investments recognized as pivotal for a major breakthrough. The Internet, coupled with emerging technologies, is changing industries and products as things related to cognition and social

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interaction. The technologies impact the real world but rarely impacts the minds. The inevitable unplanned worldwide unification through the Internet mirrors the evolution of the computing system, fusing the innovations which were split and distributed across the world into a creative existence.

2. Literature Review

2.1. Manufacturing personnel

Manufacturing as an industry has been in decline since the 1970s. In spite of the manufacturing industries have the highest percentages of hiring veterans, and these human resources (HR) professionals state the greater degrees of recruiting complexity like receiving less number of applications. Applicants do not have the desirable work experience, rivalry from other companies; contenders do not have the right technical skills, creating work-ready/qualified job candidates is not available inhouse, and salaries are not competitive for the market. Participants do not have the right personal skills, and qualified people are not interested in a move to near factory location, potential to-be employees do not have the needed credentials/ certifications, probable recruits reject compensation package and absence of curiosity in type of job. Applicants do not have the required training, and probable's do not have sufficient high levels of education. In the lack of basic skills, including computer operations, many are overqualified, are not willing to move due to mortgage or other issues, relocation allowance is not competitive or not offered, low salary package as a constraint and finally others (Schramm & Mulvey, 2016). All these are an issue of concern in the recruitment of personnel in manufacturing industries. With the introduction of AI, organizations can manage these concerns and recruit their desired personnel.

2.2. Current scenario change

Before the pandemic impact of COVID-19, the manufacturing segment ran to recapture the impetus it had attained after the 2008 recession. An average of 22.7% of the world population was employed in industries, as in Fig 1 (World Bank, 2021). The year 2020 faced a considerable plunge in manufacturing employment, mainly owing to compulsory shutdowns in the initial period of the pandemic and suppressed orders. However, this went down rampantly post COVID-19 pandemic, established a huge disruption globally. The manufacturing supply chains have been greatly disturbed. It is estimated that a significant number of Fortune 1000 firms have been severely disturbed by the COVID-19, expected to extend new models of employment, construct capabilities, and delve into fresh worldwide markets (Deshmukh & Haleem, 2020). Industrial production, coupled with the shutdown of factories, mostly automobiles, and electronics temporarily closed and later minimized the production output after the first wave of COVID-19, ended in a loss of global trade (Research & Markets, 2020). The shutdown and closer impacted heavily on the manufactory industries and made employment more difficult for job seekers and recruiters. Figure 1 presented employment outlook in the manufacturing industries worldwide, but the indicator will be different now due to the pre and post-effect of the COVID-19 pandemic.

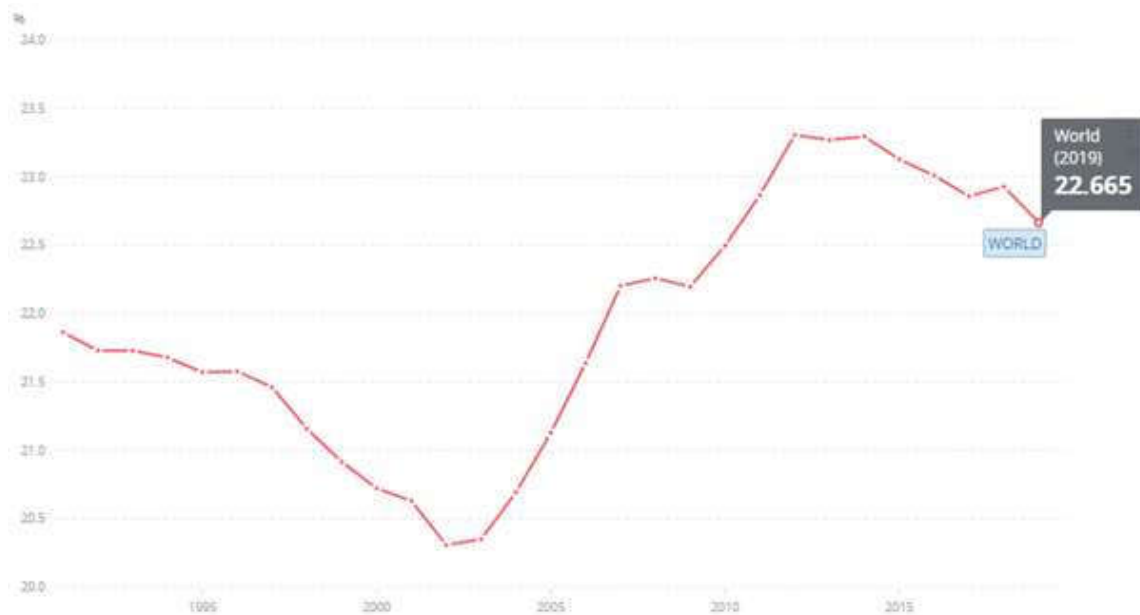


Figure 1: World manufacturing employment indicator in percentage

2.3. Innovation in the recruitment process

The start of an industrial development involves a critical gathering of pressure on manufacturers, consolidating them to lead the production efficiency and reduction in costs, enable a broad-based diffusion into mass markets. The conducive conditions that can be set in motion include income generation, diversification, and universal consumption. Consumers perform a key role in developing and strengthening manufacturing industries, expecting them to offer better and cost-effective products and services over time (United Nations Industrial Development Organization, 2017). At the same time, the engineering sector is dependent on its end-consuming sectors such as power, infrastructure, and manufacturing. A new range of productive waves affects the technological advances in manufacturing technology with advanced robots, enhanced sensors, ambidexterity, and intelligence enviable to humans in manufacturing (Akila, Vasantha & Thirumagal, 2019). The manufacturing sector spans Automobile, Food & Beverage, Chemical, Machinery, Electrical and Electronics, Metal, Aviation, Pharmaceutical and Medical Equipment, Others including Textile and Plastic (Gujarat Government, 2013). Export shares are also of greater importance in these manufacturing industries (European Commission, 2013). Appropriate recruitment facilitates the line managers to operate highly efficiently in achieving the set goal of the business. The manufacturing recruitment activity consumes time, communication connectivity from the point of requirement from the user department, preparation of Job description, sourcing, screening, selection, and finally, deployment (Bhoganadam & Rao, 2014).

2.4. Online recruitment process

The online recruitment cycle includes the following process of Screening, Interviewing, Assessment and Selection through Internet reaching Company Websites, Social Networks, mailers, CV databases, and Online Job Portals. The quality of applicants depends on the search criteria of a wider choice, with notifications of job vacancies, facilitated search by job title, job description, and vacancies available. The expected optimization parameters are timing, cost, the effort for searching activity, workload, Recruitment cycle, and process consistency, substantiating swift acceptability for the adoption of e-recruitment (Akila et al., 2019). Initially, the technology impacted the job postings, and resumes appeared online; then the social media for recruitment arrived and increased the focus on candidate experience; later, the recruitment marketing campaigns impacted on the potential pipelines; and now the Big data has a massive impact on the candidate and

employee data points, where AI will augment HR, and will not replace it (Allyo, 2018). Manufacturing industries that are manpower-centric find better ways to resourcing the right talent, which can be lean-mean and rightly placed as per the business requirements.

Recruitment is the keystone process in Human Resources Management (HRM). Employers across all sectors are progressively aligning to human resource challenges by budgeting more resources into recruiting and developing skilled professionals (Reeb, 2019). Depending heavily on human intervention in recruitment has inevitable limitations, such as incomplete skills, meticulous follow-up, monotonous task adherence, committed time with personal restraints, individual biases, and preconceptions can hinder the effectiveness of a recruitment process resulting in onboarding people who may not be of the right parametric requirement specified at a large-scale level. Biases can be interpersonal, institutional, systemic, or intersection of multiple identities. Predictive tools can be turned to offer organizations to look inward and adjust their erroneous past bearings and suppositions. Such insights could inform data and design alternatives for digital hiring tools to secure and promote diversity or equity goals (Bogen & Rieke, 2018) and also measure aptitude, thinking, or reasoning with logic and appetite for risk.

2.5. Outsourcing recruitment process

The easy option is that many organizations outsource recruiting to outside firms, resulting in vulnerability affected by breaching processes such as forced recommendations, bribed intrusions, unsuitable seeped-in entries, and constrained time pressures; thus, diluting the practice slowly by engaging into more non-traditional methods affecting selection reliability becoming devoid of equal opportunity. AI in recruitment for Sourcing, Screening, Interviewing, and selection (Bogen & Rieke, 2018) can be an affordable solution with less cost per hire or replacement and enhanced quality of recruitment. This can happen only when the algorithm development gets fueled with competent consulting assistance and using the wide database, akin to big data, demanding the input functional knowledge and skill required for automated recruitment when rich and abundant gets to be tapped into the process. When implemented on a smaller database, the search criteria will iteratively keep searching within the limited pool, scrambling within the existing and available databases, leading to no new or better candidate search output. In such automation, in addition to the delivery recommendations based on pattern recognition or candidate matching; luring the right candidate, or according to a connection with the potential recruit for future positions and many more, can also the built-in as extended recruitment services, which are the key latencies available in the recruitment process; in addition to the guiding, reflecting and recommending actions (Bogen & Rieke, 2018). However, organizations can avoid this through their checks and balances, necessitating the final selection to be decided by experienced and key personnel in charge of the end-user, and help eliminate pertinent factors of misses or biases that have gone into the recruitment may endanger the organizational requirements.

2.6. Latent skills of recruiter

The literature review technique was the method deployed in this research. According to Brishti and Javed (2020), Chukwuere, Onyebukwa and Mbukanma (2020), and Nwosu and Chukwuere (2020), academic research can be done using literature review (desktop survey or research) technique in selecting, evaluating, and analyzing existing studies. The exploitation of technology in recruitment is becoming popular due to its online feature reachable to the potential job candidate through job portals, professional and social media networks (Chukwuere & Ramawela, 2019); with accessibility, quickness, affordability, better efficiency, and equal opportunity towards job requirements fulfillment. To find the right job applicants with enhanced speed and efficiency, AI in the recruitment process can reach a larger candidate database involving less paperwork and automatic analysis. It can reveal more data that is normally not extractable from a CV or explicitly divulged by the candidate even during the selection process. Recruitment is a vital process for ensuring a method to employee management to retain a capable and committed workforce aligned within the cultural,

operational, and employee structure for a competitive advantage. Thus, the recruitment process can be quickly identified and verified through AI for its suitability verification process, on the adherence of match between the organizational demand and the claimed or proven potentialities of the candidate. However, activities such as negotiations, appraisal of cultural fit, and many more can be validated through human intervention through experts.

Ethically the information collected should be handled carefully while using the application of AI and should remain anonymous, without revealing the identity of the information source, social media insights, and opinions from others posted online along with the antecedent information received during the selection process. Human Resources collects data from various data points and processes the resumes, assessments, job boards, and social networks for decision making. Recruiters often face difficulty reaching out to the right database on their vacancies. With the application of AI, candidate prediction for a good fit for the job being offered can be attained with candidate information and company data. The AI algorithm will analyze the predictable factors of success linking the job and the candidate from among the suitable pool of candidates through the collection, analysis, and interpretation from available data, online public sites, and the company's systems. The proliferation will lead to the recruitment process evolve smarter and more efficiently. AI increases diversity inclusiveness while filling the vacancies. (Poelmans, 2020; Sehgal, 2020).

2.7. Errors to be corrected

Predictive recruitment instruments disclose institutional, systemic biases; hence detaching such sensitive features does not lead to any pertinent solution. Predictions on the earlier hiring decisions and evaluations divulge and replicate patterns of unfairness at all junctures of the recruitment process, smoothening clear disregard to discriminating attributes of race, gender, age, and other protected details. These possible loopholes upon investigation need not be a postmortem if the organizational recruitment process emerges with a policy such as breaking down the steps of recruitment to seamlessly connect the existing resources for mobility and identify the need and path for the future recruits laid on a clear job and role description for positioning the preferred employee. It is time to change from the existing process and practices of recruitment to more innovative recruiting methods to stand out in the global market scenario. The above problem does not necessitate any comparison of Human intelligence concerning Machine Intelligence and becomes dragged into controversies of undermining or overpowering any of the above, but only facilitates identifying a solution that can overcome the problems in the existing human-based intervention for a fair unaffected recruitment process.

3. Result and discussion - The Need for AI in manufacturing recruitment

Manufacturing industries have gone through an automated process in their core functions during the recession, eliminating nonvalue added and low-middle skilled activities. It involves skilled technicians to operate the machinery or technology that had replaced the jobs. These new roles need varied and hypothetically additional technical proficiencies compared to the past (Schramm & Mulvey, 2016). An interview process does not limit audition, but it enlarges the opportunity for both candidates and the organization to explore the best possible fit. AI applications in recruitment can include Pre-screening, Pre-selection, Communication, Scheduling the interview process, Validation of people and professional networks, and others. Pre-screening is the first stage which includes matching the job description with the keywords of Skills, Qualifications, relevant market matching details such as job profiles, and specified similar or competitor organizations in the CV. The second stage is the Pre-selection, which is enabling the conduct of Aptitude, technical and Psychometric tests online with real-time capture of the texts within the specified time limits. The third stage is the process of Scheduling through a web conference. The interview meeting gets

scheduled after identifying the panel member's acceptance. Later the meeting gets arranged to be organized on the candidate's and panel availability. This process finally culminates with a recording of the event.

Social media networks and professional online networks can also describe the technological process that bridges together in listing the ranks of the best-fit candidates for a job vacancy. AI thus focuses on facilitating the algorithmic decision based on the past events relying on the patterns, logic and automatically learns to propose the way to pick candidates, schedule the time, date of the interview process, and finally categorize the type of people required eliminating others who might not be suitable for the job. AI hastens the recruitment process and generates an exceptional applicant experience, with a substantial reduction in costs. It can easily find suitable candidates and focus more on the best job vs. Person match. Using AI for talent gain is possible to drive insight into the competitors and increase organizational competitiveness. AI is the right tool to solve unconscious biases, enforcing legitimate selection, which is social, morally, ethically, and legally accepted, equally and non-discriminatory in all areas.

AI can take many different forms of robots, bots, or software with novel applications verified as a set of techniques that allow machines or gadgets to accomplish tasks that would otherwise necessitate the reasoning skills that human intelligence brings. Machine learning is a form of AI and big data for the implementation of customized solutions within manufacturing industries to use for the recruitment process. The customization is routed through cognition correction and amplification and further seasoned for accuracy through deep learning. AI-based recruitment can rank the candidates for qualification, experience, and skills and responds to candidates with positive or negative feedback. The feedback is quick and timely that the candidates are avoided any frustrating wait while being informed with a positive experience on their deficiencies in skills, experience, qualification also hence providing them the available alternative positions that might be of interest to them in the current period, through web and mobile platforms; saving time and effort significantly (Brishti & Javed, 2020). Depending on the features, the automation assistances report with candidates reduces the supervisory attention required to engage with potential hires through intelligent automation, AI recruiting assistants, intelligent recruiting software, and digitized interviews (Paramita, 2020; Deshpande, 2018).

AI includes Machine Learning (ML) as a subdomain for the technical investigation of data models and algorithms that computer-based program structures use to improve their output on a particular effort. At its core, ML is the mechanization technique to uncover patterns in the details to create a prognosis (Bhavsar, Shah & Gopalan, 2019). This acquired knowledge is stored in the knowledge base. Deep learning (DL) center's on researching the data depiction and is entirely nonidentical to delivery set algorithms. DL algorithms localize components as categorization of ML algorithms to bring efficacy in functional correlations with computational inputs such as voice, text, and image comprehensions (Bhavsar et al., 2019). The analyzing system works on the algorithm that uses Natural Language Processing (NLP), a subdomain of Artificial Intelligence—reading the resumes and understanding the CV format transformed into a specified format. The system acquires more information about a candidate from their social and professional profiles then updates the knowledge base. Ranking Attributes include current drawn compensation, total experience, expected compensation, relevant experience, correlated with educational qualification, skills of communication, specialization; proven ability with a current employer with a specific location, stability with a span of the work period, and gap if any during the entire career (Khan, 2016).

4. Additional benefits

The escalated attention on automation varies the way firms believe occupational tasks such as MIS, infrastructure support, data management, organizing, sequencing, and people management. Artificial intelligence-powered software and applications cannot fully substitute human intervention in the recruitment process. Still, they can cover talent acquisition, resume scouting, virtual video interviews, multifunctional

chatbots, and predictive analytics. Covariates for prediction include selection groups design, procedural and distributive equity, job pursuit intend, organizational appeal, and disputable areas that can be scrutinized and balanced across conditions (Booth et al., 2017).

5. Conclusion

The use of AI offers a better ability to assess skills, objective evaluations, better-felt experience in the candidate, and stamps the employer brand during the recruitment process. Seamless online scanning of applications, interview robot application, antecedent, and character verification, proposes salary and compensational benefits, gauging the team's potentiality and others, are transformational factors of AI application leading to better ability to assess skills, less unconscious bias, and more candidate engagement from the existing. Manufacturing industries are leveraging the valuable AI automation in recruiting delegates talent acquisition process with the right hiring decisions to be swift and greater efficient throughout the recruitment operations.

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