Cloud Computing Policy and Healthcare Service Delivery in Lagos State, Nigeria

[1]Busayo Qazeem Ibikunle (PhD.)
Public Administration, Lagos State University, Ojo, Nigeria
Email: busayo.ibikunle@lasu.edu,ng

[2]Olawale Sefiu Sanusi (PhD.)
Public Administration, D.S. Adegbenro ICT Polytechnic, Itori, Ewekoro, Ogun State
Email: olawalesanusi35@gmail.com

[3] Adeniyi Olamide Eweje
Public Administration, Lagos State University, Ojo, Nigeria
Email: adeniyieweje@gmail.com

Abstract
This study investigates the substantial correlation between cloud computing policy and the provision of healthcare services at state-owned hospitals in Lagos, Nigeria. It employs primary and secondary research methods. With the aid of sample size determination, the study realised that 145 questionnaire and stratified sampling techniques were adopted which enabled the study to distribute the questionnaire among the selected respondents which including medical doctors, matron/midwives, laboratory scientists/technologists, nurses, accountants, and records personnel. Regression analysis was used to analyse the data collected from the selected respondents. The study's findings reveal that, despite the implementation of cloud computing, there has been no improvement in service delivery for health record-keeping in Nigeria. Consequently, the study suggests that failure to identify problems and provide appropriate solutions could further compromise the efficacy of record-keeping service delivery. This study proposes several recommendations, including the need for policymakers to provide extensive training to staff responsible for managing health records technology. Additionally, it emphasizes the significance of ongoing policy evaluation and monitoring to guarantee effective communication of policies. This will enable policymakers to identify areas of uncertainty and address them, thereby facilitating effective service delivery in Nigeria.

Keywords: Cloud computing, Digitalization, Public Policy, Health Records, Service Delivery

Introduction
Cloud computing is transforming the healthcare sector. By streaming the process of sharing patient information with doctors, minimising paperwork, and reducing the likelihood of errors. Cloud computing facilitates the secure storing of data and information in the form of Electronic Health Records (EHR) (Ahmadi & Aslani, 2018). The International Organisation for Standardisation (ISO) defines an electronic health record (EHR) as the digital storage, secure exchange, and access to patient information by multiple permitted users. The principal objective of the EHR is to promote the maintenance of integrated, efficient, and high-quality healthcare (Ravindra & Singh, 2022).

Cloud computing for electronic health records (EHR) poses certain obstacles despite its advantages (Ravindra & Singh, 2022). The issues encompass training and development, system downtime, scalability, installation costs, and maintenance, with the primary worry of cloud computing being the privacy and security of healthcare facilities. The Nigerian government has implemented cloud computing policies to stimulate the development of the local ICT sector, enhance business continuity, and elevate service delivery quality, capitalising on the advantages of cloud computing (Ali, Shrestha, Soar, & Wamba, 2018). This policy permits the public sector to utilise cloud computing and related technologies, including artificial intelligence, machine learning, and the Internet of Things, which are crucial for fostering an environment conducive to organic development and innovation (Sun, Ren, Ji, Chen, & Guo 2016).

A plethora of studies have investigated the influence of cloud computing in healthcare (Simon et al., 2007; Dünnebeil et al., 2012; Olowu et al., 2019; Buyya et al., 2018; Gaurav, et al 2023), demonstrating a consistent efficacy of cloud computing. We praise all prior investigations for their varied perspectives. However, the majority of this research has taken place in developed nations, with a small amount also taking place in Nigeria. The majority of research in Nigeria focusses on the effects of artificial intelligence (AI), machine learning (ML), the internet of things (IoT), and computer-aided design (CAD) on health records. This study seeks to address this gap by examining the influence of cloud computing regulations on health records in general hospitals in Lagos State. This study examined the effect of EMR cards on mortality rates in general hospitals in Lagos State, assessed the accessibility of EMR in other government facilities, and evaluated the performance of healthcare professionals pre- and post-implementation of digital healthcare in Lagos State, Nigeria.

The Objectives of the Study

The primary objective of this study is to examine the influence of cloud computing regulations on health records in general hospitals in Lagos State. The specific aims of the study are outlined as follows:

a. To investigate the substantial impact of machine learning implementation on electronic health record (EHR) storage at Alimosho General Hospital, Lagos State, Nigeria
b. To ascertain the degree to which artificial intelligence (AI) has affected error reduction in electronic health records (EHR) at Alimosho General Hospital, Lagos State, Nigeria,
c. To evaluate the significant influence of the Internet of Things (IoT) on the timely retrieval of electronic health records (EHR)
d. To assess the adoption of computer-aided designs (CAD) and its effects on the construction of electronic health records (EHR) at Alimosho General Hospital in Lagos State, Nigeria.

Literature Review

The deployment of health information management via mobile devices presents numerous challenges, including data storage and management (e.g., physical storage concerns, accessibility, and maintenance), interoperability and availability of diverse resources, security and privacy (e.g., permission control, data anonymity, etc.), and seamless and ubiquitous access. A viable solution to the challenges is the implementation of cloud computing in electronic healthcare systems (Grander, Ferreira da Silva, Del Ros, & Gonzalez, 2021). Cloud computing allows users to access shared resources and infrastructure in a widespread manner, providing on-demand services across the network to meet evolving electronic healthcare application requirements. Health-Cloud is a comprehensive healthcare information management system for mobile devices that employs cloud computing and the Android Operating System (OS) (Pillen & Eckard, 2023).

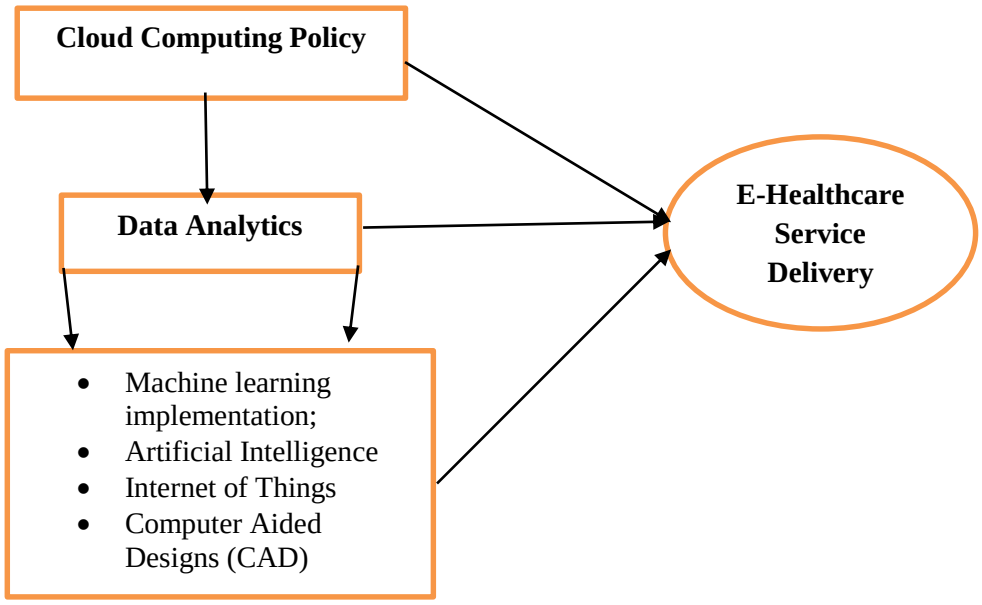
The Office of the National Coordinator for Health Information Technology, part of the US Department of Health & Human Services, has recently selected Acumen Solutions' cloud-based customer relationship management and project management system for the selection and implementation of Electronic Health Record (EHR) systems nationwide (Grander et al., 2021). The software allows regional extension centres to oversee interactions with medical providers concerning the selection and deployment of an EHR. A consortium in Europe, consisting of IBM, Sirrix AG security technologies, Portuguese energy and solution providers Energias de Portugal and EFACEC, San Raffaele Hospital (Italy), and various European academic and corporate research institutions, engaged Trustworthy Cloud Computing. This entity offers healthcare services and a patient-centric home health care solution to remotely monitor, diagnose, and assist patients beyond the confines of a hospital environment. Patients, physicians, and pharmacy personnel will have access to the cloud-stored comprehensive lifecycle, encompassing prescription, delivery, intake, and reimbursement (Abdullah & Seng, 2015).

In Australia, Telstra and the Royal Australian College of General Practitioners have established a partnership to develop an eHealth cloud computing platform for healthcare services. Telstra is a prominent telecommunications provider in Australia, while the College serves as the nation's largest representative body for general practice, boasting over 20,000 members and more than 7,000 in its National Rural Faculty. The eHealth cloud computing will provide applications for healthcare services, encompassing clinical software, diagnostic and management decision-support tools, care plans, referral tools, prescriptions, training, and various administrative and clinical services (Su, Chao Sun Tai, & Liu, 2015).

Cloud computing and other technologies in Africa presents a considerable problem for both the public and private health sectors. The property is unowned, complicating accountability for its maintenance and repairs. African nations must adopt cloud computing technology to bridge the healthcare divide, and public-private partnerships can facilitate this process. Numerous African nations indicate that they allocate less than 10% of their gross domestic product (GDP) on healthcare technology, such as cloud computing. A scarcity of skilled healthcare

professionals from Africa exists, as many opt to reside and work in regions such as the United States and Europe (Clausen, Piro & Ott, 2015).

Conceptual Model



Source: Researcher (April 2024)

Empirical Review

Adeyemi and Fawole (2023) studied healthcare machine learning. EHRs store patients' medical histories, treatment plans, and test results digitally. In several ways, they are more efficient and advantageous in healthcare delivery than traditional case notes, including cost, accessibility, and portability. However, underdeveloped nations like Nigeria have been slow to implement electronic health records. Machine learning offers several advantages over case notes in electronic health records, as this paper demonstrates. The review commences with an introduction, subsequently delves into the topic of machine learning in healthcare, explores its recent applications for efficient healthcare delivery, highlights its benefits and future potential, and culminates with a concluding section. From surgery to medicine predictions, Nigerian healthcare is poised to generate the most value in Africa by implementing machine learning and EHRs early. Machine learning using EHR data will inspire applied statistics and computer science to solve several healthcare issues. Machine learning approaches combined with EHR may make it possible to produce fine-tuned, individualised prognostic models, which will be especially useful for patients with conditions or combinations of conditions that conventional modelling approaches cannot capture. Future research should examine their adoptions' ethical and social impacts. Pillen and Eckard (2023) explored how machine learning affected digital recordkeeping at the University of Michigan Bentley historical library. Over the last decade, industry, government, and academia have adopted cloud-based productivity, collaboration, and storage applications to increase collaboration and cost savings. Shobana and Shanker (2021) reviewed how deep learning-automated EMR data processing is helping understand the evolution chronic diseases and predict the risk of development and complications. The availability of enormous amounts of clinical data is expanding research in several domains.

The secondary use of healthcare data is revolutionising healthcare, which is exciting. Besides big data, such as EMR data from healthcare institutions and health and wellness devices like personal trackers, recent advances in machine learning, particularly deep learning algorithms, are contributing to this trend. We reviewed scholarly literature using Google Scholar, PubMed, IEEE, and ACM, searching searched publications related to electronic medical records, deep learning, and their synonyms. Using deep learning to analyse EMR data, some researchers have obtained remarkable insights into chronic conditions.

These tools assist organisations, IT departments, and end-users, but records managers and archivists have distinct hurdles. A review of the relevant literature shows that cloud computing issues include organisation management, human behaviour, regulation, and records management, making digital information archiving in this day and age more difficult. The Bentley Historical Library's mission is to "collect the materials for the University of Michigan." After discussing relevant literature, two practicing archivists will examine the impact of cloud computing, U-M's productivity software, and collaboration tools on digital recordkeeping.

Theoretical Framework

Dynamic Capabilities Theory (DCT)

Dynamic Capabilities Theory (DCT) is mainly about how well a company can combine, build, and change its internal and external skills to adapt to an environment that changes quickly (Oluigbo et al., 2021). High-velocity markets are defined by their tendency to undergo non-linear and unpredictable shifts. In such marketplaces, the relevance of existing knowledge diminishes, and the task at hand is to generate novel knowledge that is tailored to the specific circumstances. The primary focus of this study was on the analysis of large datasets, also known as big data, and their impact on operational value. The assumptions say that dynamic capabilities are simple, based on experience, and have an iterative process, while more stable markets are complex, based on analysis, and follow a straight line (Xie et al., 2018).

Methodology

This study's population includes Alimosho General Hospital's management and entire staff. The population is characterised by both genders (male and female), regardless of marital status or physical challenges, as long as they are mentally alert. At the time of conducting this research, Alimosho General Hospital has had hundred and five (205) professional employees, which comprise the following:

Employee Category	Number of staff	Male	Female
Medical Doctors	49	27	22
Matrons/ Midwives	56	3	53
Laboratory Scientists	24	11	13
Nurses	67	17	50
Accounts and Records	31	20	11
Total	**227**	**78**	**149**

Source: Researcher (April, 2024)

Sample Size and Sampling Technique

We used the stratified random sampling technique to divide the organisation into departments, with each department representing a stratum. Taro Yamani's (1973) sample size determination formula serves as the basis for this research. You can find the formula below:

$$n = \frac{N}{1+N(e^2)}$$

Where n = sample size

N = population size

1 = constant

e = error margin (accepted error margin at 5%).

e = error margin (accepted error margin at 5%)

$$n = \frac{227}{1+227(0.05^2)}$$

$$n = \frac{227}{1+227(0.0025)}$$

$$n = \frac{227}{1+0.5675}$$

$$n = \frac{227}{1.5675}$$

n = 144.8 approximately. Therefore, the sample size of this research is 145

Selected Employee category and Sample distribution based on gender

Departments	**Male**	**Female**
Medical Doctors	27/227×145 = 17	22/227×145 = 14
Matrons/ Midwives	3/227×145 = 2	53/227×145 = 34
Laboratory Scientists	11/227×145 = 7	13/227×145 = 8
Nurses	17/227×145 = 11	50/227×145 = 32
Accounts and Records	20/227×145 = 13	11/227×145 = 7
Total	**50**	**95**

One hundred and forty-five (145) copies of the administered questionnaire were retrieved and used for the analysed using regression analysis.

Results

Descriptive analysis of responses on Machine learning (ML) on electronic health record (EHR) storage

	Level of Agreement (%) (n= 145)				Average	
	SA	A	D	SD	Mean	SD
Application of machine learning (ML) generates enormous returns in improved diagnosis and treatment	63.4%	25.5%	6.9%	4.1%	3.48	.80
New information about patients are generated easily with machine learning	33.1%	52.4%	10.3%	4.1%	3.14	.76
Machine learning algorithm helps to interpret the signals and give users prompt feedback	33.1%	60.7%	4.8%	1.4%	3.26	.61
Machine learning helps to improve data analytic efficiently in the data analysis module	35.9%	49.0%	13.1%	2.1%	3.17	.74
Adoption and use of ML gives timely access on 24hrs basis to patients' records without delays than paper records	31.0%	51.0%	17.2%	0.7%	3.12	.71
Grand Mean					**3.24**	**0.72**

Source: Field Survey Data (April 2024)

Table above shows that 63.4 percent of the respondents strongly agreed that application of machine learning (ML) generates enormous returns in improved diagnosis and treatment; 52.4 percent of the respondents agreed that new information about patients are generated easily with machine learning; 60.7 percent of the respondents agreed that machine learning algorithm helps to interpret the signals and give users prompt feedback; 49 percent of the respondents agreed that machine learning helps to improve data analytic efficiently in the data analysis module; 51 percent of the respondents agreed that Adoption and use of ML gives timely access on 24hrs basis to patients' records without delays than paper records. The descriptive statistics on the impact of machine learning (ML) on electronic health record (EHR) storage reveal that all respondents hold similar opinions on the subject matter. The grand mean is 3.24, which indicates that, on average, the respondents agreed with most of the statements on a high scale as it relates to machine learning (ML) and electronic health record (EHR) storage. The overall standard deviation of 0.72 implies that the responses were clustered around the mean because the standard deviations for all the statements were less than 1.

Descriptive analysis of responses on Artificial Intelligence (AI) and error minimization in electronic health records (EHR)

	Level of Agreement (%) (n=80)				Average	
	SA	A	D	SD	Mean	SD
Use of artificial intelligence (AI) platform provides prompt access to patients' medical history on diagnosis, prescriptions, treatments and care	20.7%	66.2%	11.0%	2.1%	3.06	.63
Use of AI reduces duplication of laboratory tests and X-ray results	20.0%	65.5%	9.0%	5.5%	3.00	.72
Use of AI/ reduces overall patient waiting time and enhances the quality of care delivery	33.1%	53.1%	10.3%	3.4%	3.16	.74
AI enables the integration and combination of a variety of services to increase creativity and productivity in health records storage	22.1%	61.4%	15.2%	1.4%	3.04	.65
AI ensures that errors associated with health records storage and retrieval is minimized to the minimum	33.1%	53.1%	12.4%	1.4%	3.18	.69
Grand Mean					**3.09**	**0.69**

Source: Field Survey Data (April 2024)

Table above shows that 66.2 percent of the respondents agreed that Use of artificial intelligence (AI) platform provides prompt access to patients' medical history on diagnosis, prescriptions, treatments and care; 65.5 percent of the respondents agreed that public Use of AI reduces duplication of laboratory tests and X-ray results; 53.1 percent of the respondents agreed that AI enables the integration and combination of a variety of services to increase creativity and productivity in health records storage; 61.4 percent of the respondents agreed that AI enables the integration and combination of a variety of services to increase creativity and productivity in health records storage; 53.1 percent of the respondents agreed that AI ensures that errors associated with health records storage and retrieval is minimized to the minimum. The result of the descriptive statistics on artificial intelligence (AI) and error minimization in electronic health records (EHR) shows that all the respondents have similar opinions about the subject matter. The grand mean for the rate of artificial intelligence (AI) is 3.09, which indicates that, on average, the respondents agreed with most of the statements on a high scale as it relates to error minimization in electronic health records (EHR). The overall standard deviation of 0.69 implies that the responses were clustered around the mean, because the standard deviations for all the statements were less than 1.

Descriptive analysis of responses on Internet of things (IoT) and timely retrieval of electronic health records (EHR)

	Level of Agreement (%) (n=80)				Average	
	SA	A	D	SD	Mean	SD
Internet of things (IoT) facilitate long lasting preservation of records and easy accessibility	35.2%	46.9%	13.8%	4.1%	3.13	.80
Electronic health records (EHR) can be closely monitored using IoT	33.8%	57.2%	6.9%	2.1%	3.23	.66
With IoT, less is spent on hardware and data are easily accessible without having to carry a lot of equipment.	33.1%	54.5%	11.0%	1.4%	3.19	.68
IoT saves on transmission time of the records hence expedites the decision-making process in the public institutions.	19.3%	63.4%	15.9%	1.4%	3.01	.64
IoT connect health professionals and specialists all over the world, and they can observe and consult patients remotely	22.8%	69.0%	8.3%	0%	3.14	.54
Grand Mean					**3.14**	**0.67**

Source: Field Survey Data (April 2024)

Table above shows that 46.9 percent of the respondents agreed that Internet of things (IoT) facilitate long lasting preservation of records and easy accessibility; 57.2 percent of the respondents agreed Electronic health records (EHR) can be closely monitored using IoT; 54.5 percent of the respondents agreed that With IoT, less is spent on hardware and data are easily accessible without having to carry a lot of equipment; 63.4 percent of the respondents agreed that IoT saves on transmission time of the records hence expedites the decision making process in the public institutions; 69.0 percent of the respondents agreed that IoT connect health professionals and specialists all over the world, and they can observe and consult patients remotely.

The result of the descriptive statistics on Internet of things (IoT) and timely retrieval of electronic health records (EHR) shows that all the respondents have similar opinions about the subject matter. The grand mean for Internet of things (IoT) is 3.14 which indicate that on average, the respondents agreed with most of the statements on the high scale as it relates to timely retrieval of electronic health records (EHR). The overall standard deviation of 0.67 implies that the responses were clustered around the mean, because the standard deviations for all the statements were less than 1.

Descriptive analysis of responses on Computer Aided Designs (CAD) on electronic health records (EHR) developments

	Level of Agreement (%) (n=80)				Average	
	SA	A	D	SD	Mean	SD
The deployment of computer aided designs (CAD)ensures that health records are developed with precision and little errors	26.2%	65.5%	6.2%	2.1%	3.16	.62
CAD helps create health records that are easily understandable	13.8%	69.7%	10.3%	6.2%	2.91	.69
CAD enables the effective observation, diagnosis and treatment of patients adequately and on time	29.7%	64.8%	3.4%	2.1%	3.22	.61
CAD enhance the integrity of records compared to physical records which can be lost, amended or mutilated easily	34.5%	42.1%	17.9%	5.5%	3.06	.86
IoT allows for fast and easy distribution of resources pertaining to health records	21.4%	73.1%	4.8%	0.7%	3.15	.52
Grand Mean					**3.09**	**0.66**

Source: Field Survey Data (April 2024)

Table above shows that 65.5 percent of the respondents agreed that the deployment of computer-aided designs (CAD) ensures that health records are developed with precision and few errors; 69.7 percent of the respondents agreed that CAD helps create health records that are easily understandable; 64.8 percent of the respondents agreed that CAD enables the effective observation, diagnosis, and treatment of patients adequately and on time; 42.1 percent of the respondents agreed that CAD enhances the integrity of records compared to physical records, which can be lost, amended, or mutilated easily. 73.1 percent of the respondents agreed that IoT allows for fast and easy distribution of resources pertaining to health records.

The result of the descriptive statistics on computer-aided designs (CAD) for electronic health records (EHR) developments shows that all the respondents have similar opinions about the subject matter. The grand mean for computer-aided designs (CAD) is 3.09, which indicates that, on average, the respondents agreed with most of the statements on a high scale as it relates to electronic health records (EHR) developments. The overall standard deviation of 0.66 indicates a clustering of responses around the mean, as all statement standard deviations were less than 1.

Test of Hypotheses

Hypothesis One

Model		Sum of Square	Df.	Mean Square	F	Sig.
1	Regression	1.173	1	1.173	1.066	.304[b]
	Residual	157.338	143	1.100		
	Total	158.510	144			

a. Dependent Variable: EHR Storage

b. Predictors: (Constant), Machine Learning

Coefficients[a]

		Unstandardized coefficient		Standardized coefficient		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	5.435	.812		6.692	.000
	Machine Learning	.084	.081	.086	1.032	.304

a. Dependent Variable: EHR Storage

H_{O1}: Machine Learning (ML) has no significant effect on electronic health record (EHR) storage. The hypothesis was tested using the t-test values. The results show that the significance level is.304 more than the critical value of 0.05 level of significance and the calculated t-value is 1.03. Therefore, the null hypothesis is REJECTED while the alternate hypothesis is ACCEPTED. This means that machine learning (ML) has significant effect on electronic health record (EHR) storage.

Hypothesis Two

Model		Sum of Square	Df.	Mean Square	F	Sig.
1	Regression	6.124	1	6.124	7.371	.007[b]
	Residual	118.813	143	.831		
	Total	124.938	144			

a. Dependent Variable: EHR error minimization

b. Predictors: (Constant), Artificial Intelligence

Coefficients[a]

		Unstandardized coefficient		Standardized coefficient		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	4.780	.536		8.915	.000
	Artificial Intelligence	.156	.058	.221	2.715	.007

b. Dependent Variable: EHR error minimization

H_{02}: Artificial intelligence (AI) has no significant effect on error minimization in electronic health records (EHR) in Alimosho General Hospital, Lagos State, Nigeria. The hypothesis was tested using the t-test values. The results show that the significance level is.000 less than the critical value of 0.01 level of significance, and the calculated t-value is 2.72. Therefore, the null hypothesis is REJECTED while the alternate hypothesis is ACCEPTED. This means that artificial intelligence (AI) has significant effect on error minimization in electronic health records (EHR) at Alimosho General Hospital, Lagos State, Nigeria.

Hypothesis Three

Model		Sum of Square	Df.	Mean Square	F	Sig.
1	Regression	31.439	1	31.439	39.931	.000[b]
	Residual	112.589	143	.787		
	Total	144.028	144			

a. Dependent Variable: EHR timely retrieval

b. Predictors: (Constant), Internet of Things

Coefficients[a]

		Unstandardized coefficient		Standardized coefficient		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	2.734	.559		4.894	.000
	Internet of Things	.370	.058	.467	6.319	.000

c. Dependent Variable: EHR timely retrieval

H_{03}: The Internet of Things (IoT) has no significant effect on the timely retrieval of electronic health records (EHR) in Alimosho General Hospital, Lagos State, Nigeria. We tested the hypothesis using the t-test values. The results indicate that the significance level is.000 less than the critical 0.01 level of significance, and the calculated t-value is 6.32. Therefore, we REJECT the null hypothesis and ACCEPT the alternate hypothesis. This means that the Internet of Things (IoT) has significant effect on the timely retrieval of electronic health records (EHR) in Alimosho General Hospital, Lagos State, Nigeria.

Hypothesis Four

Model		Sum of Square	Df.	Mean Square	F	Sig.
1	Regression	12.400	1	12.400	12.407	.001[b]
	Residual	142.911	143	.999		
	Total	155.310	144			

a. Dependent Variable: EHR Development

b. Predictors: (Constant), Computer Aided Design

Coefficients[a]

		Unstandardized coefficient		Standardized coefficient		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	4.235	.527		8.029	.000
	Computer Aided Design	.195	.055	.283	3.522	.001

a. Dependent Variable: EHR Development

H_{04}: Computer-Aided Design (CAD) has no significant effect on the electronic health records (EHR) development in Alimosho General Hospital, Lagos State, Nigeria.

We tested the hypothesis using the t-test values. The results show that the significance level is.000 less than the critical value of 0.01 level of significance, and the calculated t-value is 3.52. Therefore, we REJECT the null hypothesis and ACCEPT the alternate hypothesis. This means that computer-aided design (CAD) has significant effect on the electronic health records (EHR) development in Alimosho General Hospital, Lagos State, Nigeria.

Discussion of Findings

The study examined the effect of cloud computing policy on health records in Lagos State general hospitals. The study's highlights include the following: The first hypothesis of the analysis concluded that machine learning (ML) has a significant effect on the storage of electronic health records (EHR). The second hypothesis revealed that artificial intelligence (AI) has significant effect on error minimization in EHR at Alimosho General Hospital, Lagos State,

Nigeria. Also, the Internet of Things (IoT) has a significant effect on the timely retrieval of EHR at Alimosho General Hospital, Lagos State, Nigeria; and computer-aided design (CAD) has significant effect on the development of EHR at Alimosho General Hospital, Lagos State, Nigeria.

Conclusion

In conclusion, the impact of cloud computing policy on health records in Lagos State general hospitals is a multifaceted and evolving process with both opportunities and challenges. The adoption of cloud computing in managing health records holds the potential to revolutionize healthcare delivery by enhancing accessibility, scalability, and efficiency. The shift from traditional paper-based systems to cloud-based solutions can streamline data management, improve collaboration among healthcare professionals, and ultimately contribute to better patient outcomes.

However, the successful implementation of cloud computing policies in health records management is contingent upon addressing various considerations. Security and privacy concerns are paramount, requiring robust measures to safeguard sensitive patient information. Adherence to data protection regulations and the implementation of encryption, authentication, and access control mechanisms are imperative to instill confidence in patients and healthcare providers. Furthermore, to ensure seamless adaptation to the new technology, comprehensive training programs for healthcare staff should accompany the integration of cloud computing. Collaboration with reputable cloud service providers and the development of standardized protocols can facilitate interoperability and data exchange among different healthcare systems.

In the context of Lagos State general hospitals, the implementation of a well-defined and meticulously executed cloud computing policy has the potential to overcome infrastructural limitations, improve resource utilization, and enhance the overall efficiency of health services. The scalability of cloud solutions allows for the accommodation of growing data volumes, supporting the ever-expanding healthcare needs of a populous state like Lagos. Lastly, while challenges such as initial investment costs, connectivity issues, and resistance to change may arise during the transition to cloud-based health record systems, the long-term benefits can significantly outweigh these obstacles. A judiciously crafted cloud computing policy, aligned with the specific needs and challenges of Lagos State general hospitals, can pave the way for a more resilient, accessible, and technologically advanced healthcare system, ultimately contributing to improved patient care and outcomes.

Recommendations

1. Before adopting cloud computing solutions, the hospital should conduct thorough risk assessments to identify potential security and privacy risks associated with storing health records in the cloud. The hospital should also collaborate with cybersecurity experts to implement robust security measures, encryption, and access controls to safeguard sensitive patient information.
2. Hospital management should develop and implement training programs for healthcare staff to enhance their skills and understanding of cloud-based health record systems.

This will aid in reducing resistance to change and ensuring effective use of the new technology.

3. There should be partnerships with reputable and compliant cloud service providers that specialize in healthcare solutions, as well as collaboration with providers that offer high levels of security, reliability, and scalability to meet the unique needs of healthcare data.
4. There should be a public awareness campaign to inform patients and the general public about the benefits and security measures in place for cloud-based health records. Transparent communication can help build trust and alleviate concerns regarding data privacy and security.

By following these recommendations, Lagos State general hospitals can establish a foundation for a secure, efficient, and scalable cloud-based health records system, ultimately enhancing healthcare delivery and patient outcomes.

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