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## Fourth industrial revolution and Human Resources Management: Evidence from developing economies

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### Abstract

There is no gainsaying that Industry 4.0 further scales up human resources management capability and enable upper hand to organization, such that the Fourth Industrial Revolution (4IR), characterizes the integration of digital, physical, and biological systems, with profound influence on HRM through the utilization of machine learning (ML) and the Internet of Things (IoT) from recruitment and selection, employee training and development, performance management, employee engagement and satisfaction, workforce planning and optimization, and data-driven decision making. It was against this background that this study engaged the Resource-based view to explain internet of things (IoT) and machine learning (ML) as constructs of human resource management to measure influence of Industry 4.0. Survey research design was adopted, and census sampling technique was used in the study. Sixty six (66) respondents were administered structured questionnaire that underwent validity and reliability test to ascertain survey validity, accuracy and consistency. The findings showed that there is significant effect of internet of things and machine learning on human resource management. Hence this study recommends that existing software, IoT, and sensors should be taken delivery of by the institution for the ICT unit to optimize her IoT interface. The study also recommends that ICT staff should be trained and re-trained on trending machine learning algorithms so they can build and use computer systems that are able to learn and adapt without explicit instructions.

**Keywords:** Fourth Industrial Revolution; Internet of Things; Machine Learning; Resource-Based View Model

### 1. Introduction

With the world's increasingly competitive business environment and technological revolution, it has become ever more important for global business organizations to depart from traditional business practices to equip themselves with the up-to-the-minute technologies and analytics to carry forward their businesses' strategic growth in the long run. With human resource (HR) taking on the role of strategic partner, HR leaders are continually embracing new technologies to ensure that human capital is productive and meets organizational needs, as well as strategically and technologically building them to provide further performance.

Technology has made it easier for HR departments worldwide to manage the workplace from the comfort of homes. Individual-level analysis has typically been the focus of HR studies. It began to evolve in the 1980s to cover higher levels of analysis, including the plant level and gained traction in the 1990s, notably in associated industrial relations work. Work on the effects of HR on company performance, individual practices, and then systems of HR practices ensued. Human Resource Management (HRM) is more important than ever, especially emphasizing bringing in new individuals with skills and knowledge. With technological improvements comes the opportunity to automate previously manual operations (Vijay, 2022; Gerhart & Feng, 2021).

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Businesses expect more from HR workers as technology advances. Aside from managing HR processes, they must track activities and productivity to enhance them. HR workers benefit substantially from applications such as association management software. The software centralises all departmental activity, saving both time and money. You may complete tasks on a single platform with this program. When you organise work electronically, you may easily assign assignments to personnel. This improves management efficiency and cost-effectiveness. Using software and other tools, technology enables the streamlining and automating of different HR procedures (Kim et al., 2021).

The way HR departments contact employees, maintain files, and analyse employee performance is changing due to technological advancements. When implemented correctly, technology improves the efficiency of HR procedures. Misuse of technology might impede the management of the company's human resources. Reasonable human resource procedures increase advantages while minimising difficulties. Human resource management (HRM) has been considerably revolutionised by technological improvements, which have streamlined processes, improved efficiency, and allowed HR professionals to focus on more strategic initiatives. HR's function has shifted from transactional to strategic due to the automation of many HR procedures through software and human resource information systems (HRIS). Technology has also enabled the centralisation of employee data storage and management, making tracking and retrieving critical HR information easier. Furthermore, incorporating technology into the HR workflow has freed HR professionals to focus on improving the overall employee experience, developing a talented workforce, and making sound business decisions. Technology improvements have substantially impacted HRM, improving efficiency, effectiveness, and HR professionals' overall strategic role (Gayathri&Smrimathi, 2019).

Many functions and responsibilities previously performed by HR experts can now be automated thanks to the development of HR software and other technology solutions. Payroll and benefits management, performance assessments, and even recruiting and recruitment are all part of this. With the introduction of technology, the nature of recruitment and employment has also altered. Many businesses are increasingly advertising positions on online job boards and social media platforms to attract potential candidates. As a result, the recruitment process has become more efficient because HR experts can readily search for and assess resumes and profiles from a broad pool of candidates. HR management solutions, including HRIS and performance and learning management systems, have become more popular due to technological advancements. These solutions enable HR professionals to store and manage employee data, analyse and evaluate employee performance, and give opportunities for training and development (Boon et al., 2019; Stewart & Brown, 2019).

Nonetheless, technology has tremendously impacted human resource management, increasing efficiency and streamlining operations. However, HR professionals must stay current with the newest technology innovations to correctly use these technologies and continue to provide high-quality HR services.

### **1.1. Statement of the problem**

Globalization is undoubtedly one of the most influential ideas in recent years, significantly impacting society, business, and the economy. From a political economy perspective, globalization has eliminated barriers to trade and transactional activities between and among nations; it has increased rivalry among industry participants in general.

### **1.2. Research hypotheses**

- H<sub>03</sub>: There is no significance relationship between machine learning and human resource management.
- H<sub>04</sub>: Internet of Things (IoT) has no significance effect on human resource management.

### **1.3. Significance of the study**

The study facilitates company to know to why and where the improvement it needed. It shall also serve as a reference material for future research work, by the academia.

### **1.4. Scope of the Study**

The study was restricted to selected 20 firms in Calabar metropolis. The result of this study was constrained by factors such as non-compliance by some Human Resource Managers of selected firms to provide required information, time factor and cost of studying the entire population.

### **1.5. Human Resource Management**

Human Resource Management is the process of recruiting, selecting, inducting employees, providing orientation, imparting training and development, appraising the performance of employees, deciding compensation and providing

benefits, motivating employees, maintaining proper relations with employees and their trade unions, ensuring employees safety, welfare and healthy measures in compliance with labour laws of the land and finally following the Orders / Judgments of the concern High Court and Supreme Court, if any.

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## 2. Literature Review

### 2.1. Conceptual Framework

#### 2.1.1. Machine Learning

Machine learning (ML) is a field of Artificial Intelligence that revolves around machines being able to imitate human behaviour without being “smart”. It is increasingly being used in Human Resource Management (HRM) to streamline processes, improve efficiency, and provide valuable insights into employee behavior and performance. ML has the potential to transform HRM by automating mundane tasks, improving efficiency, and providing valuable insights into employee behavior and performance. Some key applications of machine learning in HRM include:

Smarter candidate identification and applicant tracking: Machine learning is being used to identify and define recruitment patterns, helping HR professionals shortlist suitable candidates for a specific role.

Streamlining HR tasks: ML can analyze large volumes of employee data to identify trends and opportunities, improving efficiency in various HR tasks such as scheduling interviews, performance appraisals, and meet.

Analyzing employee engagement: Machine learning can be used to analyze employee sentiment through Natural Language Processing (NLP), helping HR professionals spot potential red flags and address issues before they lead to employee attrition.

Predicting turnover trends: Machine learning can provide valuable insights into factors that contribute to employee turnover, allowing HR and management to deal with attrition more effectively and quickly.

Scheduling HR functions: Machine learning can efficiently handle scheduling tasks, such as interviews, performance appraisals, and group meetings, freeing up HR staff to focus on more strategic projects.

Developing new recruits and existing staff: ML can be useful in identifying and addressing areas for improvement in the skills and performance of both new and existing employees.

#### 2.1.2. Internet of Things (IoT)

Internet of Things (IoT) is a ubiquitous paradigm but also an increasingly present reality in the academic world, industry and business. The very first concept and name of Internet of Things is conceived in the Auto-ID labs of Massachusetts Institute of Technology (MIT) as an effort to describe a vision in which all objects can become virtually intelligent and connected. Consequently, today's remarkable efforts, especially in developed parts of the world, are done towards developing and deploying devices, production plants, systems and complex systems of systems virtually intelligent and fully connected. This industry digitalization is known as “Industry 4.0”, and in Germany, e.g., as “Wirtschaftswunder 4.0”, or “Economic Miracle 4.0” in literal translation. The IoT has undoubtedly had an impact on digital industry, and the question is: in which ways it will affect business in different sectors in the future (Bauk et al., 2018).

According to Mary et al. (2022) the internet of things (IoT) is focused in offering new technologies which is changing the business environment by showing the potential in different sectors like retail, transportation, healthcare etc. Through IoT, the managers can gather and process data and information in an effective manner; also they can use them to automate in order to enhance productivity and efficiency. With the usage of such technologies, human resource managers can access information for possible candidates which can be accessed through IoT. The application of IoT has emerged in enhancing the recruitment of candidates in search of candidates based on large volume of information, assist in screening the candidates, selecting the most suitable ones.

Internet of Things (IoT) is a series of devices and objects connected to each other and to the internet to optimize output through sending and receiving data. Hence, it is the interconnection of computing devices through internet, devices that are embedded in everyday objects, thereby enabling objects to send and receive data (Hassan et al., 2017). For instance, managing home appliance located at a distance from the office through internet, smart medical objects for remote controlling patient care, sensors to monitor general health and wellbeing and administering treatment when necessary.

Physical objects are now connected to the virtual world and can be controlled through remote controls from different places acting as access points for internet.

Internet of Things (IoT) is defined as a game-changer in the HRM sector. It is because of IoT that employers can now have access to performance data of employees. It helps the managers simplify the evaluation and appraisal process, making the HR-related work in the organization more accurate and streamlined. This saves a lot of time and effort (Vijay, 2022). Pauget and Dammak (2019) opined that “implementations of health information technologies are notoriously difficult, which is due to a range of inter-related technical, social and organizational factors that need to be considered (...) However, these dimensions are inter-related.” IoT presents a similar entanglement of technical, human and organizational dimensions.

According to Mohanty and Mishra (2020) IoT has revolutionized business. Tracking productivity has never been as simple as now because of these series of devices. Communication tools, wearable computer devices, trackers etc. have greatly taken the workplace and normal life than ever before. In what way IoT is changing the world of business is still not fully fathomed by researchers nor practitioners. There is a difference between consumer IoT and Industrial IoT having repercussion on the technology utilized as well as their business models. Whereas the earlier aims at improving consumer quality of life by saving time, money and energy, the later is integration of operation technology and information technology for improving business through networked sensors, smart machines and data analytics (Palattella et al., 2016).

Kremer (2022) reported that the application of the IoT potentially increases the efficiency in regard to the recruitment process. The IoT can optimize all stages of the recruitment process and improve hiring decisions. At present, Internet of Things (IoT) has great impact on e-HRM, which gives various facilities and supports to e-HRM functionalities such as securities, standards, privacy, and regulations. The combination of e-HRM with IoT has wide applications for implementing policies, strategies, and practices within the organization. An e-HRM has mainly five activities: e-Selection, e-Recruitment, e-Performance, e-Compensation, and e-Learning. (Nasar et al., 2021).

Yawson et al. (2021) assert that since the launch of the world-wide web in the early 1990s, the Internet has impacted the way we live and work with the 'speed of light.' Society is facing yet another wave of Internet technologies that will have a big impact on the way we live and work. This phenomenon known popularly as the Internet of Things (IoT) presents a situation where data generation is the order of the day – every human interaction whether with living or non-living things generate some form of data making the workplace a data-driven environment.

## 2.2. Essential Technological Tools Used

Human Resource tools are the wide range of technological solutions that help organizations to manage their day-to-day HR activities effectively. Here are six HR tech tools that businesses of any size can implement for a happier, better-organized workforce.

### 2.2.1. The Human resource integrated system

The Human resource integrated system (HRIS) is an integrated system designed to improve the efficiency with which HR data is compiled and to make HR records more useful to management as a source of information. An HRIS offers a wide range of HR uses, with payroll, benefits administration, and EEO/affirmative action tracking being the most prevalent. The major characteristics are: Recruiting / ATS (Applicant Tracking System); Core Human Resources; Benefit Administration / Open Enrollment; Absence Management; Compensation Management; Training & Development; Workflow; Reporting.

### 2.2.2. Payroll Service

HR technology can help businesses handle all their human resource needs, including the payroll services for small businesses. Some of the most popular, well-established, or well-known online payroll service companies and payroll technology firms to consider when researching small business payroll solutions.

- **Paychex:** Cloud-based platforms where employers and accountants can upload payroll data, create custom reports, and manage benefits. Paychex provides personalized customer support from their team of payroll specialists. It acts as a popular choice among small businesses i.e., between 1-49 employees. Their current software packages include cloud-based access and mobile app capability which helps in handling the employee payroll details for the busiest business owners

- **Automatic Data Processing:** Automatic Data Processing (ADP) is a well-known provider of payroll and human capital management solutions. ADP offers a wide variety of solutions for businesses of every size. It helps small business to handle their payroll based on various determinants of an employee. Employees can access their records and pay information through a self-service portal available on any device. The specific products you consider will depend on the size of your business. RUN is a good choice for small businesses, Workforce Now for midsize companies, and Vantage HCM for enterprises.
- **Intuit:** By using QuickBooks software, it is possible to reduce financial errors, keep track of deadlines, avoid financial penalties and also improves the overall experience of a small business.
- **Patriot Software:** It is a lesser known software, but a solid choice for small business. A unique thing in Patriot Software is that they offer both accounting and payroll so that customers can potentially manage their financial information from a single system. Also Patriot doesn't offer a mobile application; hence the self-service options for employees are limited.

### 2.3. Performance Solutions

Performance evaluations and tracking are not only an annual meeting between supervisor and employee, but the goals and objectives discussed in that meeting are tracked and re-visited throughout the year in an organization by the HR. Many HRMS and payroll solutions such as ADP come with customized module.

### 2.4. Employee Engagement Tools

Employee engagement is a high priority for many companies. With today's tech tools, you can monitor your organization's culture, giving you better insights into what your employees want. Other options for engagement technology include: Company intranet platforms; Corporate social networking. Technology within the workplace continues to allow businesses to improve communication with employees. Tools such as virtual technology, social networking, and online portals make employee engagement limitless, as it fosters the ability to collaborate between departments, increases social engagement within the workplace and also facilitates employee training and education.

The potential of these new technologies can become overwhelming. It implies, recruiting software streamlines the hiring process. You can post job ads, sort and accept applications, manage candidates and more. Some of the recruiting software packages and its determinants used in an organization are: Video Interviewing; Testing and Assessment; AI & Automation; Applicant Tracking System (ATS); Recruitment CRM.

Benefits Management platform includes the benefits provided to the employees working in the organization like vacation time, retirement plans, health insurance, paid time-off, worker's compensation and other perks. The Professional Employer Organization (PEO) acts as a legal employer of your workforce, issuing employee's paychecks and managing benefits and compliance as it operates under a co-employment arrangement (Gayathri&Smrimathi, 2019).

### 2.5. Advantages of Technology in HRM

Technology has brought about the beneficial transformation that is required in the HR department. Technology that centralizes administrative tasks helps put HR professionals' priorities into more important tasks. A list of association management companies can help you choose the best management software. One of the main advantages of technology in HRM is the ability to access a larger pool of talent. With the use of online job boards and social media platforms, HR professionals can easily reach out to and recruit candidates from around the world. This allows companies to tap into a diverse talent pool and find the best candidates for open positions, regardless of their location.

Another advantage of technology in HRM is improved efficiency and effectiveness. HR professionals can automate many of their tasks and responsibilities by using human resource information systems (HRIS) and other HR technology tools, freeing up time and resources to focus on more strategic HR initiatives. Technology also allows HR professionals to store and manage employee data in a centralized location, making tracking and accessing important HR information easier. HR professionals who effectively utilize these developments will be successful in a changing business environment.

Technology changes the way HR departments contact employees, store files and analyze employee performance. When it is used well, technology makes HR practices more efficient. When used poorly, it can get in the way of managing the company's human resources. Good HR practices maximize the benefits and minimize the problems (Gayathri&Smrimathi, 2019).

## 2.6. Challenges of human resource management technology

While technology has improved and streamlined human resource management in some ways, it has introduced new issues as well. Some of the most common HR tech challenges include selecting the right HR system, implementing it and integrating it with other tech (Tambe et al., 2019).

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## 3. Empirical Review

Ewertowski et al. (2023) interrogated the use of machine learning techniques for assessing the potential of organizational resilience. Data for the study was collected through the use of questionnaire. Two well-known regression algorithms were employed in the analyses, namely, Multiple Linear Regression (MLR), and Multivariate Adaptive Regression Splines (MARS) as a more advanced and adaptable regression technique for high dimensional data. The result of the research revealed that it is possible to optimize the results of estimating the organizational resilience potential by an appropriate machine learning method and that, there exists a difference between the importance of the surveyed variables influencing the potential of organizational resilience in the studied subscales.

Maqbool et al. (2023) examined the prospect of emerging industry 4.0 and Internet of Things (IoT) technologies in the Ghanaian construction industry. The study adopted a descriptive survey design to conduct an exhaustive literature search on existing work on industry 4.0 practices in public-funded initiatives, followed by a survey employing a face-to-face and postal questionnaire technique. The population of the study comprised of architects, engineers, construction managers, and quantity surveyors who were registered with their parent institutions, such as the Ghana Institution of Surveyors (GhIS) and the Ghana Institution of Engineers (GhIE) and practise within Kumasi. The purposive sampling technique was used to determine 154 professionals. Data was acquired for the study from both primary and secondary sources. The collected data were analyzed using the one-sample T-test and mean score ranking. The findings revealed that smart construction was the most popular industry 4.0 technology in the Ghanaian construction industry.

### 3.1. Theoretical framework

#### 3.1.1. Resource-based view Model

Resource-based view (RBV) suggests that competitive advantage stems from the unique resources and capabilities a firm possesses. ML and IoT technologies can be seen as valuable resources that enable HRM to gain a competitive advantage by improving processes such as recruitment, training, and performance management. Firm Resources and Sustained Competitive Advantage article as authored by Barney (1991) is widely cited as a pivotal work in the emergence of the resource-based view theory. The thrust of RBV argued that sustainable competitive advantage derives from developing superior capabilities and resources (Prahalad & Hamel, 1990).

The sustainability of any competitive advantage depends on the extent to which resources can be imitated or substituted (Lowson, 2003). Barney and others point out that understanding the causal relationship between the sources of advantage and successful strategies can be very difficult in practice (Barney, 1991). Thus, a great deal of managerial effort must be invested in identifying, understanding and classifying core competencies. In addition, management must invest in organisational learning to develop, nurture and maintain key resources and competencies. In the resource-based view, strategists select the strategy or competitive position that best exploits the internal resources and capabilities relative to external opportunities. Given that strategic resources represent a complex network of inter-related assets and capabilities, organisations can adopt many possible competitive positions

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## 4. Research Methodology

The study adopted the survey research design. This research design was fit for this study because the data was gathered through a survey. The study was situated in the University of Calabar, and the population comprised of the staff of the ICT department of the university. The researcher found out through an enquiry session found out that the number of ICT staff in the University of Calabar are altogether 70 staff. The study adopted a census sample technique which allows all the element in the population were studied. Questionnaires were distributed by the study team headed by the researcher to the ICT in their offices. A five-point Likert scale questionnaire was developed by the researcher to help elucidate responses from the participants. This tool was adequately verified using the content validity and Cronbach alpha to ensure that the constructs were accurately and consistently measuring the variables. Base on the reliability score which was 0.7 the instrument was said to be reliable. Lastly, the multiple regression analysis was used to test the initial hypotheses stated in the study.

The model specification of the study is;  $Y_1 = a_1 + b_1X_1 + b_2X_2 + u_1$

Where:

Y = Dependent variable (Human resource management)

a = constant

b = slope coefficient

X<sub>1</sub> = Internet of Things

X<sub>2</sub> = Machine Learning

## 5. Data presentation and analysis

### 5.1. Response rate

Seventy (70) questionnaire copies were distributed to the respondents' but 66 copies of the questionnaire were retrieved. All the questionnaires were properly responded to. Hence, the number of workable questionnaires was 66. This resulted in response rate of 94.3 percent as seen in Table 6.

**Table 1** Distribution and return of questionnaire

S/N	Category	Frequency	Percentage
1	Number of questionnaire copies not retrieved	4	5.7
2	Number of useful questionnaire copies	66	94.3
	Total	83	100

Source:Field Survey, 2023

### 5.2. Demographic attributes of respondents

The second table shows the demographic information of the respondents. From the survey, is seen that 50 respondents (75.8%) of the ICT staff are male while 16 respondents(24.4%) are female.

**Table 2** Demographic representation of the respondents

Demographic	Total	Percent (%)
Gender		
Male	50	75.8
Female	16	24.2
Total	66	100.0
Age		
18 - 27 years	26	39.4
28 - 37 years	30	45.5
38 years and above	10	15.2
Total	66	100.0
Academic qualification		
B.Sc/HND	52	78.8
Post graduate	14	21.2
Total	76	100.0

Source: Fieldwork, 2023

This implies that males are more than the females in the ICT department. In addition, the table also showed the educational qualification of the respondents. 52 respondents (78.8%) were B.Sc/HND degree holders while 14 respondents (21.2%) were holders of either post graduate diploma, MBA, M.Sc, or Ph.D.

**5.3. Descriptive statistics of variables**

The third table shows the descriptive statistic for responses to statements about Fourth Industrial revolution and human resource management. Internet of things, and machine learning were used to measure technological advancement. Six constructs were used to measure internet of thing, the mean score of the constructs was 3.74 connoting that positive response to the statements. The standard deviation is less than one (1), indicating that up to 68 percent of the value dispersion is grouped around the mean. Furthermore, another six constructs were used to measure machine learning, the average score was 4.14, this limpud that the constructs received positive responses form the participants. The standard deviation is less than one (1), indicating that up to 68 percent of the value dispersion is grouped around the mean.

Lastly, six statements were also used to measure human resource management, all the constructs had a mean score within the range of 3.95 indicating a positive response to the constructs. The standard deviation is less than one (1), indicating that up to 68 percent of the value dispersion is grouped around the mean.

**Table 3** Descriptive Statistics of 4IR and human resources performance

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
ML	66	3	5	3.74	.461	.212
IoT	66	4	5	4.14	.271	.073
HRM	66	4	5	3.95	.582	.279
Valid N (listwise)	66					

Source: Author’s analysis using SPSS, 2023

**5.4. Test of hypotheses**

- H0<sub>1</sub>: Machine learning has no significant effect on human resource management.
- H0<sub>2</sub>: Internet of Things (IoT) has no significance effect on human resource management.

**Table 4** Model Summary of the impact of 4IR and HRM

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987 <sup>a</sup>	.973	.972	.089
a. Predictors: (Constant), ML, IoT				

Source: Author’s analysis using SPSS, 2023

**Table 5** Analysis of variance (ANOVA) on the impact of 4IR and HRM

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17.629	4	4.407	559.951	.000 <sup>b</sup>
	Residual	.480	61	.008		
	Total	18.109	65			
a. Dependent Variable: HRM						
b. Predictors: (Constant), ML, IoT						

Source: Author’s analysis using SPSS, 2023



**Table 6** Coefficients for the impact of 4IR and HRM

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.732	0.391		6.980	0.000
	ML	-2.160	0.112	-1.885	-19.298	0.000
	IoT	-0.961	0.098	-.493	-9.782	0.000
a. Dependent Variable: HRM						

Source: Author's analysis using SPSS, 2023

### 5.5. Interpretation

The multiple regression analysis was conducted to test the two hypotheses. Table 4, 5, and 6 elucidate that the resultant model is highly significant. The estimated function of technological advancement on human resource management in the ICT unit of university of Calabar indicates a positive intercept represented by the constant term. This connotes that holding all explanatory variables constant, there will be an increase in the human resource management by 2.732. The R value (98.7 percent) in table 4 explains the correlation between the dependent and the independent variables. The R-squared indicates that 97.3% of the total variation of the dependent variable can be explained by the independent variables and 2.7% of the total variation is left unexplained by the independent variables. This could be attributed to other variables that have not been captured by the model. The adjusted R-square entails that 97.2% of the dependent variable is accounted for by the independent variables. The overall P-value of the model shows that there is a significant effect of the independent variables on the dependent variables as the P-value (.000) is less than .05. Furthermore, the last table perspicuous the individual significant effect of the independent variables on the dependent variable.

- While machine learning and internet of things had a negative significant effect on the dependent variable. Their respective Probability values and t-statistics values confirms this.
- The result of the regression requires that we reject the two null hypotheses and accept the alternatives. The results are summarized as follows:
- There is a significant effect of machine learning on human resource management.
- Internet of Things (IoT) has a significance effect on human resource management.

## 6. Discussion of findings

The first hypothesis implied that there is a significant effect of machine learning and human resource management. This finding agrees with the study of Ewertowski et al. (2023) that researched on "The use of machine learning techniques for assessing the potential of organizational resilience." The main aim of the study was to propose the best technique of Machine Learning (ML) in the context of accuracy for predicting the attributes of the organizational resilience potential. The result of the research revealed that machine learning makes it possible to optimize the results of estimating the organizational resilience potential by an appropriate machine learning method.

Lastly, the second result revealed that internet of things (IoT) has a significance effect on human resource management. The finding is in harmony with the study of Mohanty and Mishra (2020) conducted a study on Framework for understanding Internet of Things in human resource management. The main objective of the study was to investigate the role of Internet of Things (IoT) in Human Resource (HR) and attempts in developing a framework for understanding the same. The result shows that internet of things has significant effect on the five HR functions that are considered for this paper and they constitute basic HR contributions to organizations and are relevant in organizational objectives.

## 7. Conclusion and Recommendation

The study considered the impact of the fourth industrial revolution (4IR) on human resource management with a focus on the ICT unit of the University of Calabar. two proxies were used by the study to measure technological advancement these include, internet of things and machine learning. The survey research design was deployed by the researcher, and the census sampling technique was adopted as the population was not large.

Based on these findings the following recommendations are offered for onward implementation;

- The ICT staff should be trained and re-trained on the trending machine learning algorithms so they can build and use computer systems that are able to learn and adapt without explicit instructions.
- Current softwares BOT, and sensors should be acquired by the institution for the ICT unit to optimize their IoTs interface.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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