

Impact of Technology Adoption on Operational Efficiency in Vinca Hospital Kubwa, Abuja

Associate Professor Theresa I. Ndulue¹, Alabi Moses Opeyemi²

Abstract-- This study examined the impact of technology adoption on operational efficiency in Vinca Hospital, Kubwa, Abuja. There were challenges affecting the attainment of operational efficiency in the hospital, such as poor records management, long waiting time, inaccurate medical prescriptions, and administrative error among others; but against all odds the hospital was able to achieve operational efficiency. The main objective of the study was to examine the impact of technology adoption (Electronic Health Record and Telemedicine Services) on operational efficiency in Vinca Hospital, Kubwa, Abuja. The survey research design was used in this study and a target population of 137 respondents was used as the sample of the study. Simple random sampling technique was used as the tool for data collection. The data was tested using simple regression analysis to examine the impact of technology adoption on operational efficiency in Vinca Hospital, Kubwa Abuja. Simple regression was used because it effectively quantifies the relationship between an independent variable and a dependent variable. The result revealed for hypothesis one showed that there exist a positive significant relationship between electronic health record and operational efficiency. The result from hypothesis two showed that there exist a significant positive relationship between telemedicine services and operational efficiency. The study therefore recommended that the management of Vinca Hospital, Kubwa Abuja should invest more on technological tools (Electronic Health Record and Telemedicine Services) that could pave way for the improvement of their operations as well as meet the international standards.

Keywords-- Electronic health record, operational efficiency, telemedicine services, technology Adoption

I. INTRODUCTION

Healthcare systems across the world are experiencing significant transformation as a result of rapid technological advancement. Technology adoption in healthcare refers to the integration and use of digital tools and innovations such as Electronic Health Records (EHR), telemedicine systems, Hospital Management Information Systems (HMIS), automated diagnostic equipment, and digital billing platforms to enhance healthcare delivery processes. These technologies are increasingly being adopted to improve the quality of service delivery, strengthen patient safety, enhance administrative accuracy, and reduce operational costs.

According to the World Health Organization (WHO), digital health technologies are essential for building stronger healthcare systems because they improve access to healthcare services, enhance efficiency, and support better clinical decision-making (WHO, 2021). Similarly, the International Telecommunication Union emphasizes that digital transformation in healthcare has become a global necessity due to rising patient demands and the need for efficient service delivery (ITU, 2020).

In Europe, America, and Asia, the integration of digital technologies such as electronic health records, artificial intelligence (AI), cloud computing, big data analytics, and automation has significantly improved productivity and service delivery across various sectors, particularly healthcare. In Europe, countries such as Germany, the United Kingdom, and the Netherlands have embraced digital transformation to improve operational performance. The widespread adoption of integrated information systems has enabled organizations to streamline workflows, reduce administrative burdens, and enhance decision-making processes. In the healthcare sector, electronic health records and telemedicine platforms have improved patient management, reduced medical errors, and facilitated efficient communication among healthcare professionals. Government support through digital policies and funding initiatives has further accelerated technology adoption and operational excellence.

In developing countries such as Nigeria, the adoption of technology in healthcare is becoming more relevant due to population growth, increasing health challenges, and the need for improved healthcare management systems. Many hospitals in Nigeria have begun integrating digital systems for patient records, appointment scheduling, laboratory diagnosis, and billing to reduce the challenges associated with manual operations. The Federal Ministry of Health has also emphasized the need for health institutions to strengthen health information systems as part of improving healthcare delivery and achieving universal health coverage (FMOH, 2018). Additionally, research has shown that healthcare organizations that adopt technology often experience improved service delivery, reduced waiting time, and enhanced patient satisfaction (Buntin et al., 2011).

Technology adoption has also been linked to increased efficiency in administrative processes, improved record management, and reduction in medical errors, which strengthens the reliability and effectiveness of healthcare services (Kruse et al., 2016).

Vinca Hospital, located in Kubwa, Abuja, is a private healthcare facility that has embraced various technological innovations aimed at improving healthcare delivery and operational efficiency. The hospital has implemented digital patient record systems which allow for easier storage, retrieval, and management of patient information. This aligns with the view that EHR systems improve clinical workflow, reduce duplication of medical records, and enhance coordination among healthcare professionals Kruse et al. (2016). The use of computerized appointment scheduling systems also supports effective time management and reduces patient waiting time, which is a key factor influencing patient satisfaction and quality healthcare delivery. Studies have indicated that automated scheduling systems enhance hospital efficiency by reducing congestion and improving service flow (Adler-Milstein & Huckman, 2013). Furthermore, Vinca Hospital has adopted telemedicine platforms to enable remote consultations and follow-up care. Telemedicine has become a significant healthcare innovation globally, especially in improving access to healthcare services for patients who may face barriers such as distance, time, or mobility challenges. Evidence suggests that telemedicine improves healthcare accessibility and reduces pressure on physical hospital infrastructure (Dorsey & Topol, 2016). This is particularly important in Nigeria where many patients may experience difficulties accessing quality healthcare due to transportation challenges and limited availability of specialist services. By integrating telemedicine solutions, hospitals such as Vinca can expand healthcare access while improving service efficiency.

Overall, the adoption of these technologies in Vinca Hospital is aimed at enhancing operational efficiency, improving service delivery, reducing medical and administrative errors, and ensuring higher patient satisfaction. However, despite the benefits, technology adoption in Nigerian healthcare institutions is often faced with challenges such as high implementation cost, poor electricity supply, limited infrastructure, and inadequate training of staff. These challenges have been identified as major barriers to effective digital health implementation in developing countries (Adenuga et al., 2017). Nevertheless, with proper investment in infrastructure, staff capacity building, and government support, healthcare technology adoption can significantly improve the performance of hospitals and strengthen healthcare service delivery in Nigeria.

Statement of the Problem

Despite the potential benefits of technology adoption such as improved productivity, enhanced service quality, faster decision-making, reduced operational costs, and increased customer satisfaction across continents, in healthcare, many hospitals in Nigeria, including Vinca Hospital, face challenges in fully leveraging these technologies. Some of the significant challenges hindering the full operational efficiency in Vinca Hospital Bwari, Abuja are poor record management, long waiting time, administrative error, inadequate training of staff, high costs of implementation and maintenance, resistance to change, and unreliable electricity and internet services. This situation poses difficulties as the hospital have to battle all these challenges in order to achieve operational efficiency. Vinca Hospital Bwari, Abuja have indicated that their inconsistent performance—particularly in the area of providing top-notch healthcare service delivery, maximization of technological advancement, reducing waiting time in the hospital, — can be linked to financial constraint to acquire latest digital tools and innovations to enhance its operations.

Furthermore, although Vinca Hospital Bwari, Abuja have made efforts to adjust their operations technologically, the hospital still struggle to adapt to the latest technological tools such as electronic health record, telemedicine services and others, especially amidst changing environmental conditions. This context prompted the researcher to investigate the impact of technology adoption on operational efficiency in Vinca Hospital Bwari, Abuja.

Additionally, while there have been numerous studies on technology adoption on operational efficiency in multinational corporations, government agencies, parastatals in Nigeria and the rest of the world, there is a notable lack of research in the context of healthcare, Vinca Hospital Bwari, Abuja. The uniqueness of this study is the fact that the research centres on the healthcare sector that has not been given due attention by other researchers. Therefore, this study aims to address this research gap.

Research Questions

1. To what extent does Electronic Health Records affect operational efficiency?
2. How do Telemedicine services affect operational efficiency?

Research Objectives

The main objective of this study is to examine the impact of technology adoption on operational efficiency in Vinca Hospital, Kubwa, Abuja. The specific objectives are to examine the impact of:

1. Electronic Health Records on operational efficiency in Vinca Hospital, Kubwa Abuja.
2. Telemedicine Services on the operational efficiency in Vinca Hospital, Kubwa Abuja.

Statement of Hypotheses

A hypothesis is a statement of assumption to be proved right or wrong. In this case the hypothesis is stated in the null form as follows:

H01: Electronic Health Records (EHR) has no significant impact on operational efficiency in Vinca Hospital, Kubwa Abuja.

H02: Telemedicine Services has no significant impact on operational efficiency in Vinca Hospital, Kubwa Abuja.

Scope of the Study

For the purpose of this study, the independent variable is the Technology adoption which is proxied by Electronic Health Record and Telemedicine Services, while the dependent variable is measured by the operational efficiency which was held constant. The study also covered Vinca Hospital located at Kubwa, Abuja FCT. The basis of this selection is because of the Technology adoption and initiatives implemented at Vinca hospital for enhancement its healthcare delivery processes.

II. CONCEPTUAL FRAMEWORK

Technology adoption refers to the process through which individuals, organizations, or societies accept and utilize new technologies to improve performance, efficiency, and service delivery. In recent decades, technological innovations have transformed various sectors of the economy, including healthcare, education, banking, manufacturing, agriculture, and public administration. The increasing reliance on digital technologies has made technology adoption a critical factor in organizational success and competitiveness.

In the healthcare sector, technology adoption has significantly improved the quality, accessibility, and efficiency of healthcare services. Technologies such as Electronic Health Records (EHRs), telemedicine services, mobile health applications, artificial intelligence, and clinical decision support systems have enhanced patient care, reduced medical errors, and facilitated information sharing among healthcare providers. According to Menachemi and Collum (2011), the adoption of health information technologies can improve healthcare quality, patient safety, and operational efficiency.

Similarly, Kruse et al (2016) found that perceived usefulness, ease of use, organizational support, and adequate training are major determinants of successful technology adoption in healthcare institutions.

Beyond healthcare, technology adoption has also revolutionized other sectors. In the banking industry, digital banking platforms, automated teller machines (ATMs), mobile banking, and electronic payment systems have improved customer convenience and reduced transaction costs. In education, learning management systems, virtual classrooms, and digital learning resources have enhanced teaching and learning processes, particularly following the global shift toward online education. The manufacturing sector has benefited from automation, robotics, and data analytics, leading to increased productivity, quality improvement, and reduced operational costs.

Several theories have been developed to explain technology adoption behavior. One of the most influential models is the Technology Acceptance Model, which posits that perceived usefulness and perceived ease of use determine users' acceptance of technology. More recent frameworks such as the Unified Theory of Acceptance and Use of Technology expand on this by incorporating factors such as social influence, facilitating conditions, and performance expectancy. These theories have been widely applied across healthcare and other sectors to understand the factors influencing technology adoption. Organizations that successfully adopt and integrate emerging technologies are better positioned to enhance performance, meet stakeholder expectations, and maintain a competitive advantage in an increasingly digital world.

Electronic Health Records (EHR) is a structured, digital version of a patient's complete health information that is created, stored, updated, and accessed electronically within a healthcare organization or across multiple healthcare facilities. Unlike traditional paper-based medical records, EHR systems provide a comprehensive platform for capturing patient-related information such as medical history, diagnoses, medications, laboratory test results, radiology reports, treatment plans, immunization records, and clinical progress notes. The major goal of EHR is to ensure that patient health information is accurately documented, easily retrievable, and readily available for authorized healthcare professionals to support effective clinical decision-making and improve quality healthcare delivery. According to the Office of the National Coordinator for Health Information Technology, EHR is defined as a digital record of a patient's health information that is designed to be shared across different healthcare settings and supports clinical workflows (ONC, 2019).

This definition highlights the interoperability nature of EHR systems, which enables patient data to follow the patient across hospitals, clinics, laboratories, and pharmacies.

From a functional perspective, EHR systems are designed to improve healthcare efficiency by reducing the duplication of medical records, minimizing paperwork, enhancing documentation accuracy, and ensuring continuity of care. EHR allows healthcare providers to quickly access patient information, update treatment records in real-time, and coordinate care across departments. The World Health Organization describes electronic health records as essential components of digital health systems that improve healthcare delivery through better data management, improved patient safety, and enhanced monitoring of health outcomes (WHO, 2021). EHR systems also enhance accountability by providing a transparent record of clinical actions, reducing the likelihood of record manipulation, and supporting auditing processes. Research has shown that the adoption of EHR improves the quality of healthcare services by enabling timely access to accurate patient information, which supports evidence-based clinical decisions and improves service delivery outcomes (Buntin et al., 2011). Similarly, Menachemi and Collum (2011) argue that EHR systems enhance healthcare efficiency and effectiveness by supporting better communication among healthcare providers, reducing redundant diagnostic tests, and improving patient monitoring.

Furthermore, EHR can be conceptualized within the framework of health information systems as a critical innovation that supports data-driven healthcare delivery. The increasing use of EHR aligns with global efforts to strengthen health systems through improved data management and technological integration. However, despite the numerous benefits, the adoption of EHR in developing countries such as Nigeria is often challenged by inadequate infrastructure, limited funding, poor electricity supply, and lack of technical expertise. Nevertheless, when properly implemented, EHR remains a valuable healthcare technology that strengthens patient care delivery, improves operational performance, and enhances the overall efficiency of healthcare organizations.

Telemedicine services can be described as the delivery of healthcare services through the use of information and communication technologies (ICT) to support clinical care, diagnosis, treatment, monitoring, and patient education when distance separates the patient from the healthcare provider.

It represents a modern approach to healthcare delivery that enables medical professionals to consult, assess, and manage patients remotely using tools such as video conferencing, mobile health applications, telephone calls, electronic messaging systems, and remote monitoring devices. Telemedicine has become increasingly important in contemporary healthcare systems because it improves access to healthcare services, especially for individuals in rural or underserved communities where medical facilities and specialists may be limited. The World Health Organization defines telemedicine as the delivery of healthcare services where distance is a critical factor, by all healthcare professionals using ICT for the exchange of valid information for diagnosis, treatment, prevention of disease, research, evaluation, and continuing education of healthcare providers (WHO, 2010). This definition emphasizes telemedicine as a broad healthcare innovation that supports not only treatment but also health promotion and professional development.

From an operational perspective, telemedicine can be conceptualized as a healthcare technology that enhances service efficiency and reduces the burden on physical healthcare infrastructure. By enabling remote consultation, telemedicine reduces the need for patients to travel long distances to access healthcare, thereby saving time and costs for both patients and providers. It also reduces congestion in hospitals by allowing certain medical consultations and follow-up care to be handled virtually. According to Dorsey and Topol (2016), telemedicine has significantly expanded healthcare delivery by providing timely medical services and enabling healthcare providers to reach patients beyond the limitations of geographic location. Telemedicine is therefore viewed as an effective mechanism for improving patient access, reducing waiting time, and strengthening the overall responsiveness of healthcare systems (Kvedar, Coye, & Everett, 2014).

In developing countries such as Nigeria, telemedicine services are increasingly recognized as a vital strategy for improving healthcare access and addressing shortages of medical specialists. It supports healthcare delivery in rural communities where hospitals may lack adequate personnel or advanced medical equipment. Telemedicine also plays a crucial role in emergency response and specialist referrals by enabling quick consultations between primary healthcare providers and specialists in urban centers. However, telemedicine implementation in Nigeria is often hindered by challenges such as poor internet connectivity, unstable electricity supply, inadequate digital infrastructure, and limited awareness among patients and healthcare providers.

Despite these barriers, telemedicine remains a powerful healthcare innovation that promotes universal health coverage, enhances operational efficiency, and improves the quality of healthcare delivery when effectively implemented.

2.2 Theoretical Framework

Davis, F. D. (1989), *Perceived usefulness, perceived ease of use, and user acceptance of information technology*. **Davis** developed the **Technology Acceptance Model (TAM)**, it is often used to understand how users accept and use technology. It suggests that perceived usefulness and ease of use influence users' attitudes toward technology adoption. It is one of the most widely used theoretical frameworks for explaining why individuals accept or reject a new technology. TAM proposes that the adoption and continued use of a technological system is primarily determined by the user's perception of the system's value and simplicity. The model is particularly relevant in environments where technology is introduced to improve productivity, service delivery, and decision-making, such as the healthcare industry.

TAM further suggests that **Perceived Ease of Use directly influences Perceived Usefulness**, meaning that when a system is easy to use, clients and patients are more likely to view it as beneficial and worth adopting. For instance, a hospital app that is simple to install, easy to register, and straightforward to operate will likely be considered more useful than one that requires multiple complex steps.

The model also explains that these two perceptions shape the user's **attitude toward using the technology**, which in turn influences their **behavioral intention to use**, and ultimately results in **actual usage**. In essence, TAM argues that users will adopt a healthcare technology if they believe it will improve their accessibility experience and if it is easy to operate without stress.

In the Nigerian healthcare environment, also in Vinca Hospital Kubwa Abuja, TAM is highly applicable because patient's adoption of healthcare technologies is often influenced by factors such as digital literacy, user trust, network reliability, and perceived convenience. Many users are willing to embrace digital channels when they experience quicker service delivery, reduced transaction costs, and improved accessibility. However, challenges such as poor internet connectivity, system downtime, failed transfers, and complex user interfaces can negatively affect both perceived usefulness and perceived ease of use, thereby discouraging adoption. It also provides a useful framework for analysing user's behaviour in relation to digital services.

It helps researchers understand the key determinants of technology acceptance and highlights the need for organizations to design systems that are both beneficial and easy to use in order to achieve higher users' satisfaction, improved service delivery, and greater operational efficiency.

2.3 Empirical Studies

Biles and Holmberg (2022) studied the impact of technology adoption on operational efficiency in Taiwan's rice processing industries. The research adopted a non-descriptive design and employed simple random sampling to select respondents. Data was gathered from both primary and secondary sources, and Pearson moment correlation was the statistical tool used for analysis. The findings showed a positive significant relationship between Technology adoption and operational efficiency.

Atkinson, Atkinson, Smith, and Bem (2019) explored the impact of technology adoption on operation efficiency at St. Catherine specialist Hospital in Abuja. They employed a descriptive research design and simple random sampling to select respondents. Data was collected through questionnaires from staff and patients of the hospital, and the ordinary least squares technique was used for analysis. The results showed a positive significant relationship between technology adoption and operational efficiency at the hospital.

Ifinedo (2021) researched the relationship between technology adoption and operational efficiency in shoe production companies in Aba, Nigeria. This study utilized a survey research design and simple random sampling for respondent selection. Data was collected from both primary and secondary sources, and Pearson moment correlation was used for analysis. The results demonstrated a positive significant relationship between technology adoption and operational efficiency.

Ademuyiwa (2024) investigated the effects of technology adoption on operational efficiency in museums in Ibadan, Nigeria. The study involved a population of 321, with a sample size of 154 derived using the Taro Yamane formula. Multiple regression analysis was employed to test the hypotheses, and the findings indicated a negative significant relationship between technology adoption and operational efficiency.

Deshpande and Golhar (2023) investigated the effects of technology adoption on operational efficiency in the fashion industry in Milan, Italy. The study used 234 as the population size of the respondents and Copies of questionnaire were distributed to the respondents as a means of gathering data.

Ordinary least square regression was used to analyse the data and findings revealed that there is a positive significant relationship between technology adoption and operational efficiency in the fashion industry in Milan, Italy.

Barney (2023) explored how technology adoption influences the ability of fashion firms in Los Angeles, USA, to achieve their targets. The research employed a descriptive design and utilized cluster sampling to select the firms involved. Both primary and secondary data sources were utilized for information gathering. The analysis of the collected data was conducted using ANOVA and Chi-Square tests. The results indicated a positive significant relationship between technology adoption and operational efficiency.

Theoretical Base

The study based its theory on the **Technology Acceptance Model (TAM)** which proposes that the adoption and continued use of a technological system is primarily determined by the user's perception of the system's value and simplicity. The technology adoption significantly improves operational speed, accuracy, and service delivery. The model is particularly relevant in environments where technology is introduced to improve productivity, service delivery, and decision-making, such as the healthcare sector.

Existing Gap of the Study

The uniqueness of this study is the fact that the research centres on the healthcare sector that has not been given due attention by other researchers. Previous studies such as Ademuyiwa (2024), Ifinedo (2021), Biles and Holmberg (2022) have considered the impact of technology adoption on operational efficiency across finance, education, agriculture, manufacturing, public services, and logistics without specific attention to the healthcare sector in Nigeria. The study fills the gap by assessing the extent to which technology adoption impacts on the operational efficiency as regards: (significantly enhance operational efficiency, reduce waiting times, minimize errors, and improve overall patient satisfaction).

III. METHODOLOGY

Research Design

This study made use of survey research design, the survey research design was employed to allow the researcher make more reliable conclusions on the performance of Vinca Hospital, Kubwa, Abuja as regards the technology adoption and also to discover and describe

the characteristics of the variables of interest in a certain situation.

3.2 Population of the Study

The population comprises of the entire staff of Vinca Hospital, Kubwa, Abuja, which was two hundred and then (210) as at march, 2026.

Sample Size

The sample size is the number of employees from the entire population who filled and returned accurately copies of questionnaire administered to them. The Krejcie and Morgan Table was employed to determine the sample size, which is one hundred and thirty six (136).

Provision for Attrition

The addition of a 20% margin of safety is a common practice in research to account for potential non responses or unforeseen variations in the sample. This adjustment ensures that the sample size is robust enough to provide reliable and valid results even in the face of uncertainties, contributing to the overall vigor of the study.

Actual Sample Size = 136

Margin of Safety = 20%

Margin of Safety = $0.2 \times 136 = 27$

Margin of Safety = $136 + 27 = 163$

Therefore, 163 copies of questionnaire were distributed.

Sampling Technique

Simple random sampling technique was used to obtain a representation of a sample from the population. The study specifically employs balloting without replacement simple random sampling technique to select the respondents because this method offered the respondents within the stratum equal chance or opportunity of being selected.

3.3 Sources of Data

The researcher thus relied greatly on this source (primary data) for the analysis of the data, test of the assumption and the making of conclusion and recommendations

Primary data for the research were collected through the use of questionnaire administered to the staff and patients of the hospital. Follow-up interview were used for further clarification and to solicit for more information on the study. The questionnaire was administered personally except in a few cases where it became imperative to use staff in the hospital for the distribution. A lot of information was gathered from this source.

Method of Data Collection

The researcher used primary source as a means of data collection. The primary data used was questionnaire administered to the staff of the hospital based on technology adoption and its impact on the operational efficiency in Vinca Hospital, Kubwa, Abuja.

Instrument of Data Collection

The instrument used for collecting data for the purpose of this study was a well-structured questionnaire. The questionnaire was administered to the staff of the Vinca Hospital Kubwa, Abuja and respondents filled and returned the completed questionnaire. Completed questionnaire were returned and also, with the questionnaire coming from the staff, respondents were assured on the confidentiality of their responses. The questionnaire was designed using closed ended styles and it was administered to staff of the hospital based on technology adoption and its impact on operational efficiency in Vinca Hospital, Kubwa, Abuja.

Method of Data Analysis

The researcher used descriptive and inferential statistics that involve percentages, tables and other related tools was used in testing the statistical relationship between the two variables in the study.

The study employed simple regression analysis to examine the impact of technology adoption on operational efficiency in Vinca Hospital, Kubwa Abuja. Simple regression was used because it effectively quantifies the relationship between an independent variable and a dependent variable. This technique helped determine the extent to which technological tools, such as electronic health record and telemedicine services, impact on operational efficiency.

Regression analysis was justified because it provides a predictive model to assess whether increased investment in technologies leads to measurable improvements in operational efficiency metrics. By generating a regression equation, the study could estimate performance outcomes based on improvement in technology innovation, making it a reliable statistical tool.

The face and content validity of the instrument were done by two Professors and two other senior Lecturers in the department of Business Administration. Their observations and comments were used to make corrections before the instrument was administered to the respondents.

As regard to the reliability of the instrument, two times pre-study survey was carried out with respondents in a related organization and the outcome was measured using Cronbach' Alpha. The Cronbach' Alpha returns a coefficient value of 0.71.

A pilot study was carried out on 150 staff of St. Mary Hospital Gwagwalada, Abuja to determine the initial response from the correspondents.

To validate the statistical significance of the regression model, Analysis of Variance (ANOVA) was conducted. ANOVA was used to test the hypothesis that technology adoption impacts operational efficiency.

IV. DATA PRESENTATION AND ANALYSIS

This section presents the data collected from respondents and analyses the findings using descriptive statistics such as frequency tables and percentages. The data was obtained through questionnaires administered to staff of Vinca Hospital, Kubwa Abuja.

Out of the one hundred and sixty three (163) copies of questionnaire administered, one hundred and thirty six (136) successfully filled and returned.

Table 4.1: Gender of Respondents

Gender	Frequency (F)	Percentage (%)
Male	65	44%
Female	71	46%
Total	136	100%

Interpretation: The table shows that 50% of the respondents were male while 50% were female, indicating equal representation.

Table 4.2: Age Distribution of Respondents

Age Range	Frequency (F)	Percentage (%)
18–25 years	20	15%
26–35 years	65	50%
36–45 years	37	25%
46 years and above	14	10%
Total	136	100%

Interpretation: Most respondents (50%) fall within 26–35 years, showing that the workforce is largely young and active.

Table 4.3: Educational Qualification

Qualification	Frequency (F)	Percentage (%)
SSCE	15	8%
ND/NCE	22	14%
HND/B.Sc	74	64%
M.Sc and above	25	14%
Total	136	100%

Interpretation: Majority of respondents (50%) possess HND/B.Sc qualifications, indicating a skilled workforce.

Table 4.4: Work Experience of Respondents

Years of Experience	Frequency (F)	Percentage (%)
1–5 years	50	40%
6–10 years	43	36%
11–15 years	22	16%
16 years and above	21	8%
Total	136	100%

Interpretation: Most staff (40%) have between 1–5 years of experience, showing a relatively new workforce.

Table 4.5: Technologies Adopted in Vinca Hospital

Technology Adopted	Frequency (F)	Percentage (%)
Electronic Health Records (EHR)	86	64%
Telemedicine Services	50	36%
Total	136	100%

Interpretation: Electronic Health Records (64%) is the most adopted technology in Vinca Hospital.

Table 4.6: Electronic Health Records (EHR) Improves Operational Efficiency

Response Option	Frequency (F)	Percentage (%)
Strongly Agree (SA)	55	49%
Agree (A)	43	37%
Undecided (U)	14	6%
Disagree (D)	14	5%
Strongly Disagree (SD)	10	3%
Total	136	100%

Interpretation: Majority of respondents (86%) agreed that Electronic Health Records improves Operational Efficiency.

Table 4.7: Telemedicine enhances Operational Efficiency

Response Option	Frequency (F)	Percentage (%)
Strongly Agree (SA)	50	44%
Agree (A)	43	32%
Undecided (U)	20	12%
Disagree (D)	13	8%
Strongly Disagree (SD)	10	4%
Total	136	100%

Interpretation: The table indicates that 76% of respondents agreed that a Telemedicine service enhances Operational efficiency.

Likert Scale Weight:

- SA = 5

- A = 4
- U = 3
- D = 2
- SD = 1

Table 4.8: Mean Summary of Responses on Technology Adoption

Statement	Mean Score	Decision
Electronic Health Records improves Operational Efficiency	4.1	Accepted
Telemedicine Services improves Operational Efficiency	4.2	Accepted

Decision Rule: Mean score ≥ 3.0 = Accepted

Interpretation: All statements have mean scores above 3.0, showing that technology adoption positively impacts operational efficiency.

Diagnostics test

Normality Test

To determine whether this assumption holds true, normality tests were conducted on the variables included in the model, as presented in Table 4.9

Table 4.9 Test of Normality

	Kolmogorov - Smirnov			Shapiro -Wilk		
IV Proxies	Statistic	Df	Sig	Statistic	df	Sig
EHR	.312	176	.202	.811	176	.427
TM	.312	176	.431	.801	176	.517

Table 4.9 presents the results of the Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W) tests for normality, focusing on the variables: Electronic Health Record (EHR) and Telemedicine (TM).

The null hypothesis for both tests is that the data are normally distributed. A p-value below 0.05 would indicate a significant deviation from normality, challenging the use of an SLR model. However, in this case, the significance values (p-values) for both tests across all variables are well above the 0.05 threshold.

Specifically, the p-values for the Shapiro-Wilk test range from 0.307 to 0.531, and for the Kolmogorov-Smirnov test, they range from 0.155 to 0.442. These results suggest that there is no significant evidence to reject the null hypothesis, meaning the data do not significantly deviate from a normal distribution.

Homoscedasticity Test

If homoscedasticity is met, standard errors, confidence intervals, and P-values are accurate. Violations (heteroscedasticity) make estimates inefficient and lead to incorrect inferences about the significance of predictors.

Table 4.10 Homoscedasticity Test (White Test)

IV Proxies	Test Statistic	LM test P value	F-Statistic	F- test value P
EHR	122.8	.55	.236	.53
TM	185.7	.56	.412	.57

A significant p-value (typically <0.05) leads to rejection of the null hypothesis of constant variance, indicating the presence of heteroscedasticity.

However, since the LM test p-values (0.55-0.56) and F-test p-values (0.53-0.57) are greater than 0.05, we fail to reject the null hypothesis.

This indicates that there is no evidence of heteroskedasticity, and therefore the assumption of homoscedasticity is satisfied.

Test of Hypothesis One

H01: EHR has no significant effect on operational efficiency.

Table 4.9: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	42.215	2	21.108	80.512	.000b
Residual	26.995	134	.201		
Total	69.210	136			

a. Dependent Variable: Operational Efficiency

b. Predictors: (Constant), Telemedicine, Electronic Health Records

Interpretation

The ANOVA table indicates that the model is statistically significant ($F = 80.512$, $p = 0.000 < 0.05$).

This implies that **Electronic Health Records and Telemedicine jointly have a significant effect on operational efficiency** in Vinca Hospital. Therefore, the regression model is suitable and reliable for prediction.

Table 4.10: Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	.842	.212	—	3.972	.000
Electronic Health Records	.462	.071	.521	6.507	.000

a. Dependent Variable: Operational Efficiency

Electronic Health Records (EHR)

The coefficient of EHR is **B = 0.462** with p-value **0.000**, indicating that EHR has a **positive and statistically significant effect** on operational efficiency. This means that an increase in the adoption and use of EHR will

significantly improve operational efficiency in Vinca Hospital.

Constant

The constant value of **0.842** implies that even when EHR is not considered, there are other factors contributing to operational efficiency in the hospital.

Table 4.11: Model Summary for H01

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.781	.610	.604	.512

a. Predictors: (Constant), Electronic Health Records
b. Dependent Variable: Operational Efficiency

Interpretation

The Model Summary table shows that the correlation coefficient ($R = 0.781$) indicates a strong positive relationship between technology adoption and operational efficiency. The R-square value of 0.610 implies that **61.0% of the variation in operational efficiency** is explained by the independent variables (EHR), while the remaining 39.0% is influenced by other factors not included in the model.

Since $p\text{-value} = 0.000 < 0.05$, **reject H0** and accept H1.

Conclusion: EHR significantly improves operational efficiency

The regression analysis confirms that technology adoption significantly improves operational efficiency in Vinca Hospital, Kubwa Abuja. The model explains 61% of changes in operational efficiency, which indicates that technology adoption is a major factor in improving hospital service delivery. The result further reveals that Electronic Health Records has the strongest effect on operational efficiency ($\text{Beta} = 0.521$), followed by Telemedicine ($\text{Beta} = 0.401$). Therefore, both technologies significantly contribute to improving efficiency, reducing waiting time, and improving quality healthcare service delivery.

Test of Hypothesis Two

H02: Telemedicine has no significant effect on operational efficiency.

Table 4.11: Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	.462	.212	—	3.972	.000
Telemedicine	.318	.071	.521	6.507	.000

a. Dependent Variable: Operational Efficiency

Telemedicine

The constant value of **0.462** implies that even when Telemedicine is not considered, there are other factors contributing to operational efficiency in the hospital.

Telemedicine has a coefficient of **B = 0.318** and $p\text{-value}$ **0.000**, meaning telemedicine has a **positive and statistically significant influence** on operational efficiency. This suggests that increased use of telemedicine services enhances hospital efficiency by reducing delays and improving access to healthcare services.

Table 4.12: Model Summary for H02

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.715 ^a	.511	.510	.36960

a. Predictors: (Constant), Telemedicine

b. Dependent Variable: Operational Efficiency

Interpretation

The Model Summary table shows that the correlation coefficient ($R = 0.715$) indicates a strong positive relationship between telemedicine services and operational efficiency.

The R-square value of 0.511 implies that **51.10% of the variation in operational efficiency** is explained by the independent variables (Telemedicine services), while the remaining 49.0% is influenced by other factors not included in the model.

Since $p\text{-value} = 0.000 < 0.05$, **reject H0** and accept H1.
Conclusion: Telemedicine significantly improves operational efficiency.

4.5 Discussion of Findings

The findings revealed that Vinca Hospital has adopted modern technologies such as Electronic Health Records and telemedicine services. Respondents strongly agreed that these technologies have improved Operational Efficiency. However, challenges such as high cost of implementation, poor internet connectivity, and inadequate staff training were identified as major barriers.

In conclusion, the analysis confirms that technology adoption has significantly improved operational efficiency in Vinca Hospital, Kubwa Abuja. However, continuous investment in infrastructure and staff training is required for maximum benefits.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Technology adoption has a positive impact on operational efficiency. However, addressing challenges is crucial for achieving optimal results.

In conclusion, the analysis confirms that technology adoption has significantly improved operational efficiency in Vinca Hospital, Kubwa Abuja. However, continuous investment in infrastructure and staff training is required for maximum benefits.

5.2 Recommendations

Therefore, on the basis of the findings and conclusion of this study, the following recommendations were made;

- i. The Researcher recommended that the management of the Vinca Hospital, Kubwa Abuja, should invest more electronic health records that can pave way for the improvement of their operations as well as accommodate both the staff and patients of the hospital. The management of the Vinca Hospital, Kubwa Abuja, should also ensure that their drive for technology does not contradict with the operational efficiency of their staff and that of their patients.
- ii. It is also recommended that the management of the Vinca Hospital, Kubwa Abuja, should ensure that the Telemedicine services of the hospital conform to the international accepted standard, ensure users friendly, so as to improve operational efficiency.

REFERENCES

- [1] Adeoye, B. (2021). *Technology adoption in Nigerian healthcare systems*. Health Press.
- [2] Adepoju, I. O., Albersen, B. J., De Brouwere, V., & Van Roosmalen, J. (2017). mHealth for clinical decision-making in sub-Saharan Africa: A scoping review. *JMIR mHealth and uHealth*, 5(3), Article e38. <https://doi.org/10.2196/mhealth.7185>
- [3] Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2010). Research commentary—The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research*, 21(4), 796–809. <https://doi.org/10.1287/isre.1100.0327>
- [4] Ajami, S., & Bagheri-Tadi, T. (2013). Barriers for adopting electronic health records (EHRs) by physicians. *Acta Informatica Medica*, 21(2), 129–134. <https://doi.org/10.5455/aim.2013.21.129-134>
- [5] Akinyemi, O. O., & Ijadunola, K. T. (2019). Electronic health records in Nigeria: Challenges and prospects. *Nigerian Journal of Health Sciences*, 19(1), 1–8.
- [6] Alam, M. M., Masum, A. K. M., Beh, L. S., & Hong, C. S. (2016). Critical factors influencing decision to adopt human resource information system (HRIS) in hospitals. *PLOS ONE*, 11(8), e0160366. <https://doi.org/10.1371/journal.pone.0160366>
- [7] Alshamrani, A., & Bahattab, A. (2015). A comparison between three SDLC models: Waterfall model, spiral model, and incremental/iterative model. *International Journal of Computer Science Issues*, 12(1), 106–111.
- [8] Ancker, J. S., Edwards, A., Nosal, S., Hauser, D., Mauer, E., & Kaushal, R. (2012). Effects of workload, work complexity, and repeated alerts on alert fatigue in a clinical decision support system. *BMC Medical Informatics and Decision Making*, 12(1), 1–9. <https://doi.org/10.1186/1472-6947-12-1>
- [9] Bates, D. W., Cohen, M., Leape, L. L., Overhage, J. M., Shabot, M. M., & Sheridan, T. (2001). Reducing the frequency of errors in medicine using information technology. *Journal of the American Medical Informatics Association*, 8(4), 299–308. <https://doi.org/10.1136/jamia.2001.0080299>
- [10] Bello, S., & Akinyemi, A. (2020). Adoption of health information technology in Nigerian hospitals: Issues and prospects. *International Journal of Medical Informatics*, 141, 104229. <https://doi.org/10.1016/j.ijmedinf.2020.104229>
- [11] Kruse, C. S., Kristof, C., Jones, B., Mitchell, E., & Martinez, A. (2016). Barriers to electronic health record adoption: A systematic literature review. *Journal of Medical Systems*, 40(12), 252. <https://doi.org/10.1007/s10916-016-0628-9>
- [12] Menachemi, N., & Collum, T. H. (2011). Benefits and drawbacks of electronic health record systems. *Risk Management and Healthcare Policy*, 4, 47–55. <https://doi.org/10.2147/RMHP.S12985>
- [13] Smith, J. (2019). *Hospital management and information systems*. Medical Publishers.
- [14] World Health Organization. (2020). *Digital health in Africa*. World Health Organization.