



## ASSESSMENT OF THE INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN THE MANAGEMENT OF HUMAN RESOURCES IN UNIVERSITIES IN NORTH WEST ZONE, NIGERIA

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### Abstract

This study examined the assessment of the integration of ICT in the management of human resources in universities in North West Zone, Nigeria. The main objective was to ascertain the integration of ICT in the management of human resource in universities in north west zone, Nigeria, convergent mixed method was used, the overall population of the study comprises of 22,768 staff. Stratified sampling technique was used, Convenient and Purposive sampling techniques. 378 was used as sample sized for the quantitative method as identified by Research advisors (2006). The qualitative method 72 respondents were sampled conveniently as saturated level. Questionnaire and interview guides were used as instrument for data collection. The Questionnaire was Tagged “Questionnaire on the Integration of ICT in the Management of Human Resources in Universities in North West Zone, Nigeria “(QIICTMRUNZN), was used. While interview guides were titled: “In-depth Interview Guide on Integration of ICT in the Management of Human Resources in University|” (IDIGIICTMRU). “Key Informant Interview Guide on Integration of ICT in the Management of Human Resources in University” (KIIGIICTMRU) “Focus Group Discussion Guide on Integration of ICT in Management of Human Resources in University” (FGDGIICTMRU). Null hypotheses were tested at 0.05 level of significance, using ANOVA. The qualitative data was transcribed and analyzed using NVIVO analytical software. Findings among others revealed that, there was no Integration of ICT in Management of Human Resource in Universities. It was recommended that Universities implement ICT Integration in areas like recruitment, induction trainings, virtual capacity building training, among others.

**Key Words:** Human, Resources, Integration, Management, Universities.

### Introduction

Human Resources Management practices with the advent of ICT have revolutionized the Universities management by introducing digital tools and platforms that streamline and automate HR processes. These technologies include Human Resource Information Systems (HRIS), cloud-based HR platforms, e-recruitment systems, performance management software, and learning management systems (LMS) for staff training and development. ICT-enabled HRM systems

offer several benefits, including improved data accuracy, enhanced decision-making capabilities, and greater operational efficiency. One of the key advantages of integrating ICT in HRM is the ability to centralize and digitize employee information, making it easily accessible and manageable. This centralization allows for real-time data analysis, enabling HR professionals to make informed decisions regarding workforce planning, talent management, and policy formulation.



(Shakir, Al Farsi, Al-Shamsi, Shannaq, & Taufiq-Hail, 2024).

Traditionally, HRM in Universities involved manual, paper-based processes for managing various aspects of human resources, including recruitment, performance evaluation, staff development, and employee records management. These conventional methods were often labour-intensive, prone to errors, and lacked the agility to respond swiftly to dynamic institutional needs. The inefficiencies inherent in such practices posed significant challenges, particularly in universities with diverse and sizable workforces. The integration of Information and Communication Technology (ICT) into Human Resources Management (HRM) practices in universities has become an essential strategy for modernizing administrative functions and enhancing institutional effectiveness. As Universities face increasing demands for efficiency, transparency, and adaptability in a rapidly changing educational landscape, the adoption of ICT in HRM has emerged as a critical enabler of sustainable organizational development (Matayo, Abdulganiyu, Musa & Ahmed, 2023).

In recent decades, the Internet has led to greater use of Electronic Human Resource Management (E-HRM) in organizations worldwide, including universities. In a technology-driven economy, human resource professionals' capacity to foster technological progress is crucial for an organization's economic and social success. The services of human resource practitioners have continued to be at the forefront to embrace technology in different organizations. (Oluwatoyin, 2024). Most of the universities are introducing E-HRM, which has led to a remarkable change in their workplace. In fact, it can be said that the human resource management departments of most universities have

continued to integrate new technology into that of old processes. (Ofor-Douglas, 2021).

In the twenty first century many universities are facing increased challenges in the world of work. These challenges include the introduction of technological advancement, globalization, economic restructuring and new employment patterns. Due to the effect of global changes, the way and manner human resources employees and their work are managed have been influenced (Wairiuko, Nyonje, & Omulo, 2018). This has led HR professionals in most countries to change and increase their role and functions from basic personnel activities to an operational role that gives strategic direction to universities moving towards the use of technology in their human resources functions to a dynamic and strategic way of managing resources. Electronic Human Resource Management (E-HRM) is a web-based tool, which is used to automate and support human resource processes (Ukandu, 2015). Implementing E-HRM in universities will save costs and time. It also supports HR administrative work and improves the quality of HR information. This information helps HR managers to make strategic decisions (Ukandu, (2015).

ICT integration in human resource management (HRM) practices in universities can bring significant benefits and improvements. AlHamad, Alshurideh, Alomari, Kurdi, Alzoubi, Hamouche, and Al-Hawary, (2022), identified that: ICT tools can streamline the recruitment and hiring process by automating job postings, online application submission, and resume screening. Online applicant tracking systems can help manage candidate databases, track application statuses, and facilitate communication with applicants. Video interviews and online assessments can also be conducted, reducing the need for in-person interviews and expediting the selection process. ICT can support the onboarding process by providing online



portals or learning management systems where new employees can access training materials, orientation documents, and policies. E-learning platforms can deliver training modules and assessments, enabling employees to learn at their own pace. Online training records and progress tracking can be maintained, making it easier to monitor employee development. ICT solutions like HR information systems (HRIS) or human capital management (HCM) platforms can centralize employee data, including personal information, employment history, performance reviews, and training records. This allows HR professionals to access and manage the data more efficiently, reducing paperwork and manual record-keeping. (Matayo, Abdulganiyu, Musa & Ahmed, 2023).

Alabi, & Mutula, (2020), stated that ICT tools can facilitate the performance management process by providing digital platforms for setting goals, conducting performance evaluations, and providing feedback. Online performance management systems can automate performance review cycles, track progress, and generate performance reports. This promotes transparency, consistency, and timeliness in performance management practices. Online self-service portals or intranet systems can empower employees to access and update their personal information, view pay stubs, request leaves, and access HR policies. This reduces administrative burden on HR staff and improves employee satisfaction by providing easy access to relevant information and services. ICT tools, such as email, instant messaging, and collaboration platforms, enable efficient communication and collaboration among HR professionals, employees, and managers. Virtual meeting tools support remote communication and allow for real-time collaboration, ensuring effective HR operations and engagement.

### Statement of the Problem

Despite national ICT policies and increasing investments in digital infrastructure within the Nigerian higher education sector, the management of human resources in many universities remains largely manual, fragmented, and inefficient. Human resource operations in several institutions are still characterized by paper-based record keeping that pose serious challenges to data storage, retrieval, and security. Physical files are vulnerable to loss, misplacement, damage from fire, water, pests, and unauthorized access. In many universities, this often leads to administrative bottlenecks, payroll inconsistencies, promotion delays, poor workforce planning, reduced staff morale. inconsistencies in data, unreliable institutional statistics, which negatively affect planning, monitoring, and policy formulation, inadequate filing facilities and poor record-keeping practices make it difficult to retrieve accurate information when needed, delayed in processing of personnel information, duplication of records, data inaccuracies, and limited access to real-time staff data.

The lack of virtual recruitment limits transparency and accountability in university management. Manual recruitment processes increase the risk of favoritism, lack of standardized evaluation criteria, and inadequate documentation of recruitment decisions. This situation undermines public confidence in university recruitment processes and may result in the employment of underqualified personnel, thereby affecting the quality of teaching, research, and administrative services. The absence of structured virtual induction training in universities has resulted in several administrative and professional challenges. Newly recruited staff often assume their duties without adequate orientation on institutional regulations, reporting structures, service delivery standards, and the use of digital



administrative systems. This lack of systematic induction contributes to role confusion, procedural errors, low productivity, and difficulties in adapting to the university work environment.

The continued absence of virtual capacity-building training poses a significant challenge.

to effective university management. It limits staff competence, hinders innovation, and weakens institutional performance. Furthermore, the effective integration of ICT into HR management in Nigerian universities is constrained by multiple factors. These include inadequate ICT infrastructure, irregular power supply, insufficient funding, limited internet connectivity, and poor maintenance of existing ICT facilities. In addition, many universities face a shortage of ICT-skilled human resource personnel and limited training opportunities for administrative staff responsible for managing HR systems. Resistance to change, low levels of digital literacy, and weak institutional commitment to ICT-driven reforms further compound the problem.

Consequently, disparities exist in the level of ICT adoption in HR management among federal, state, and private universities in Nigeria, leading to unequal administrative efficiency and service quality. These problems negatively affect the efficiency, accountability, and strategic role of human resource management in Nigerian universities. As universities strive to compete globally and meet international standards in teaching, research, and administration, the persistent challenges surrounding ICT integration in human resource management raise concerns about institutional effectiveness. The potential benefits of ICT integration in the management of human resources in Nigerian universities have not been fully realized. The persistent reliance on traditional administrative practices undermines institutional efficiency, data-

driven decision-making, and the overall quality of university governance. Therefore, there is a compelling need to systematically examine the problems associated with ICT integration in human resource management in Nigerian universities, with a view to identifying gaps, challenges, and strategies for improving effective ICT adoption and utilization in Universities in North-West Zone, Nigeria;

### **Objective of the Study**

The study aimed to achieved the following objective

1. To ascertain the Integration of Information and Communication Technology ICT in the Management of Human Resource in Universities in North-West Zone, Nigeria.

### **Research Question**

The study was guided by the following research question

1. To what extent does the Integration of Information and Communication Technology ICT assess Management of Human Resource in Universities in North-West Zone, Nigeria.?

### **Research Hypotheses;**

The study was guided by the following Hypothesis

- Ho<sub>1</sub> There is no Significant Difference in the Opinion of Respondents in the Integration of Information and Communication Technology ICT on Management of Human Resource in Universities in North-West Zone, Nigeria;

### **Methodology**

Convergent mixed method research design was used, for the quantitative aspect descriptive survey method was utilized, while, for the qualitative aspect, thematic study method was used The population of the study was made up 22,768 across the 17



public Universities in the North-west Zone, Nigeria. Multi-stage sampling techniques was adopted (Convenient Sampling Technique and purposive sampling techniques). In determining the same size of the respondents, procedure recommended by the research advisors (2006) were used that a sample size of 378 was identified. Meanwhile, purposive sampling technique was used in selecting the respondents in each of the Federal and States Universities. Equal number of respondents was selected from each of the sampled Federal and States Universities. while for qualitative method 72 responded were identified conveniently as saturated level. Questionnaire and Interviews guides are used as instrument for data collection] titled “Questionnaire for the Integration of Information and Communication Technology in the Management of Resources in Universities in North-west Zone, Nigeria “(QIICTMRUNZN), was used for the study. A 5- point Likert’s scale was used as fully integrated (FI), Integrated (I), Rarely Integrated (RI), Fairly Integrated (FI) and Not Integrated (NI). Similarly, the interview guides are title: “In-depth Interview on Integration of Information and Communication Technology in the Management of Resources in University” (IDIICIMRU) for Deputies Vice Chancellors/DVCs, Registrars/assistant registrars, Director of ICT. Liberians, Bursas and Directors of Works. “Key Informant Interview on Integration of Information and Communication Technology in the Management of Resources in University” (KIIICTMRU) for Deans of Faculties, Head of Department, Sectional Heads and executive cadre. “Focus Group Discussion on

Integration of Information and Communication Technology in the Management of Resources in University” for non-teaching staff (administrative and clerical cadre). Both the questionnaire and interview guides were validated by team of experts in educational administration and planning, test and measurement and English specialist from their respective units in ABU Zaria. Pilot study was conducted in none of the sample Universities not covered by the study, Split-half method was used and Cronbach Alpha was used in establishing the coefficient index of 0.72 was obtained at 0.05 levels of significance. The data was analysed using both quantitative and qualitative methods. Quantitative approach was descriptive where simple frequencies and mean were used. A mean score of 3.00 and above was regarded as criterion level for agreement while below 3.00 was regarded as criterion level for disagreement. Similarly, in testing the hypothesis inferential statistics of One-way ANOVA was used to test the five null hypotheses at 0.05 level of significance. Moreover, for the qualitative data that was recorded voice of KII (Key Informant Interviews), IDIs (In-depth Interviews), and FGDs (Focus Group Discussions) were transcribed verbatim and thematically coded under appropriate nodes. However, the data coded was analyzed using NVIVO analytical software version 10.

## Result

### Quantitative Result for the Research

**Question:** To what extent does the Integration of Information and Communication Technology ICT assess Management of Human Resource in Universities in North-West Zone, Nigeria?



**Table 1: Integration of Information and Communication Technology ICT in Management of Human Resource in Universities in North-West Zone, Nigeria,**

S/N	Items Statement	Categories of Respondents	N	FUI	I	RI	FI	NI	Cum Mean	Remarks
1	Our university applies ICT tools for recruitment process	Management Staff	18	3	0	0	72	244	1.61	Fairly Integrated
		Academic Staff	138	0	6	17	22	93		
		Administrative Staff	150	3	19	13	41	74		
		Clerical Staff	72	0	1	0	9	62		
2	ICT tools are applied to assist in tracking and monitoring compliance with labor laws	Management Staff	18	0	0	0	5	13	1.89	Fairly Integrated
		Academic Staff	138	7	8	10	55	58		
		Administrative Staff	150	20	8	18	31	73		
		Clerical Staff	72	1	2	10	14	45		
3	Online platforms are used for employees' induction training in your University	Management Staff	18	0	0	0	0	18	2.07	Fairly Integrated
		Academic Staff	138	29	14	9	5	81		
		Administrative Staff	150	19	18	16	25	72		
		Clerical Staff	72	1	2	14	5	50		
4	There are ICT tools used for managing employee records of service on the cloud in the University	Management Staff	18	0	0	0	0	18	2.06	Fairly Integrated
		Academic Staff	138	4	3	3	24	104		
		Administrative Staff	150	21	19	20	19	71		
		Clerical Staff	72	19	11	10	11	21		
5	There are social media platforms for recruitment process by the University	Management Staff	18	0	0	0	0	242	1.96	Fairly Integrated
		Academic Staff	138	5	5	0	1	127		
		Administrative Staff	150	15	14	16	19	86		
		Clerical Staff	72	25	10	15	10	12		
6	ICT tools are applied for effective communication and knowledge sharing in the Universities	Management Staff	18	2	21	23	54	278	1.45	Fairly Integrated
		Academic Staff	138	0	11	6	4	117		
		Administrative Staff	150	0	5	4	24	117		
		Clerical Staff	72	2	5	13	26	26		
7	Are there ICT tools integrated for assessing and monitoring employees' performance effectively	Management Staff	18	0	0	0	83	231	1.68	Fairly Integrated
		Academic Staff	138	4	2	2	13	117		
		Administrative Staff	150	6	9	16	51	68		
		Clerical Staff	72	5	10	10	19	28		
18	Online platforms are used for employees to access HR policies, conditions of service, or schemes	Management Staff	18	0	0	0	0	18	1.77	Fairly Integrated
		Academic Staff	138	9	7	6	13	103		
		Administrative Staff	150	9	14	17	6	104		
		Clerical Staff	72	3	16	13	4	36		



9	Performance appraisals exercise is applied and processed electronically in the University	Management Staff	18	2	0	0	0	241	1.76	Fairly
		Academic Staff	138	6	6	14	9	103		Integrated
		Administrative Staff	150	4	15	16	19	96		
		Clerical Staff	72	4	15	6	21	26		
10	University uses online platforms for employees' developmental opportunities	Management Staff	18	0	2	0	24	275	1.66	Fairly
		Academic Staff	138	2	2	5	4	125		Integrated
		Administrative Staff	150	7	15	13	9	106		
		Clerical Staff	72	8	13	12	11	28		
<b>Grand Mean</b>								<b>1.79</b>		

The analysis of data in Table 1 shows the influence of ICT Integration in the Management of Human Resource in Universities in the North-West Zone, Nigeria. The results revealed mean scores for items 1–10 to be below the 3.0 benchmark. The cumulative grand mean score is 1.79, which is also below the 3.0 benchmark. This indicates that ICT Integration in the Management of Human Resource is fairly integrated in Universities in the North-West Zone, Nigeria, have

limited application of ICT tools for recruitment, induction training, virtual capacity building trainings, performance monitoring, and record management.

**Qualitative Result for the Research Question:** To what extent does the Integration of Information and Communication Technology ICT assess Management of Human Resource in Universities in North-West Zone, Nigeria?

**Table 2: Integration of ICT in Management of Human Resource in Universities in North-West Zone, Nigeria**

S/No	Node/themes	Description/Probes	Quotations
1	Advertisement	E-application that streamline advertisement	"The recruitment system in the University does not align with ICT. Most a times we used national newspapers for advertisement only"
2	On boarding trainings Posting	Website for newly hire induction trainings	"Nothing like online training or induction for newly hire in the University. Postings are done manually by giving letter to the affected personnel's"
3	Selection/screening Interviews Assessment Reference check Appointment letters	Is there automation of ICT assisted processes for screening, interviewing, assessing, referees' scrutiny and dissemination of appointment letters?	" In University we don't integrate any IT related tool except documents that are type in the computers and printed for dispatch. We still rely on manual checks for compliance because the system is unreliable the system has been politicizing employment in the University is based on connection or nepotism but there is no any online screening base on merit"



4 Record of service	Is there any ICT tool leverage to store employee record of service which can be access globally with permission from the main sources?	“ We still used manual procedure for records keeping despite computers and other gadgets available in the University, each staff has a file in the registry but the file are not translated into online schedules to ease the manual operations”
5 Knowledge sharing	How does the University automate platforms for knowledge sharing among newly employed staff?	“ There was no any e-learning for the newly employed staff except account generation, most a time newly employed staff are to be mentored on the job training there is no any online platform for knowledge sharing among newly employed”
6 Performance appraisal/promotion and HR policies	ICT systems are integrated to conduct appraisal processes and HR policies?	"The appraisal system lacks transparency if automated, University maintain manual procedure for appraisals process and HR portal is difficult to navigate, and employees struggle to find relevant policies. Scheme of service and condition of service and other relevant document are printed books giving to newly hire if available,
7 Employees development	ICT-enabled tools for professional development and skill-building	"There aren't enough online training opportunities to help employees up skill. There are few trainings organized by TETFUND targeting ICT Skills in the University”

Table 2, revealed that ICT integration in Human resources management practices were no longer fully integrated in the University. Stakeholders have agitated the concern during the interactive sessions which was transcribed and analysed thematically.

**Null Hypotheses (Ho<sub>1</sub>):** There is no Significant Difference in the Opinion of Respondents on Integration of ICT on

Management of Human Resource in Universities in North-West Zone, Nigeria;

Data on the Significant Difference in the Opinion of Respondents on Integration of ICT and Management of Human Resources in Universities in North-West Zone, Nigeria were analyzed using One-way Analysis of Variance (ANOVA) as summarized in Table 3.



**Table 3: One-way Analysis of Variance (ANOVA) on Opinions of Respondents for the Integration of ICT in Management of Human Resource in Universities in North-West Zone, Nigeria**

	Sum of Squares	Df	F	Mean Square	Sig.	Decision
<b>Between Groups</b>	264.762	2	47.282	66.191		Rejected
<b>Within Groups</b>	530.571	380		1.400	.000	
<b>Total</b>	795.333	378				

The analysis of result in Table 3, the result reveals p-value of .000 which is less than the fixed probability level of 0.05. Since the P-value is less than the level of significance set for the study, the hypothesis is therefore rejected. Thus, there is significant difference in the opinions of respondents for Integration of ICT in Management of Human Resource in Universities in North-West Zone, Nigeria.

### Discussions of the Findings

It was established by the findings of this study that the integration of ICT in human resource management practices such as: Recruitment, Attendance Tracking, Employee Performance Monitoring, Induction Training, Appraisals and Automation of HR Policies which are Scheme of Work, Condition of Service Access to Students Hand Book and other Policy Documents or Guidelines, Online Applications for Students Request such as Transcript, Progress Report, Recommendation Letters, E-evaluation of Lecturers Performance etc. are not fully integrated in the Universities in the North-West Zone, Nigeria (p=.000). The Findings reject the report of Alabi, & Mutula, (2020). Who reported that Information and communication technology (ICT) artefacts such as the Internet, World Wide Web, email, and learning management systems (LMS) have become among the top concerns of modern organizations including higher educational institutions and multinational corporations

Consequently, University administrators, despite the meagre resources, are continuously investing in information and communication technologies (ICT) to support learning, teaching, management, research and also to help deal with educational budget cuts.

In line with Alabi, & Mutula, (2020), Information and Communication Technology (ICT) has become a critical tool for effective human resource management (HRM) in modern organizations, including universities. ICT integration in HRM enhances efficiency in recruitment, personnel records management, payroll administration, performance appraisal, staff development, and communication. Despite its potential to improve transparency, accuracy, and decision-making, the effective integration of ICT in the management of human resources in Nigerian universities remains a major challenge. Teryima and Sunday, (2015), established that in the higher education and human- capacity building sector, ICT is impetus for change from the traditional concepts of management into modern method known as e-management, However, the above assertion was corroborated during KII session as follows:

"The IT recruitment tools we use don't help us identify the best candidates, and the process is too slow. Social media isn't fully utilized in our recruitment strategy, because it has become home of fake new



which limits our ability to reach younger, so we end up doing most of the work manually, the online induction feels like just a checklist; it doesn't give new hires a sense of connection to the organization." Respondent 2.

However, for the in-depth Interview responses it was equally revealed that:

"ICT tools are present but not fully integrated across HR functions, leading to inefficiencies and manual interventions in processes like recruitment and record management. There is no integrated platform for employee training or development, we rely on traditional methods which limit access to consistent professional development opportunities. Employees have to manually apply for leave, Respondent 11.

However, the above assertion was supported by Zakayo, (2016), recommended that Universities identify strengths and weaknesses in technological resources, seek partnerships to finance ICT infrastructure, reduce teachers' workloads to allow time for ICT training, and provide regular training and seminars on ICT integration. Additionally, Universities were advised to adopt policies to guide structured ICT integration in teaching and learning.

The statement rejected the opinion of Karanja, (2016). Posits that integration of ICT in human resource management of higher educational institutions has revolutionized HEIs management bringing forth new ways of doing administrations that are innovative, efficient, more effective, quick and accurate decisions of HEIs managers require readily available and relevant information, a fact that makes ICT a vital tool in today's HEIs business world. The author points out that HEIs must cope with the emerging trends of competing on the ICT platform and thus they need to

continually assess their current status, and that of their competitors to formulate and manage their own strategies if only to stay abreast with the latest challenges of the information age. According to Omotayo, and Chigbundu, (2017), Lack of E-induction trainings in universities has jeopardised the system in the advance world of technology. Since Olajide, Akingbade, & Oladimeji, (2015), stress the needs for capacity building trainings to develop organization individual core skills and capabilities to help them achieve their development goals.

### Conclusion

Based on the findings of this study, it is evident that the integration of Information and Communication Technology (ICT) into human resource management (HRM) practices in universities within the North-West Zone of Nigeria remains inadequate. Although ICT has the capacity to enhance efficiency, transparency, and effectiveness in university administration, key HRM functions such as recruitment, attendance tracking, employee performance monitoring, induction training, staff appraisal, and the automation of HR policies are not fully integrated across the universities.

### Recommendations

The following recommendations were made:

1. Universities should fully digitize HR-related documents and processes, including schemes of work, conditions of service, staff and students' handbooks, and other policy documents. In addition, student-related services such as transcript requests, progress reports, recommendation letters, and lecturers' performance evaluations should be processed through secure online platforms.
2. Universities should adopt and implement comprehensive Human Resource Management Information Systems (HRMIS) that integrate core HR functions such as recruitment,



attendance tracking, performance monitoring, induction training, appraisal systems, and the automation of HR policies and procedures.

- Universities should fully digitize HR-related documents and processes, including schemes of work, conditions of service, staff and students' handbooks, and other policy documents. In addition, student-related services such as transcript requests, progress reports, recommendation letters, and lecturers' performance evaluations should be processed through secure online platforms.

### Reference

- Alabi, A. O., & Mutula, S. (2020). Information and communication technologies: Use and factors for success amongst academics in private and public Universities in Nigeria. *South African Journal of Information Management*, 22(1), 1-8.
- AlHamad, A., Alshurideh, M., Alomari, K., Kurdi, B., Alzoubi, H., Hamouche, S & Al-Hawary, S. (2022). The effect of electronic human resources management on organizational health of telecommuni-cations companies in Jordan. *International Journal of Data and Network Science*, 6(2), 429-438.
- Karanja, D. (2016) Integration of ICT in Human Resource Management: Case of Kenyan Higher Education. *Journal of Research & Method in Education (IOSR-JRME)* vol, 6, 34-41  
[www.iosrjournals.org](http://www.iosrjournals.org)
- Karanja, L., Gakuo, S., Kansiiime, M., Romney, D., Mibei, H., Watiti, J., ...& Karanja, D. (2020). Impacts and challenges of ICT based scale-up campaigns: Lessons learnt from the use of SMS to support maize farmers in the UPTAKE project, Tanzania. *Data Science Journal*, 19(1).
- Matayo, V. A., Abdulganiyu, J., Musa, M. N., & Ahmed, A. A. (2023). Efficient management of information communication technology resources in an organisation. *Qeios*. CC-BY 4.0
- Ofor-Douglas, S. (2021). Human resource management as an effective tool for productivity in Nigerian Universities. *International Journal of Scientific Research in Education*, 14(2), 223-237.
- Omotayo, F. O., & Chigbundu, M. C. (2017). Use of information and communication technologies for administration and management of Universities in Nigeria. *Journal of Systems and Information Technology*, 19(3/4), 183-201.
- Shakir, M., Al Farsi, M. J., Al-Shamsi, I. R., Shannaq, B., & Taufiq-Hail, G. A. M. (2024). The Influence of Mobile Information Systems Implementation on Enhancing Human Resource Performance Skills: An Applied Study in a Small Organization. *International Journal of Interactive Mobile Technologies*, 18(13).
- Teryima, S. J., & Sunday, A. (2015). The role of information communication technology (ICT) in enhancing productivity in local government administration in Benue State, Nigeria. *International Journal of Business and Economic Development (IJBED)*, 3(1).
- Ukandu, N. E. (2015). *A Comparative Assessment of the Utilisation of Electronic Human Resource Management Systems as a Decision-Making Tool by Selected*



*South African and Nigerian Universities* (Doctoral dissertation, Cape Peninsula University of Technology).

Wairiuko, J. W., Nyonje, R., & Omulo, E. (2018). Human resource capacity and adoption of e-government for improved service delivery in Kajiado County, Kenya. *International Journal of Business and Social Science*, 9(10), 94-110.

Zakayo, G. (2016), "Factors Influencing Integration of Information and Communication Technology in Learning and Teaching in Public Secondary Schools": A Case of Tigania West Sub County, Meru County, Kenya. Unpublished Masters Dissertation University of Nairobi Kenya.