

A Review on Involvement of AI, RPA and IoT in Human Resource Management

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Abstract— By definition, Human Resource Management (HRM) is the strategic approach to effectively and efficiently managing people in a company or organization. HRM involves tasks like recruitment, training, and development, managing company culture, managing employee benefits, salary processes, attendance records, data maintenance, exit formalities, etc. From the start of HRM, the work was mainly paperwork, which is being digitized in this digital era. In this paper, technologies like AI (Artificial Intelligence), RPA (Robot Process Automation), and IoT (Internet of Things) are reviewed. These technologies help HRM departments and HR (Human Resources) individuals in several ways to improve the services involved in it. The primary purpose of the present research is to investigate the ways in which HR practices are being influenced by technological advancements. Taking into account earlier study investigations and evaluating both the prospective benefits and drawbacks of utilizing these systems, one arrives at the conclusion that this technology is very recent.

Keywords— Human Resource Management, Artificial Intelligence, Automation, Robotic Process Automation, Internet of Things.

I. INTRODUCTION

The oversight of the human resources department is a role in organisations that strives to maximise the performance of employees in helping to achieve the corporate objectives of the company they work for. This role is frequently referred to as human resource management (HRM) or just HR for short. Human resources is largely concerned with the management of people inside organisations, with a particular emphasis on policies and procedures. In most businesses, the Human Resources (HR) department or unit is responsible for a variety of tasks, some of the most common of which include employee recruiting, training and development, performance evaluation, and awards. Industrial relations also fall within the purview of HR. [1].

Human resource management (HRM) maximises employee performance to meet the company's strategic goals. HRM in changing organizations, 2009. HR is primarily focused on policies and mechanisms that govern how people are handled within firms. HR departments and units are often in charge of a variety of tasks, such as hiring new employees, providing them with training and development, evaluating their performance, and providing awards. Industrial relations or the balance of organizational practices with rules resulting from collective bargaining and governmental laws is another area of HR that is of interest. The goal of human resource management, also known as HR or just HR, is to maximize employee performance in support of the strategic goals of the company. 2009 study on HRM in evolving

organizational situations. HR is primarily focused on policies and mechanisms that govern how people are handled within firms [2]. HR departments and units are often in charge of a variety of tasks, such as hiring new employees, providing them with training and development, evaluating their performance, and providing awards. [3].

However, there has been relatively little research done on its effectiveness, and the majority of the research that has been done thus far has not examined the degree to which these new platforms assist businesses in achieving their HR goals of attracting, motivating, and retaining workers. The fact that current systems have a variety of problems, such as the fact that they primarily rely on one-way communication, are impersonal and passive, rarely permit an interpersonal connection, and usually create an unnatural barrier between people and organizations, is one reason for this. Another reason for this is that technological advancements have made it possible for individuals to communicate with each other in multiple ways. [4].

II. ROLE OF HR

Documentation, hiring, screening, training, relations with employees, and remuneration are all topics included in normal HR programs. Despite the fact that each of these programs comprises a variety of HR-related activities, these activities can be categorized into three basic categories: transnational, conventional, and revolutionary. HR personnel makes sure that the company employee is having high productivity so they can help companies to achieve their goals. And in this process employees get the benefits that companies have set aside for them. HR personnel deals with onboarding when more workforce is needed while doing so, they have to evaluate and assess the right candidate for the vacant position. In a bad time of a company where management decides to lay off some workforce for cost-cutting or whatever the reason might be HR personnel has to deal with the procedure of letting go of employees [5].

Large-scale management of organizational leadership and culture falls under the purview of HR. HR frequently oversees health, safety, and security in addition to making sure that local labour and employment laws are followed. When workers seek and are able to legally hold a collective bargaining agreement, HR frequently serves as the company's main point of contact with the employee representatives. In order to advance its objectives, HR thus participates in lobbying actions with governmental organizations, usually through representatives. The field may also deal with mobility, especially in relation to expatriates, and it frequently takes part in merger and

acquisition activity. HR is typically viewed as a business support role that reduces risks and expenses [6].

III. AI IN HUMAN RESOURCE MANAGEMENT

In order to successfully transition HR operations into the digital age, AI is absolutely necessary. Certain activities, such as training, development, and organisation, will be increasingly vital to adapt to these changes that have occurred internally with certain activities and workers, particularly owners' simple skills and regular work. This is because certain activities and employees may be dispensed with, such as certain activities and employees. There is no question that the rising usage of technology and information within the organisation has dramatically altered the kinds of business you need to be successful in as well as the abilities you need to have. The application of artificial intelligence (AI) in the field of human resources can be helpful in a number of areas, including the recruitment and retention of employees, the reduction of the workload of shared service centres and help desks by addressing typical enquiries, and the reduction of the amount of time that HR specialists spend on administrative tasks. [7-10].

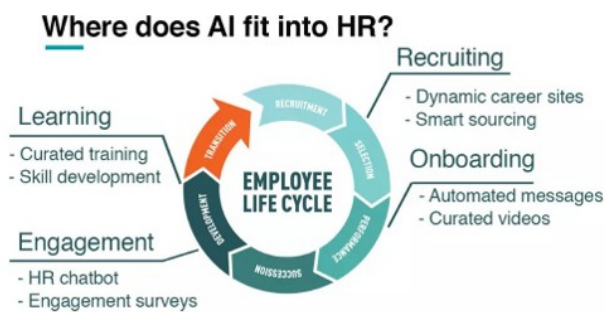


Fig.- 1 [7]

Between 2000 and 2018 on numerous HR subjects using AI, they discovered that until roughly 2006 or 2007, very little research had been done in HRM. These themes included management, team estimation, training, turnover, employability, etc. The use of AI in management proceeded around the first half of 2010, and from then on, the research centered on its use in hiring [11].

An AI system can help with administrative tasks including providing IDs, granting access requests, and organizing first meetings for new hires. It can also verify documentation, manage orientation programs, manage orientation sessions, and manage orientation meetings. Training and development is another area where AI will have a profound effect on HR. In all industries, improving one's skills is a key strategy for remaining competitive. Enhancing your employees' skill sets through training and development is a terrific idea. AI tools can be used to construct training and development plans that are unique to each individual. Consider providing different employees with varying levels of training modules based on their skill levels, employment status, and requirements. Additionally, these AI systems can make it easier to discover resources internally by connecting new projects with employees who have enhanced their abilities or completed a required course. The degree of engagement that a person has

in their work can be significantly improved through the use of recognition and incentives. A motivated employee is one that is not only more productive but also more self-reliant in their work. When it involves incentives and honour, there are a few factors that are necessary, and they include the following: the benefits need to be promptly, they need to be comprehensive, and they need to be consistently.

Zomato is a meal delivery business that works with other delivery companies to offer them with an artificial intelligence system that encourages them to make more deliveries. The system rewards delivery partners with financial incentives after they have completed a predetermined threshold of deliveries. A sizeable portion of each workday is devoted by HR staff members to fielding inquiries. When performance reviews are carried out, a great number of additional questions pertaining to the completion of assessment forms, the submission of work, and the filing of complaints are posed. [12]

These fundamental questions can be answered by AI tools, which may result in a reduction in the volume of messages sent via chat and email that a person must process each day. In addition, AI may assist with the administrative chores of a corporation. Some examples of these are the handling of employee paperwork, the generation and updating of organisational terms and conditions, the updating of employee information in the internal database, and the verification of legal compliance. Depending on the kinds of adaptations that are required, AI may be able to take over some, most, or all of these jobs. AI tools have the potential to assist in decision-making, but not entirely, through the use of methods such as conducting surveys, gathering feedback, and a variety of business-related statistics, such as performance, engagement, and potential areas for improvement. Individuals working in HR are able to base their decisions on the information offered by AI tools. [13-14].

There are many different applications for AI in HRM, some of which include recruitment, personnel acquisition, performance evaluation, and compensation. There are several establishments that use artificial intelligence to screen the thousands of applications they receive, which makes the hiring process far easier and more cost-effective for enterprises. Additionally, it is especially beneficial when picking the most qualified individual to fill a post. An advantage over the competition can be achieved by a business in a service-based economy, in which people are the most valuable resource a company possesses, by using decision assistance to select the best employees. Artificial intelligence (AI) systems are able to "predict" and "learn" statistically by drawing curves that indicate prospective outcomes and then make decisions that are optimized for a range of parameters. As a result, it is possible that AI will eventually develop a system that "predicts" a candidate's performance on the job based on all pertinent demographic data, employment history, and interview questions. When looking for new personnel, it is no longer essential to spend countless man-hours searching through tens of thousands of applications and online job profiles. [15-16]

A firm that offers services related to AI recruiting has stated that the amount of time required for the hiring process may be

cut down to nine days using the AI candidate sourcing algorithm that it has developed. Previously, the procedure required 34 days. The efficiency of candidate sourcing and onboarding have both seen considerable improvements as a result of the implementation of a non-biased strategy that removes the need for assumptions throughout the sourcing process and discovers individuals who are technically qualified for the post. The application of AI also enables the automation of the candidate screening process. This advanced method makes it possible to collect significantly more data from online sources, such as social media accounts, online career records from the past, and school credentials, which in turn improves the ranking system of prospects from which recruiters can choose. [17].

Companies that want to save money on hiring expenses, improve access to talent, shorten response times, and enhance candidates' impressions of the organisation may choose to implement an electronic recruiting platform. Proponents of this strategy assert that automatic matching between job offers and suitable candidate profiles offers a number of benefits, including reduced effort (in terms of cost and time) and the elimination of the requirement that HR professionals have knowledge pertaining to. However, despite the fact that the shift towards the use of information technology for electronic recruitment has altered the process of employee hiring and retention, there are a number of obstacles that prevent it from being fully effective. [18].

Over the years due to the digitalization of job information, including information from candidates to employer and employer to candidates is easily available it has resulted in a reduction of cost and inconvenience of matching jobs. With this applications from interested candidates have increased exponentially. To be able to deal with the assessment of a lot of data could be expensive and inefficient for humans but, AI has been proven more efficient over past decades than humans. fairness can become a determinant of AI adaption. this paper consists of 21 interviews from different backgrounds and ages. It demonstrates that the pre-selection of promising talents is where the use of AI in recruiting is most widely acknowledged.

There are some factors that contribute to fairness that are The level of perceived fairness increases with the degree of diversity, ethical aspects considered, the degree to which people think AI makes fair decisions and reduces discrimination, and the degree to which decisions made using AI are understandable increases or decreases the degree of fairness of AI in hiring. HR leaders and practitioners need to have a comprehensive understanding of how decisions are made. Making sure that employees trust the new technology will depend on this openness For instance, according to a Deloitte survey of senior executives, 72% of them believe that AI in hiring is essential, but just 31% believe that their companies are set up to take advantage of the potential [19].

The term "artificial intelligence" refers to a technology that, in some contexts, can perform as well as or even better than the brain of a human being. When the efficiency of automation the process for hiring was compared to that of conventional recruiting processes, businesses took note of the former and took steps to implement it. Now that growth is being pursued, the recruiting sector is integrating intelligent techniques to

recruit, specifically through the use of artificial intelligence. Because it enables the recruiter to align all unstructured candidate biodata, develop profiles into uniformity, and discover and match skill sets required for the sector, artificial intelligence technology is of significant assistance in the recruitment process. [20].

Specialised artificial intelligence (AI) systems are evolving at an impressive pace in a variety of industries, including health care, automobile manufacturing, online communities, advertising, and sales. While overall-purpose AI continues to be some way off in every field of human endeavour, AI as a whole is nevertheless in its infancy. Concerns relating to the administration of the workforce have led to a lot fewer headway. We offer the following causes for this phenomenon: the complexities of HR, the limited data available from the HR department, equitable and legal constraints, and the responses of employees to AI administration. [21].

Candidates who participate in AI-enabled recruiting may be influenced in their decision-making by a variety of factors, including online communities, intrinsic perks, equal opportunity, and trendy on the side of potential employment. 89% of people who are looking for work say that their mobile devices are the most important resource they have while doing so, and 45% of those people indicate that they use their mobile devices to look for work at least once each day. However, just 16% of applications are submitted via mobile devices.

Push notifications will encourage candidates to engage and complete AI-enabled job application processes on their mobile devices in order to increase that number and AI-enabled advertising. Job seekers could easily anticipate the intrinsic advantages of participating in a social media job application process using artificial intelligence (AI) without regard to any practical consequences, such as landing a job through an AI-enabled hiring procedure. Candidates will be more engaged and more likely to finish a digital, AI-enabled job application process if they perceive it as intrinsically satisfying. The issue is that HR sees AI-enabled recruiters as a threat to their jobs, yet instead of being a threat, AI-enabled recruiters will allow HR to pivot into their higher-value activities. When enterprises carry out recruiting AI was used for evaluating applications. The enhanced efficiency brought about by AI in recruiting was clear, however, opinions on the accuracy of applicant evaluations were divided. More than 50% of those surveyed who had not yet used technology or who planned to do so in future either disagreed with an evaluation of the application or had no opinion on it, there was a lack of trust shown in AI's capabilities for evaluation [22].

IV. RPA IN HUMAN RESOURCE MANAGEMENT

Transactional activities are daily activities that largely concern record keeping. Examples include entering payroll data, monitoring changes to an employee's status, and overseeing benefits administration. Traditional HR programs including planning, hiring, selecting, training, compensating, and managing performance. These activities may have strategic value for the organization if the results or outputs align with the organization's strategic objectives. Organizational or cultural change, structural realignment,

strategic reorientation, and increased creativity are examples of transformational actions that offer value to the organization. [15].

Robotic process automation is being used to transform HR procedures in small and medium-sized businesses (SMEs) enhancing competitiveness in the digital era. An evaluation of the HRM department's present manual, paper-based processes are required to assess whether or not RPA can be used to improve them. Adding automation to operations is a significant barrier for many SMEs. The order in which RPA could be used to automate various processes and sub-processes, as well as which ones to automate first, can prove to be a significant problem for HR departments of SMEs. RPA deployment is dependent on the RPA platform being utilized; therefore it might be challenging to select the best RPA platform for the HR department. The type of papers being analyzed whether they are scanned or created, with or without graphics, etc. must be taken into account while establishing an RPA-based solution for documentation. Processing data that has been wrongly extracted might frequently take a long time. RPA can be regarded as a feasible option for streamlining HR procedures, which can quickly increase a business's overall value even though some HR processes still need human intervention to fix extraction problems [15].

A pilot implementation of RPA in an enterprise is carried out to gather information about how RPA can be implemented in an enterprise and how it affects employee productivity although it remained in the initial phase and could not be implemented in live operations. But this study has presented some benefits like when human resources are overused or when the HR department is unable to manage onboarding or training on time, the organization may leverage this robotic capability. The very repetitive jobs, which are still carried out by humans and may lead to burnout and other workplace problems, provide another enormous area of opportunity. This might be done by robots, and since work-life balance is popular right now, it might be advertised as a perk for employees [16].

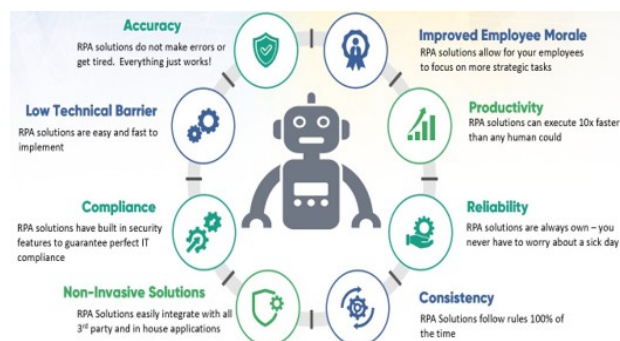


Fig:2 RPA benefits [14].

The use of RPA in HR procedures has enormous potential. It can facilitate the automation of numerous common HR operations, including the onboarding and offboarding of employees, updating employee information, the procedure for timesheet submission, and many other similar duties. This study gives a structured approach in implementing RPA which involves 6 stages. Stage 1 involves assessing the RPA product, identifying processes that should be automated, and

creating a business case for RPA implementation. The second stage involves resource allocation and approval. The third step entails creating the RPA structure and putting together the team to implement it, with an emphasis on developing internal capabilities and self-sufficiency as soon as is practical. It also involves team training for all participants. The fourth stage involves testing the four automated processes, communicating the test results to management, emphasizing the advantages of RPA, and addressing concerns about job loss. In stage 5, six more processes are automated, offering all employees advanced training. Stage 6 is concerned with ongoing development [17]. Chronologically growth from year 1998 to th recent year is shown in Table-1.

V. IOT IN HUMAN RESOURCE MANAGEMENT

In recent years, IoT is revolutionizing the industry by connecting everything to the internet and the HR department is no exception to it. IoT wearable devices are helping enterprises to gather data about their employees about their physical health, mental health, and productivity, IoT sensors also help in the training and evaluation of an employee.

The application of IoT in HRM necessitates changes to HR technology (hardware, software, and data), HR activities including flexible work schedules, performance improvement, and customised work environments, as well as HR actors (tasks and qualifications) With the aid of employee self-service (ESS) technology, staff members can manage their own data without the assistance of HR specialists and register for training with the goal of increasing productivity. Electronic performance monitoring may change a number of HR processes, including evaluation, recruitment, and training. There are currently electronic records of prescription administration, call and internet monitoring, and other typical EPM forms in use. However, it is becoming more and more common to state that technology like body heat sensor desk hardware and microchip wrist implants may be the future of job monitoring [23].

The usage of wearable IoT in the workplace; these devices collect information on employees' food, sleep, pulse location, and other habits. This information helps companies and people increase productivity at work. It also helps companies keep track of employees' health in real-time. With the use of IoT wearables, there are some concerns present, even though wearables are useful for tracking attendance. It also calls into question the privacy of the workforce. HR should have a company policy about IoT, or there should be laws.

Learning management systems can deliver training in real time if sensors identify employee qualification gaps. Real-time delivery of the relevant training measures is required. Delays and interruptions are reduced if a device can measure typing speed of an employee and that employee is better at typing than receiving calls for example then [19]. This study tries to systematize the academic contributions made thus far and to make clear the uniqueness of Big Data, its implications and difficulties for HRM practice, and the primary contributors within HR practice systems. Big Data will contribute to a more diverse talent pool from which to recruit potential future employees [24]. No matter where an employee is located, IoT devices like smartphones can be utilized to solicit their innovative thoughts and proposals. Employers are using fitness trackers to monitor employee

health, which might provide a company with important employee data that could be utilized to create customized policies. For the objective of increasing efficiency, location trackers monitor the employees' movements and locations. The Microsoft HoloLens and other virtual reality and augmented reality tools aid in the evaluation of applicants by placing interviewees in a simulated setting to gauge how they would behave there.

VI. CASE STUDY

There were two different case studies in the articles that were examined. The first case study focuses on the application of RPA to a business process. This particular case study was carried out on a business process outsourcing (BPO) provider company in Bogotá, Colombia. As a result of the fact that RPA was identified by a number of analysts as one of the new technologies that not only threatens conventional process outsourcing but also presents an opportunity for this sector, this BPO company initially began by testing and prototyping this automation technology on a number of its customer's business procedures. The use case was tested on a procedure involving the creation of a payment receipt. Participants in this operation were split into two groups: those with RPA and those without RPA. One group was responsible for carrying out the operation. In the group that did not utilise robotic process automation (RPA), there were both front- and back-office agents; in the group that did use RPA, however, there were only front-office agents because the robot took care of the back-office tasks. The length of time spent on each case and an agent's overall productivity were the metrics that were utilised in the process of analysing the results. These metrics were calculated for each agent by tallying the number of cases they worked on throughout the time period being evaluated. The conclusion

reached after conducting the test for a week.

When productivity was determined by the number of cases that were worked on by each agent, the group that utilised RPA was able to work on 21% more cases than the group that utilised traditional methods. On the other hand, it was discovered that the RPA group experienced a mean case duration that was just 9 seconds less than the control group experienced. The fundamental reason for this is that some people with a lot of expertise might finish mundane back-office tasks very rapidly, even more swiftly than software robots that simulate human behaviour. [25-28]

The second case study is an interview-based investigation of the application of AI in the field of human resources (HR). The research consisted of a series of surveys that included both open-ended and closed-ended questions. The research addresses ten different questions. According to the findings of the research, interviewees would rather speak with real people than a computer throughout the interviewing process. When questioned about the influence that AI will have on their job, 32% of respondents said it will have a significant impact, 37% said it will have some impact, 20% said it will have little impact, and 10.8% said it will have no impact at all. A total of 72 percent of respondents believe that AI will make recruiting cheaper in the future, while the remaining respondents do not believe it will make any impact. When asked whether they believe AI will totally replace HR positions, 33.8 percent of respondents responded that it will, while 53.8 percent of respondents felt that it will not completely replace HR jobs. 12.4 percent of people were unsure. About 55.4% of respondents indicated that they had trust difficulties regarding the application of AI, whereas 40% of respondents stated that they do not have any trust issues.

TABLE I. CHART FOR YEARWISE TECHNOLOGY USED AND WORK DISTRIBUTION

Ref. No.	Year	Technologies used				Work contribution
		AI	RPA	IoT	HRM	
[1]	1998				√	This paper presents a definition and work of HR individuals.
[2]	2009				√	Discussion on the role of HR individuals.
[3]	2021		√			This study collected data on how robotic process automation (RPA) is being utilised to improve human resource (HR) procedures in medium-sized organisations (SMEs) and increase technological competitive.
[4]	2019				√	Discussion about various technology and their impact on HRM.
[5]	2019				√	The authors have described HR activities.
[6]	2019	√				AI technology helps recruiters align unorganised applicant biodata, generate standardised the profiles, and find and connect industrial competencies, which greatly impacts the recruitment procedure.
[7]	2020	√				The use of AI in human resource activities can aid in a number of areas, including recruiting and retention, lowering the workload of shared service centres and help desks by handling common inquiries, and reducing time spent on administrative chores by HR experts.
[8]	2019				√	Papers show research done from 2000 to 2018. It shows in which area of HRM have research taken place over the year.

[9]		√				Gives a brief description of Ai's involvement in every aspect of HRM.
[10]	2018					This study presents problems that the implementation of AI can face one of them being that employees trust on the new technology.
[11]	2019	√				It is a study of 21 interviews where AI is used to increase the degree of fairness.
[12]	2015	√				AI technology enables recruiters align unorganized applicant bio-data, create standard the profiles, and find and match industry-specific skill sets.
[13]	2019	√				HR procedures, ethics and legal constraints on advertising, and staff responses to AI management might slow growth.
[14]	2020	√				Although it was obvious that AI had increased productivity, there were differing views on how accurate application evaluations were among more than 50 per cent of surveyed individuals who planned to use or not used the technology.
[15]	2021		√			This article outlines early findings from a university-SME partnership on RPA use in HR activities. Many SMEs struggle to automate.
[16]	2019		√			This study provides a pilot implementation of RPA although it remained in initial phase it has produced some benefits.
[17]	2020		√			The study gives a structured approach to implementing RPA. It is 6 stage approach that identifies the process, resource allocation, training and maintenance.
[18]	2017		√			This study presents a study on the implementation of RPA in BPO service provider.
[19]	2018			√		This paper discusses the usage of IoT wearables and their benefits.
[20]	2020			√		Papers present a framework for IoT usage and issues with the usage of IoT wearables.
[21]	2022			√		IoT devices and how they help in the learning management system by providing real-time data.

VII. CONCLUSION

In conclusion, there need to be more quantitative research needs to be presented for further advancement of technologies in HRM. It will help to measure the benefits of mentioned technologies. AI helps in recruiting, data Maintenance, and benefits distribution. In recruiting it helps sort candidates according to job role also in interviews it could eliminate bias giving a candidate a fair chance. AI has difficulty in implementation as there are trust issues for humans as it is a very new technology. RPA helps employees to reduce their repetitive and time-consuming tasks. But RPA increases the productivity of enterprises. RPA is considered a job-snatching technology by employees. Employees will need training before getting used to the RPA.

IoT devices keep track of real-time data which helps enterprises to track their employees' data. This data will help in the policy-making of enterprises. IoT devices collect data all time and the privacy of employees.

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