



ROLE OF INTERNET OF THINGS (IOT) IN REVAMPING THE HUMAN RESOURCE FUNCTIONS IN LEADING ORGANIZATIONS: AN EMPIRICAL STUDY

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Abstract

Almost every leading organization has become a technology-based organization for the management of their business operation, and there is no choice left for Human Resource leaders but to adopt the Internet of Things in Human Resource functions. Management requirements and payroll are some of the main functions or activities of Human Resource Management (HRM). Internet of Things (IoT) or Artificial Intelligence is a highly attractive word, and it fascinates many organizations for its adoption. IoT has become a highly amusing subject in present time to discuss in the workplace, both inside and outside. The HRM department is also running in the same race. The focus of today's Human Resource professionals is on the importance of enhancing the amalgamation of human and computerized work for innate environment of work. Artificial intelligence is being adopted by organizations in the functions of human resources at varying rates. It is vital for HR professionals to acknowledge and get themselves prepared for such technological transformations that would redefine the organization and its workforce features. IoT-based HRM assists organizations in yielding both short and long-term advantages. Such

advancement in technology in business organization has brought humans and machines closer and is exploring different ways of using it for the improvement of productivity, easiness, and efficiency at work. The study had considered sample of 215 people from HR department respondents to conduct the study survey and know the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations and found that Recruitment process, Selection process, Performance management and Information and analytics are the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations.

Key words: Internet of Things (IoT), Technology, Human Resource Management (HRM), Industry 4.0, Technology Adoption.

Introduction

Internet of Things (IoT) and Artificial intelligence have helped organizations to connect, monitor, track, analyze, and evaluate humans and machines in digital framework. Internet of Things (IoT) assist organizations dealing with personal as well as organizational gadgets of workers and organizations in seeking jobs and association with population through driven applications. The Internet of Things (IoT) provides such facilities to organizations that deal effectively with Human Resources, its planning, compensation, recruitment, management of employee data, measurement of security, interviews, etc. Some of the basic HR functions like recruitment, selection, training and development, compensation, performance management, information, and analytics. IoT has become a new development in the technological field and evolved as a trend in the market and technology advancement. The Internet of Things includes concepts of computers, networks, and sensors assisting organizations to control and monitor distinct devices. It is shown by this study that there is a positive impact of IoT on HRM that results in better workplace organization. This emergence has impacted HRM in a big way. In majority of cases, such digital transformation and technological invention have assisted HR department in preparing their workforce for adjustment at workplace, putting big data to use

beginning from recruitment to talent management. Internet of Things is a technological innovation that has impacted HRM. The introduction of IoT influence organization in translating focused approach for a designed technology utilized to make a path for IoT system (**Mohanty & Mishra, 2020**). The Internet of Things would see rapid transformation and would progressively become a combined element in the workplace. We can assume that IoT would have grid inferences on activities of organizations particularly in ways of managing human resources. The progressive development and application of the Internet of Things in HRM are perceptible as an incomparable amount of data is generated by IoT related to people. Technology related to Human Resources can be acknowledged as a connection of Human Resource data, hardware, and software. Transformation in all three elements can be anticipated with the application of IoT in Human Resources (**Kremer, 2021**). Researchers and developers of IoT are making efforts together for extension of technology on a big scale and for the benefit of society at the highest possible level. In our daily life, we are experiencing huge transformation with the increased involvement of IoT technology and its devices. The importance and potential of IoT is seen in economic and industrial growth of developing nations. It has also appeared as a revolutionary step in the stock and trade

market (**Kumar, Tiwari & Zymbler, 2019**). A great impact is made by information technology on organizations that are working in a vibrant environment. The author developed a study on the portent to make contribution towards a predominant knowledge of industry. Making best use of the Internet of Things can bring high efficiency and effectiveness of human resources. This work has identified that the influence of Industry 4.0 in Human Resource Management has increased, and a majority of organizations have already started their adoption with the transformation that is brought about by Industry 4.0. There are some major functions of Human Resource Management that are job designing, recruitment, employee retention, training and development, and performance management. All these are improved and have started moving from traditional HRM to modern and smart practices of HRM. Better decisions are made by managers by using elements of Industry 4.0 helping them to make the best usage of resources, satisfaction of employees, and their engagement would improve. Functions of HRM are improving and becoming more efficient and effective with the application of elements of Industry 4.0 (**Rafique, Asim, & Manzoor, 2021**).

Integration of Artificial intelligence-based applications with functions of HRM are having more influence on improving organization performance. Even though advanced Artificial Intelligence technologies might not be as skillful as humans, and might not have cognitive and emotional capabilities, but then these strong Artificial intelligence-based applications of HRM can with its pattern and algorithms evaluate, foresee, identify situations, and can provide solutions that are practical in nature. There is one business where AI is incorporated quickly is Human Resource Management. It will be witnessed very soon that Human Resource Management will change from its normally developed organizational

abilities to more advancement such as automation, robotics, amplified intelligence, and AI that has completely–featured and re–molded working methods of employees and related links. Artificial intelligence is found to be a highly discussed term and has entered almost every sphere of human resource functions and has transformed Human resource department all over the globe (**Pandey, 2020**). Exactly like other functions of business, integration of technology and HRM with other systems of business has become a necessary requirement. Organizations are searching out ways by which they can do reinvention of process of HRM. The development of Artificial Intelligence over the revelatory assessment space makes something to take better and progressive all-inclusive jiffs of knowledge in driving capability development enabling experts of human resource to settle on better selection on the most skillful way of sending its employees to fulfill needs of organizations more sufficiently (**Arora, 2019**).

Literature Review

Saxena (2020) studied Artificial intelligence is applied in a wide range of areas of organization in an impressive way. The introduction of AI in business organizations has opened doors and ways to endless opportunities. Countless possibilities are cleared in future for AI particularly when it is regarding Human Resources. It is undeniable that Artificial Intelligence helps and supports managers of Human resources to carry out different HRM functions efficiently that enables them to concentrate on other important tasks. But even at this stage, AI cannot replace humans.

Amla & Malhotra (2017) found that there are some common tools that business organizations are using these days, like artificial intelligence, cloud solutions, big data, etc., to make their human resource management functions faster, string, and smart. The author also studied some

challenges of the application of advanced technologies in everyday functions and some possible ways of resolving them. It can be concluded that HRM is all about the human touch in work, and this human touch would gain more power with the assistance and application of technology. Human Resources is at the front of the fourth revolution of digitalization, it is vital to enable this progression without obstructing human element.

Shaw & Varghese (2018) revealed that evolving technological tools like big data, IoT (Internet of Things), and artificial intelligence would help in automating most of the functions and processes of Human Resources that would result in more efficient and learned team of Human resources. Structure of organization and styles of leadership would be changed to meet the requirement of efficient and smart Human Resource 4.0 implementation that would permit Human Resource departments to play a more tactical role in the overall growth of the organization. Therefore, the managers must adopt suitable approaches to management for their survival and growth in the 4.0 industrial revolution. In the era of Industry 4.0 innovation is a must. It is people's capability on which innovation depends and that is facilitated by learning and knowledge.

Neeraj (2018) stated that the revolution of digitalization is reliant on information technology that ranges from systems that are internet enabled like Human Resources Information Systems, portals, and corporate intranets. The driving forces are intense competition, the requirement to manage employees at global scale, for improvement of Human resource service delivery and for saving of costs. After the introduction of digitalization, HRM departments have changed totally and now they are working more effectively and at minimal cost. Digitalization of the system has helped in recruitment and training and development programs. An important role

is played by digitalization in HRM in hiring and selecting employees and keeping information on employees, training, recruitment, and identification of their achievements.

Chan & Balkova (2022) stated that with the inception of Fourth Industrial Revolution, commonly known as Industry 4.0, there are novel needs that force organizations to reevaluate their present approaches to processes so that they would survive in environment of highly increasing levels of competition whose becoming successful is dependent on tools of automation, artificial intelligence, and social networks. Production, as well as supporting processes must be respected by new challenges. These transformations in HRM are reflected particularly in changing the approach towards the development of staff. The findings of the study conclude that about Fourth Industrial Revolution, the world needs amalgamation of Human resource management, talent and skill management in organizations.

Maditheti (2017) studied that HRM functions like recruiting, learning & development, and performance management have got transformed after the introduction and adoption of technology in the system. It is found that one of the major functions of HRM that is recruitment have been highly influenced by technology. Prior to the introduction of the Internet, organizations and recruiters used to print job vacancies in newspapers, pamphlets, etc. After the introduction of different technological tools, the Human Resources department is matching the requirement of organization and candidates and it has become easier to hire the right candidate for the job.

Zhang & Chen (2023) studied how HRM has transformed digitally in digital economy. The author studied directions, drivers, and influence of digital transformation on Human Resource

Management and places like digital workplaces, digital HRM processes, and digital employee services. The emphasis of study is mainly on digital transformation and its benefits to the whole system, but its potential effects are difficult to ignore, which includes how new and old systems are converted and got impacted by negative impact of new system.

Sharma & Shukla (2013) revealed the impact of IoT and new-age technological tools on Human Resource functions and Database management. This part of the study also covers the technological transformation that took place in recruitment, performance management, and training & development, as well as workflow management. There was a high requirement for Information Technology in HRM and quick reduction of costs in organization. Anyone can be curious to know about the probability of replacing some or all traditional functions of HRM with wide automation of system. The study is an urgent need for the collaboration of Information Technology and Human Resource Management by making considerable investments in placing labor cost and IT separate. Indian organizations are trying their best to transform Human Resource functions and services into digital system of HR. Some organizations' HRM functions are conducted through intranet, while some organizations are transforming their system into new patterns of work like having virtual teams, work-from-home concepts, etc.

Singh (2021) stated that Information technology is considered as the use of personal computers, and web to store, recovering, communicating, and controlling of information. It is also known as a subcategory of Information and Communications Technology or ICT. The advancement of HRM is completely moving the direction of communication. Revolutionary changes in technology, computerization, and digitalization have completely changed the work type, and the

performance of manmade brainpower in Human Resource Management processes has worked with critical thinking and modernization of some cycles. Attributable to the computerized disruption, digital HRM has appeared as another way of practicing HRM function with the latest online and PC-based tools and applications.

Wang, Zhou & Zheng (2022) found that to enable the usefulness and efficacy of digital HRM, organizations are needed to improve capability of HRM department in the practice of implementing electronic HRM. Particularly, developing workforce with the capability of supporting strategic business, measuring capabilities of employees, and building processes for performing tasks based on their capabilities. A key boundary condition is HRM capability maturity to understand the effectiveness of digital functions of HRM. Many previous studies have also explored the influence of digital Human Resource Management in organization that included the impact on reduction of costs, and organizational performance. The focus of author is on the results of digital HRM including perception of employees on efficacy of HRM that can also influence attitude of employees and organizational behavior.

Verma & Rana (2021) revealed that it is vital to understand that digital transformation of HRM has become a highly discussed topic looking at its speed, scope, and scaling. Development of Robotics, Artificial Intelligence, Recruitment tools that are Cloud-based, HR analytics, Virtual Reality, IoT, machine learning, etc. is making HR functions smoother and easier, which is also called as Fourth Industrial Revolution. Digital transformation of Human Resource is the process of transforming operations in HR functions by using data to guide HR areas like performance management, payroll, benefits, training, learning and

development, rewards & recognition, and recruitment.

Gaur & Gupta (2022) stated that this era must be acknowledged as the era of knowledge having a the steadily rising structure of information technology, which is provided by HR analytics, and Internet of Things, marketing analytics along with many other association management fields. It has followed government, researchers, and corporates to develop and patent ethical principles, frameworks, and guidelines. Internet of Things has transformed HRM by involvement of people analytics. It enables and makes functions and activities of HR department easier and smoother through better performance management, recruitment, monitoring, tracking wellness of employees, attitude and behavior management that leads to precise vision of work done. HR professionals are assisted by people analytics for full utilization of big data for making decisions.

Rajalakshmi & Dolai (2018) studied that in present era, a vital role is played by technology in almost every other sector and changing the economy vibrantly. Implementation and execution of technology in different sectors have had positive as well as negative effects, but now the way of working and conditions have become more convenient and cost-saving. As an outcome, the Fourth Industrial Revolution brought huge digital disruption in the domain of HRM. Advanced Human Resource is predictable for digital evolution in HRM function such as performance management, training, learning development, onboarding, recruitment, social sharing, etc. The introduction and application of industrial revolution 4.0 have brought different forms of collaboration between humans and machines including improved reality, systems of virtual reality, association of robots. Quick adoption of technological tools and instruments in the system would surely bring first-mover advantage for organizations. The application of smart

technological tools would improve the way of carrying different activities and functions of HRM, as it will also identify mistakes and do corrections in work through automated system and controls. This revolution would also benefit internal organizations through better coordination and communication between functions.

Hassanzada & Rao (2020) found that in the past decade, the advancement of information technology, and rising expectations of customers have made organizations become more flexible in finding a solution for more sustainability and improved performance. One of the most valuable inputs of an organization is information. The consistency and constancy of HRM in an organization increased by valuable information. At present, organization's information is collected, processed, and stored by information technology tools. Previously, information on organization was mostly available in documents. Theorists of management science have agreed that the power of IT has increased the efficacy of HR along with the growth of organization. It has made responsibilities more transparent and HR to be answerable for enabling and providing good services. Organizations with improved and increased efficacy and by using different technological aspects permit HR managers to use less staff and play more important roles in company.

Objective

1. To know the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations.

Methodology

The study had considered sample of 215 people from HR department respondents to conduct the study survey and know the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations. The data of this empirical

study was collected through “random sampling method” and analyzed by Explanatory Factor Analysis to get the results.

64.7% are male and rest 35.3% are female. Among them 31.6% are below 34 years of age, 40.5% are between 34-48 years and rest 27.9% are above 48 years of age. 26.5% are working as employment manager, 30.7% are recruitment manager, 24.2% employee relation manager and rest 18.6% are HR analyst.

Findings

Table below is sharing respondent’s general details in which it is found that

General Details

| Variables | Respondents | Percentage |
|---------------------------|-------------|------------|
| Gender | | |
| Male | 139 | 64.7 |
| Female | 76 | 35.3 |
| Total | 215 | 100 |
| Age (years) | | |
| Below 34 | 68 | 31.6 |
| 34-48 | 87 | 40.5 |
| Above 48 | 60 | 27.9 |
| Total | 215 | 100 |
| Designation | | |
| Employment manager | 57 | 26.5 |
| Recruitment manager | 66 | 30.7 |
| Employee relation manager | 52 | 24.2 |
| HR analyst | 40 | 18.6 |
| Total | 215 | 100 |

“Factor Analysis”

“KMO and Bartlett's Test”

| | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .849 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2235.590 |
| | df | 153 |
| | Sig. | .000 |

In table above “KMO and Bartlett's Test” above, KMO value found is .849.

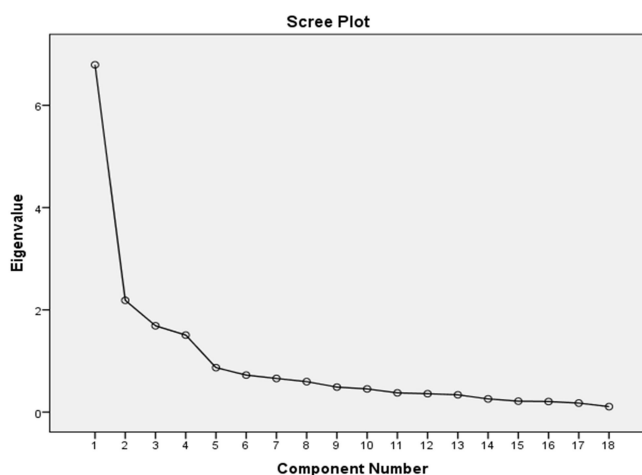
“Total Variance Explained”

| “Component” | “Initial Eigenvalues” | | | “Rotation Sums of Squared Loadings” | | |
|-------------|-----------------------|-----------------|--------------|-------------------------------------|-----------------|---------------|
| | “Total” | “% Of Variance” | Cumulative % | “Total” | “% Of Variance” | Cumulative % |
| 1 | 6.791 | 37.729 | 37.729 | 6.791 | 37.729 | 37.729 |
| 2 | 2.186 | 12.146 | 49.874 | 2.186 | 12.146 | 49.874 |
| 3 | 1.688 | 9.378 | 59.253 | 1.688 | 9.378 | 59.253 |
| 4 | 1.506 | 8.368 | 67.620 | 1.506 | 8.368 | 67.620 |

| | | | | | |
|----|------|-------|---------|--|--|
| 5 | .871 | 4.836 | 72.456 | | |
| 6 | .724 | 4.021 | 76.477 | | |
| 7 | .658 | 3.655 | 80.133 | | |
| 8 | .596 | 3.311 | 83.443 | | |
| 9 | .490 | 2.719 | 86.163 | | |
| 10 | .453 | 2.516 | 88.679 | | |
| 11 | .376 | 2.091 | 90.770 | | |
| 12 | .360 | 1.999 | 92.769 | | |
| 13 | .338 | 1.877 | 94.646 | | |
| 14 | .258 | 1.436 | 96.082 | | |
| 15 | .214 | 1.190 | 97.272 | | |
| 16 | .206 | 1.147 | 98.419 | | |
| 17 | .177 | .984 | 99.403 | | |
| 18 | .107 | .597 | 100.000 | | |

All the 4 factors contribute to explain total 67.620 % of the variance. The variance explained by Recruitment process is 37.729 % followed by Selection process

with 12.146 %, third Factor (Performance management) having 9.378 % and fourth factor (Information and analytics) explains 8.368 % of variance.



Scree Plot

Rotated Component Matrix

| S. No. | Statements | Factor Loading | Factor Reliability |
|--------|--|----------------|--------------------|
| | Recruitment process | | .892 |
| 1. | IoT help to match the requirement of organization and candidates and hire the right candidate for the job easily | .856 | |
| 2. | IoT devices collect data from various sources to identify potential candidates | .834 | |
| 3. | Enable remote skill assessments and monitoring | .794 | |
| 4. | Facilitate virtual interviews | .781 | |

| | | | |
|-----|---|------|-------------|
| 5. | Streamline the onboarding recruitment process | .702 | |
| | Selection process | | .814 |
| 6. | Provide real-time insights by capturing and transmitting data during candidate assessments | .831 | |
| 7. | Track and analyze candidate behavior during selection process | .823 | |
| 8. | Help to provide controlled and standard environment to assess candidate competencies | .800 | |
| 9. | Collect data on candidate interactions with recruitment platforms, response times, and user engagement | .593 | |
| 10. | Detect and mitigate unconscious biases in selection process | .537 | |
| | Performance management | | .872 |
| 11. | Benefit internal organizations through better coordination and communication between employees | .827 | |
| 12. | Identify mistakes and do corrections in work through automated system and controls | .795 | |
| 13. | Track wellness of employees, attitude and behavior management | .770 | |
| 14. | Measure capabilities of employees | .760 | |
| | Information and analytics | | .719 |
| 15. | Organization's information is collected, processed, and stored by information technology tools | .721 | |
| 16. | Consistency and constancy of HRM in an organization in increased by valuable information | .719 | |
| 17. | HR professionals are assisted by people analytics for full utilization of big data for making decisions | .701 | |
| 18. | Provide information to implement strategies to improve organization | .668 | |

Factors and associated variables

First factor is named as Recruitment process which includes the variables like IoT help to match the requirement of organization and candidates and hire the right candidate for the job easily, IoT devices collect data from various sources to identify potential candidates, enable remote skill assessments and monitoring, facilitate virtual interviews and streamline the onboarding recruitment process. Second factor is named as Selection process and its associated variables are Provide real-time insights by capturing and transmitting data during candidate assessments, Track and analyze candidate behavior during selection process, help to provide controlled and standard environment to assess candidate competencies, collect data on candidate

interactions with recruitment platforms, response times, and user engagement and detect and mitigate unconscious biases in selection process. Third factor is Performance management which includes the variables like benefit internal organizations through better coordination and communication between employees, identify mistakes and do corrections in work through automated system and controls, Track wellness of employees, attitude and behavior management and Measure capabilities of employees. Fourth factor is Information and analytics and its associated variables are Organization's information is collected, processed, and stored by information technology tools, Consistency and constancy of HRM in an organization in increased by valuable information, HR professionals are assisted

by people analytics for full utilization of big data for making decisions and Provide

information to implement strategies to improve organization.

Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .894 | 18 |

Total reliability of 18 items that includes the variables related to role of Internet of Things is 0.894.

Conclusion

Organizations are struggling to adopt inventive practices and functions of Human Resources for improvement in their performance and to look different from their competitors. Human Resource Management in near future will move from traditional to modern HRM practices for advanced progress such as augmented intelligence, automation, Artificial intelligence, and Robotics. Artificial Intelligence and Internet of Thing (IoT) has been a life-changing for organizations and every individual. From automation of everyday and ordinary work that consumes lot of time, to the expansion and strengthening of human capabilities, Artificial intelligence has the possibility to bring drastic change in the way we live and work. For Human Resource, it is not only an opportunity but also a requirement to adopt IoT. Today Human Resource professionals are bringing the collaboration of human and work to attain instinctive work environment. O is also providing them sufficient time to deliver the improved performance of employees. HRM functions based on IoT would make impact on certain percentage of workforce, and it is HR manager's responsibility and organizations to imitate on needs of their staff members, and future results. Ultimately, on the basis of this research work, majority of companies have efficiently incorporated IoT-related methods in HR function. Some organizations are still lagging behind in

integrating IoT into Human Resource functions because of costs of IoT integration in system. To conclude, application and implementation of IoT and Artificial intelligence must be considered as a positive opportunity as it would ultimately improve life, and produce better future.

The study was conducted to know the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations and found that Recruitment process, Selection process, Performance management and Information and analytics are the factors that determines the role of Internet of Things (IoT) in revamping the human resource functions in leading organizations.

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