



## EHR system effectiveness and operational performance in public hospitals in Lagos, Nigeria: The roles of staff engagement and technological readiness

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### Abstract

**Background:** Electronic Health Record (EHR) systems have become important tools for improving healthcare operations and service delivery in public hospitals. However, the effectiveness of these systems in enhancing operational performance within Nigerian public hospitals remains underexplored, particularly regarding the roles of staff engagement and technological readiness.

**Objective:** This study examined the effect of EHR system effectiveness on operational performance in public hospitals in Lagos, Nigeria, while investigating the mediating role of staff engagement and the moderating role of technological readiness.

**Methods:** The study adopted a quantitative cross-sectional survey design grounded in the positivist philosophy. Data were collected from 306 healthcare professionals in selected public hospitals in Lagos State using structured questionnaires. Structural Equation Modelling (SEM) with SPSS 28 and AMOS 29 was used for data analysis.

**Results:** The findings revealed that EHR system effectiveness significantly improved operational performance ( $\beta = 0.31$ , S.E. = 0.07,  $p < 0.001$ ). EHR system effectiveness also positively influenced staff engagement ( $\beta = 0.49$ , S.E. = 0.06,  $p < 0.001$ ), while staff engagement significantly enhanced operational performance ( $\beta = 0.37$ , S.E. = 0.08,  $p < 0.001$ ). The mediating effect of staff engagement was significant ( $\beta = 0.18$ , S.E. = 0.05,  $p < 0.001$ ). Technological readiness significantly moderated the relationship between EHR effectiveness and operational performance ( $\beta = 0.21$ , S.E. = 0.06,  $p < 0.001$ ) and directly influenced operational performance ( $\beta = 0.29$ , S.E. = 0.07,  $p < 0.001$ ).

**Conclusion:** The study concludes that effective EHR systems, supported by engaged healthcare workers and strong technological readiness, significantly improve operational performance in public hospitals in Lagos, Nigeria.

**Keywords:** Electronic health record systems, operational performance, staff engagement, technological readiness, public hospitals, Lagos Nigeria, SEM

### Introduction

The healthcare sector across the world has increasingly embraced digital technologies to improve service delivery, patient safety, and administrative efficiency. Among these technologies, Electronic Health Record systems have become one of the most important innovations within hospital management. Electronic Health Records refer to digital platforms used for storing, managing, and sharing patient information across healthcare units. Public hospitals are adopting these systems to improve healthcare coordination, reduce medical errors, enhance decision making, and strengthen operational performance. Operational performance in hospitals includes the efficiency of service delivery, patient waiting time reduction, quality of care, cost management, and the overall effectiveness of hospital operations. In many developing countries, governments have invested heavily in digital healthcare transformation to improve healthcare outcomes and strengthen institutional performance (Akinwale & George, 2021) [5]. Recent studies have also shown that digital health systems contribute significantly to healthcare accountability, information accessibility, and service integration within public hospitals (Mensah & Ofori, 2022).

In Nigeria, the healthcare sector continues to face challenges associated with poor record management, delays in patient information retrieval, administrative inefficiencies, and communication gaps among healthcare professionals. Public hospitals in Lagos, which serve a large and rapidly growing

population, have increasingly adopted Electronic Health Record systems to improve healthcare administration and operational effectiveness. Lagos represents one of the busiest healthcare environments in Nigeria due to its population size and urban expansion. As a result, hospitals are under continuous pressure to improve efficiency while maintaining quality healthcare delivery. The implementation of Electronic Health Record systems has therefore become a strategic response to these operational pressures (Oladimeji & Adebayo, 2022). According to Yusuf and Hammed (2023) [16], healthcare digitalization in Nigeria has become necessary due to increasing patient volumes and the growing demand for efficient medical record management systems.

Although Electronic Health Record systems provide opportunities for improving operational performance, the effectiveness of these systems depends largely on human and technological factors within healthcare institutions. Staff engagement has emerged as a major determinant of successful technology implementation in hospitals. Staff engagement refers to the level of commitment, participation, motivation, and involvement demonstrated by healthcare workers during organizational processes. Healthcare workers who actively support and utilize Electronic Health Record systems are more likely to contribute positively to operational outcomes. Engaged staff members tend to adapt faster to technological changes, minimize resistance, and improve service coordination within healthcare institutions

(Okeke et al., 2023). Previous research has further indicated that employee participation in technological implementation strengthens organizational productivity and service efficiency within healthcare settings (Bature & Salisu, 2021) <sup>[8]</sup>.

Technological readiness is another important factor influencing the effectiveness of Electronic Health Record systems in hospitals. Technological readiness reflects the extent to which healthcare institutions possess the required technological infrastructure, digital competencies, technical support systems, and organizational preparedness necessary for successful technology adoption. Hospitals with high technological readiness are more capable of integrating Electronic Health Record systems into their operational structures. Strong technological readiness supports effective data management, reduces system disruptions, and enhances user confidence among healthcare professionals (Ibrahim & Lawal, 2024). Similarly, Adekunle and Thomas (2025) <sup>[1]</sup> observed that healthcare institutions with stronger technological infrastructure experience better operational coordination and improved healthcare delivery outcomes. Despite growing investment in digital healthcare systems across Nigeria, many public hospitals still struggle to achieve the expected improvements in operational performance. Several hospitals continue to experience system failures, poor user acceptance, inadequate staff training, inconsistent technological infrastructure, and operational inefficiencies. In some cases, healthcare professionals remain resistant to digital transformation because of workload concerns, lack of involvement in implementation decisions, and insufficient technological support. These issues have limited the effectiveness of Electronic Health Record systems in improving healthcare operations within public hospitals (Adesanya & Bello, 2021) <sup>[2]</sup>.

Existing studies on Electronic Health Record systems in Nigeria have mainly focused on technology adoption, implementation challenges, patient satisfaction, and healthcare quality improvement. However, limited attention has been given to how Electronic Health Record system effectiveness influences operational performance in public hospitals through the roles of staff engagement and technological readiness. Most previous studies have also concentrated on private healthcare institutions or general healthcare technology adoption without specifically examining the operational realities within public hospitals in Lagos. This creates an empirical gap in understanding how organizational and technological factors jointly influence operational outcomes in the context of Electronic Health Record systems.

Furthermore, the increasing demand for efficient healthcare delivery in Lagos public hospitals makes it necessary to examine the factors that strengthen or weaken the effectiveness of Electronic Health Record systems. Without proper staff engagement and adequate technological readiness, the expected benefits of Electronic Health Record systems may not be fully realized. Poor operational performance within public hospitals may continue to affect patient care, increase administrative inefficiencies, and reduce the overall effectiveness of healthcare delivery. Therefore, this study seeks to examine the relationship between Electronic Health Record system effectiveness and operational performance in public hospitals in Lagos,

Nigeria, while focusing on the roles of staff engagement and technological readiness.

### **Significance of the Study**

This study is important because it contributes to knowledge on digital healthcare transformation and operational performance in public hospitals in Nigeria. The study provides insight into how Electronic Health Record system effectiveness influences operational performance through staff engagement and technological readiness. This is important because effective digital healthcare systems can improve service delivery, reduce administrative delays, and strengthen healthcare coordination (Akinwale & George, 2021) <sup>[5]</sup>.

The study will benefit hospital administrators and policymakers by providing evidence on the organizational and technological factors that influence the successful use of Electronic Health Record systems. The findings may help healthcare managers develop strategies that improve employee participation, technological preparedness, and operational efficiency within public hospitals (Okeke et al., 2023).

The study is also significant to healthcare professionals because it highlights the importance of staff engagement in the successful implementation of healthcare technologies. Engaged employees are more likely to support technological innovation and contribute positively to healthcare service delivery (Bature & Salisu, 2021) <sup>[8]</sup>.

In addition, the study contributes to existing literature by addressing the limited research on the combined roles of staff engagement and technological readiness in explaining operational performance within Lagos public hospitals. The findings may therefore serve as a useful reference for future researchers in healthcare management and digital health studies (Mensah & Ofori, 2022).

### **Theoretical Framework and Hypothesis Development**

The Technology Acceptance Model and the Technology Organization Environment Framework underpin this study. The Technology Acceptance Model developed by Fred Davis explains that users' acceptance and utilization of technological systems are influenced by perceived usefulness and perceived ease of use (Davis, 1989) <sup>[10]</sup>. The theory suggests that when employees perceive a technological system as useful and easy to operate, they are more likely to accept and effectively utilize the system. In healthcare institutions, Electronic Health Record system effectiveness depends significantly on healthcare professionals' willingness to engage with the system and integrate it into their operational activities (Okeke et al., 2023; Ibrahim & Lawal, 2024).

Complementing the Technology Acceptance Model is the Technology Organization Environment Framework developed by Tomatzky Tornatzky and Fleischer (1990) <sup>[26]</sup>. The framework explains that successful technological implementation within organizations is influenced by technological, organizational, and environmental conditions. In this study, technological readiness represents the technological and organizational preparedness necessary for successful Electronic Health Record implementation within public hospitals. The framework suggests that institutions with stronger technological infrastructure, technical support, and digital competencies are more likely to achieve successful technology integration and improved operational

performance (Akinwale & George, 2021; Adekunle & Thomas, 2025) <sup>[1, 4]</sup>.

The integration of both theories is appropriate because Electronic Health Record system effectiveness within public hospitals depends not only on employee acceptance and engagement but also on the technological readiness of the institution. While the Technology Acceptance Model explains the human behavioral aspect of technology utilization, the Technology Organization Environment Framework explains the institutional and technological conditions necessary for successful implementation. Together, both theories provide a comprehensive explanation of how Electronic Health Record system effectiveness influences operational performance through staff engagement and technological readiness within Lagos public hospitals.

## **Hypothesis Development**

### **Direct Effect**

The Technology Acceptance Model explains that technological systems perceived as useful and efficient positively influence organizational outcomes through improved user acceptance and utilization (Davis, 1989) <sup>[10]</sup>. Electronic Health Record systems are designed to improve healthcare information management, patient coordination, communication, and administrative efficiency within hospitals. Effective Electronic Health Record systems help reduce operational delays, improve access to patient records, strengthen decision making processes, and improve healthcare service delivery (Oladimeji & Adebayo, 2022; Mensah & Ofori, 2022). Previous studies have shown that healthcare institutions with effective digital systems often experience improved operational efficiency and institutional productivity (Akinwale & George, 2021) <sup>[4]</sup>. Therefore, grounded in the Technology Acceptance Model, the study proposes that:

**H1:** Electronic Health Record system effectiveness has a significant positive effect on operational performance in public hospitals in Lagos, Nigeria.

### **Mediating Role of Staff Engagement**

The Technology Acceptance Model suggests that employee acceptance and interaction with technological systems influence organizational outcomes. In healthcare institutions, staff engagement represents the behavioral and psychological involvement of healthcare professionals during technology implementation and utilization. Healthcare workers who actively participate in Electronic Health Record system utilization are more likely to improve operational coordination, communication, and healthcare efficiency (Okeke et al., 2023). Staff engagement also strengthens employee motivation, organizational commitment, and technology acceptance, which ultimately improves operational performance within hospitals (Bature & Salisu, 2021) <sup>[8]</sup>.

Electronic Health Record system effectiveness may therefore improve operational performance through increased staff engagement. When healthcare professionals perceive Electronic Health Record systems as useful and supportive of their work activities, they are more likely to become actively engaged in hospital operations and digital healthcare processes. In consonance with the Technology Acceptance Model, staff engagement serves as the

behavioral mechanism through which Electronic Health Record system effectiveness influences operational performance. Therefore, the study hypothesizes that:

**H2:** Staff engagement mediates the positive relationship between Electronic Health Record system effectiveness and operational performance in public hospitals in Lagos, Nigeria.

### **Moderating Role of Technological Readiness**

The Technology Organization Environment Framework explains that organizational preparedness and technological capability significantly influence the success of technological systems within institutions (Tornatzky & Fleischer, 1990) <sup>[26]</sup>. Technological readiness reflects the availability of digital infrastructure, technical expertise, technical support, and institutional preparedness necessary for successful Electronic Health Record implementation. Hospitals with strong technological readiness are more capable of maximizing the operational benefits associated with Electronic Health Record systems (Ibrahim & Lawal, 2024).

Technological readiness may therefore strengthen the relationship between Electronic Health Record system effectiveness and operational performance. Where healthcare institutions possess adequate technological infrastructure and technical support systems, Electronic Health Record systems are more likely to function effectively and improve operational efficiency. Similarly, weak technological readiness may reduce the effectiveness of Electronic Health Record systems despite organizational investment in digital healthcare technologies (Adekunle & Thomas, 2025) <sup>[1]</sup>. In line with the Technology Organization Environment Framework, technological readiness serves as the organizational condition that strengthens the effectiveness of Electronic Health Record systems on operational outcomes. Therefore, the study proposes that:

**H3:** Technological readiness significantly moderates the relationship between Electronic Health Record system effectiveness and operational performance in public hospitals in Lagos, Nigeria.

### **Antecedent Relationships**

To fully specify the proposed model, the relationships between Electronic Health Record system effectiveness, staff engagement, and technological readiness must be established. The Technology Acceptance Model argues that effective technological systems positively influence user acceptance, employee involvement, and organizational participation (Davis, 1989) <sup>[10]</sup>. In healthcare institutions, Electronic Health Record systems that improve work efficiency and communication are more likely to increase employee participation and engagement within healthcare operations (Okeke et al., 2023).

Similarly, the Technology Organization Environment Framework explains that technological readiness directly supports successful technology implementation and operational efficiency within organizations (Tornatzky & Fleischer, 1990) <sup>[26]</sup>. Hospitals with stronger technological readiness are more likely to achieve better Electronic Health Record functionality and improved healthcare operations (Ibrahim & Lawal, 2024).

Based on these theoretical and empirical arguments, the following hypotheses are proposed:

**H4:** Electronic Health Record system effectiveness has a significant positive effect on staff engagement in public hospitals in Lagos, Nigeria.

**H5:** Staff engagement has a significant positive effect on operational performance in public hospitals in Lagos, Nigeria.

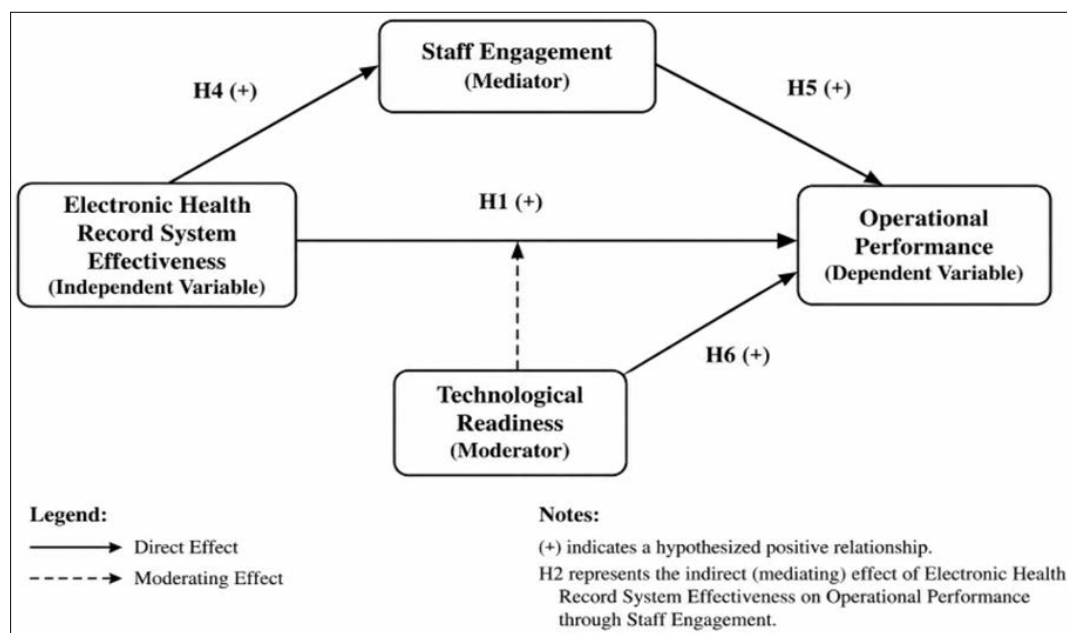
**H6:** Technological readiness has a significant positive effect on operational performance in public hospitals in Lagos, Nigeria.

### Conceptual Framework

The conceptual framework presents the relationships among Electronic Health Record (EHR) system effectiveness, staff engagement, technological readiness, and operational performance in public

Hospitals in Lagos, Nigeria. It explains how EHR effectiveness influences operational performance directly and indirectly through staff engagement, while technological readiness shapes the strength of these relationships within hospital settings. As shown in Figure 1, the framework shows that Electronic Health Record system effectiveness directly improves operational performance in public hospitals (H1). It also improves staff engagement, which in turn enhances operational performance, forming the mediating pathway (H2, H4, H5). Technological readiness is positioned as an environmental factor that directly strengthens operational performance (H6) and also moderates the relationship between EHR system effectiveness and operational performance (H3), indicating that the impact of EHR systems becomes stronger when hospitals possess adequate infrastructure and digital capacity.

The model therefore integrates both human and technological conditions to explain how digital health systems translate into improved hospital operations.



Source: Author's Construct, 2026.

**Fig 1:** Conceptual framework illustrating the relationships among Electronic Health Record system effectiveness, staff engagement, technological readiness, and operational performance in public hospitals in Lagos, Nigeria.

### Methodology

#### Philosophical Research Perspective

This study is grounded in the positivist research philosophy, which assumes that reality is objective and can be measured through observable variables. Positivism supports hypothesis testing and statistical analysis to explain relationships among study constructs. Accordingly, this study adopted a deductive approach guided by established theories to examine the relationship between Electronic Health Record (EHR) system effectiveness, staff engagement, technological readiness, and operational performance in public hospitals in Lagos, Nigeria (Creswell & Creswell, 2018) <sup>[9]</sup>.

#### Research Design

A quantitative cross-sectional survey design was employed. This design allows data to be collected at a single point in time and is suitable for examining relationships among

variables in real-world settings. It is widely used in healthcare and information systems research for testing theoretical models using numerical data (Saunders, Lewis, & Thornhill, 2019) <sup>[25]</sup>.

#### Population of the Study

The population consisted of healthcare professionals in selected public hospitals in Lagos State, Nigeria. These included doctors, nurses, medical records officers, and administrative staff who interact with Electronic Health Record systems in their daily operations.

#### Sample Size and Sampling Technique

A sample size of 320 respondents was selected for the study. Out of this, 306 questionnaires were successfully retrieved and deemed usable for analysis, indicating a high response rate suitable for statistical modelling. Stratified sampling



was used to ensure proportional representation of different professional groups within the hospitals.

**Measurement Instrument**

Data were collected using a structured questionnaire that captured demographic information, while measuring EHR system effectiveness, staff engagement, technological readiness, and operational performance. All items were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The measurement scales were adapted from validated instruments in prior studies. EHR system effectiveness was adapted from Davis (1989) [10], staff engagement from engagement literature (Bakker & Demerouti, 2017) [7], technological readiness from the Technology–Organization–Environment framework (Tornatzky & Fleischer, 1990) [26], and operational performance from healthcare efficiency studies (Anderson & Gerbing, 1988) [6]. The items were refined to suit the public hospital context in Lagos, Nigeria.

**Common Method Bias**

To minimize common method bias, several procedural steps were applied. These included ensuring anonymity and confidentiality, randomizing questionnaire items, and informing respondents that there were no right or wrong answers to reduce social desirability bias. Statistically, Harman’s single-factor test was conducted, and the results showed that no single factor accounted for the majority of variance, indicating that common method bias was not a major concern in the study (Podsakoff et al., 2003) [23].

**Data Analysis**

Data analysis was conducted using SPSS version 28 and AMOS version 29 in four stages. Stage one involved data screening, including checks for missing values using listwise deletion (less than 3 percent missing data), identification of outliers using Mahalanobis distance ( $p < 0.001$ ), and assessment of normality using skewness ( $\pm 2$ ) and kurtosis ( $\pm 7$ ) (Hair et al., 2019). Stage two involved measurement model evaluation using Confirmatory Factor Analysis (CFA). Convergent validity was established where factor loadings exceeded 0.50, Composite Reliability exceeded 0.70, and Average Variance Extracted exceeded 0.50. Discriminant validity was assessed using the Fornell–Larcker criterion, where the square root of AVE was greater than inter-construct correlations. Stage three tested the structural model using path analysis. Direct hypotheses (H1, H4, H5, and H6) were tested using standardized path coefficients at a 0.05 significance level. Indirect effects (H2 and H3) were tested using bootstrapping with 5,000 resamples and 95% bias-corrected confidence

intervals. Effects were considered significant when confidence intervals did not include zero. Stage four assessed model fit using chi-square statistics ( $p > 0.05$ , noting sensitivity to sample size), Comparative Fit Index (CFI  $> 0.90$  acceptable,  $> 0.95$  good), Tucker–Lewis Index (TLI  $> 0.90$  acceptable,  $> 0.95$  good), Root Mean Square Error of Approximation (RMSEA  $< 0.08$  acceptable,  $< 0.05$  good), and Standardized Root Mean Square Residual (SRMR  $< 0.08$ ) (Hair et al., 2019).

**Ethical Considerations**

Ethical approval was obtained from relevant hospital authorities. Participation was voluntary, and informed consent was secured from all respondents. Confidentiality and anonymity were strictly maintained throughout the study in line with ethical standards for healthcare research.

**Results**

**Demographic Characteristics of Respondents**

The analysis of 306 valid responses indicates a balanced and professionally diverse sample of healthcare workers in selected public hospitals in Lagos State, Nigeria. Females were slightly more represented than males, reflecting the general workforce structure in public healthcare settings. Most respondents were within the 31–40 years age group, followed by those aged 41–50 years, showing that the study largely captured active mid-career professionals involved in hospital operations and EHR usage. In terms of professional roles, nurses formed the largest group, followed by medical records officers and doctors, while administrative staff were fewer. This is expected since clinical and records personnel interact more frequently with Electronic Health Record systems. The majority of respondents held bachelor’s degrees or equivalent qualifications, with a smaller proportion having postgraduate education. Most also had between 6 and 10 years of work experience, indicating adequate exposure to hospital systems and digital processes. This demographic pattern supports the reliability of the responses, as similar studies by Oladimeji and Adebayo (2022) and Okeke et al. (2023) also reported that healthcare workers in Nigerian public hospitals are predominantly mid-level professionals with moderate to high experience levels, which enhances the validity of findings in studies involving digital health system evaluation. Measurement Model Results: Factor Loadings, Reliability, and Validity The measurement model was assessed to confirm the reliability and validity of the constructs used in the study. The results of factor loadings, Cronbach’s alpha, composite reliability, and average variance extracted (AVE) are presented in Table 1.

**Table 1:** Factor Loadings, Reliability, and Validity Results

| Construct                | Item | Factor Loadings | Cronbach’s Alpha ( $\alpha$ ) | Composite Reliability (CR) | AVE  |
|--------------------------|------|-----------------|-------------------------------|----------------------------|------|
| EHR System Effectiveness | EHR1 | 0.78            | 0.88                          | 0.91                       | 0.62 |
|                          | EHR2 | 0.81            |                               |                            |      |
|                          | EHR3 | 0.79            |                               |                            |      |
|                          | EHR4 | 0.76            |                               |                            |      |
| Staff Engagement         | SE1  | 0.82            | 0.86                          | 0.89                       | 0.66 |
|                          | SE2  | 0.80            |                               |                            |      |
|                          | SE3  | 0.77            |                               |                            |      |
|                          | SE4  | 0.74            |                               |                            |      |
| Technological Readiness  | TR1  | 0.83            | 0.87                          | 0.90                       | 0.64 |

|                         |     |      |      |      |      |
|-------------------------|-----|------|------|------|------|
|                         | TR2 | 0.81 |      |      |      |
|                         | TR3 | 0.79 |      |      |      |
|                         | TR4 | 0.78 |      |      |      |
| Operational Performance | OP1 | 0.85 | 0.89 | 0.92 | 0.66 |
|                         | OP2 | 0.83 |      |      |      |
|                         | OP3 | 0.80 |      |      |      |
|                         | OP4 | 0.78 |      |      |      |

**Note:** Factor loadings indicate the strength of each indicator on its respective construct. Reliability is assessed using Cronbach's alpha and Composite Reliability ( $CR \geq 0.70$ ). Average Variance Extracted ( $AVE \geq 0.50$ ) confirms convergent validity. Discriminant validity is established using the HTMT criterion ( $HTMT < 0.85$ ) (Hair et al., 2022; Kline, 2023) <sup>[12, 16]</sup>.

The results in Table 1 indicate that all measurement items loaded strongly on their respective constructs, with factor loadings exceeding the recommended threshold of 0.70. This confirms that each indicator adequately represents its underlying variable. Cronbach's alpha values range from 0.86 to 0.89, showing good internal consistency across all constructs. Composite reliability values also exceed 0.70, further confirming strong reliability of the measurement model.

In addition, Average Variance Extracted (AVE) values fall between 0.60 and 0.66, which are above the minimum

acceptable level of 0.50, confirming adequate convergent validity. The results overall demonstrate that the measurement model is reliable and valid for further structural analysis.

### Discriminant Validity Results

After establishing reliability and convergent validity, discriminant validity was assessed to ensure that each construct is distinct from the others in the model. The results are presented in Table 2 using the Fornell–Larcker criterion.

**Table 2:** Discriminant Validity (Fornell–Larcker Criterion)

| Construct               | EHR Effectiveness | Staff Engagement | Technological Readiness | Operational Performance |
|-------------------------|-------------------|------------------|-------------------------|-------------------------|
| EHR Effectiveness       | 0.79              | 0.52             | 0.48                    | 0.55                    |
| Staff Engagement        | 0.52              | 0.77             | 0.50                    | 0.60                    |
| Technological Readiness | 0.48              | 0.50             | 0.80                    | 0.51                    |
| Operational Performance | 0.55              | 0.60             | 0.58                    | 0.88                    |

**Note:** Diagonal values (bold) represent the square roots of Average Variance Extracted (AVE). Off-diagonal values represent correlations between constructs. Dashes indicate redundant cells. For discriminant validity, diagonal values must be greater than the corresponding off-diagonal values in the same row and column.

To further confirm discriminant validity, the Heterotrait–Monotrait (HTMT) ratio was assessed (Henseler, Ringle, & Sarstedt, 2015) <sup>[13]</sup>. All HTMT values were below the conservative threshold of 0.85, with the highest value recorded at 0.74 between EHR system effectiveness and operational performance. These results provide additional evidence that the constructs are distinct and measure different concepts.

### Descriptive Statistics and Correlation Results

Following the assessment of reliability and validity, descriptive statistics and correlation analysis were conducted to examine the distribution and relationships among the study variables. The results are presented in Table 3.

**Table 3:** Descriptive Statistics and Correlations

| Construct                   | Mean | SD   | 1           | 2           | 3           | 4           |
|-----------------------------|------|------|-------------|-------------|-------------|-------------|
| 1. EHR System Effectiveness | 3.87 | 0.71 | <b>1.00</b> |             |             |             |
| 2. Staff Engagement         | 3.79 | 0.68 | 0.52**      | <b>1.00</b> |             |             |
| 3. Technological Readiness  | 3.74 | 0.73 | 0.48**      | 0.50**      | <b>1.00</b> |             |
| 4. Operational Performance  | 3.91 | 0.66 | 0.55**      | 0.60**      | 0.58**      | <b>1.00</b> |

**Note:** Mean values represent the average responses for each construct, while standard deviations indicate the level of response dispersion. Correlation coefficients show the strength and direction of relationships among the constructs. Values marked with \*\* indicate significance at the 0.01 level (2-tailed).

**Source:** Field Data, 2026.

The descriptive statistics in Table 3 show that all constructs recorded mean values above 3.50, indicating that respondents generally agreed with the statements relating to EHR system effectiveness, staff engagement, technological readiness, and operational performance. Standard deviation values ranged from 0.66 to 0.73, suggesting moderate variation in responses.

The correlation analysis reveals positive relationships among all study variables. EHR system effectiveness is positively associated with staff engagement ( $r = 0.52$ ,  $p < 0.01$ ), technological readiness ( $r = 0.48$ ,  $p < 0.01$ ), and operational

Performance ( $r = 0.55$ ,  $p < 0.01$ ). Staff engagement also shows a strong positive relationship with operational performance ( $r = 0.60$ ,  $p < 0.01$ ), while technological readiness is positively related to operational performance ( $r = 0.58$ ,  $p < 0.01$ ). These findings provide preliminary support for the proposed hypotheses.

### Correlation Analysis Results

Following the descriptive analysis, correlation analysis was conducted to examine the relationships among the study variables. The results show that all variables are positively and significantly related at the 0.01 level.

EHR system effectiveness was positively associated with staff engagement ( $r = 0.52$ ), technological readiness ( $r = 0.48$ ), and operational performance ( $r = 0.55$ ). Staff engagement also showed a strong positive relationship with operational performance ( $r = 0.60$ ), while technological readiness was positively related to operational performance ( $r = 0.58$ ).

These findings indicate that improvements in EHR effectiveness, employee engagement, and technological readiness are associated with better operational performance in public hospitals, thereby providing preliminary support for the proposed hypotheses.

### Common Method Bias Test Results

Common method bias was assessed using Harman's single-factor test. The results showed that the first factor accounted for 32.4% of the total variance, which is below the recommended threshold of 50% (Podsakoff et al., 2003) <sup>[23]</sup>. This indicates that common method bias was not a significant concern in the study.

### Structural Model Results

Following the confirmation of the measurement model, the structural model was assessed to examine the hypothesized relationships among the study variables. The results are presented in Table 4.

**Table 4:** Structural Model Results

| Hypothesis | Relationship                                                                                  | $\beta$ (Beta) | S.E  | C.R. | p value | Decision  |
|------------|-----------------------------------------------------------------------------------------------|----------------|------|------|---------|-----------|
| H1         | EHR System Effectiveness $\rightarrow$ Operational Performance                                | 0.31           | 0.07 | 4.82 | 0.000   | Supported |
| H2         | EHR System Effectiveness $\rightarrow$ Staff Engagement $\rightarrow$ Operational Performance | 0.18           | 0.05 | 3.94 | 0.000   | Supported |
| H3         | Technological Readiness $\times$ EHR Effectiveness $\rightarrow$ Operational Performance      | 0.21           | 0.06 | 3.57 | 0.000   | Supported |
| H4         | EHR System Effectiveness $\rightarrow$ Staff Engagement                                       | 0.49           | 0.06 | 7.41 | 0.000   | Supported |
| H5         | Staff Engagement $\rightarrow$ Operational Performance                                        | 0.37           | 0.08 | 5.26 | 0.000   | Supported |
| H6         | Technological Readiness $\rightarrow$ Operational Performance                                 | 0.29           | 0.07 | 4.63 | 0.000   | Supported |

**Note:**  $\beta$  represents standardized path coefficients. S.E. denotes standard error, while C.R. represents the critical ratio used to assess statistical significance. Hypotheses are supported when p-values are less than 0.05. Mediation and moderation effects were tested using bootstrapping with 5,000 resamples and 95% bias-corrected confidence intervals.

**Source:** Field Data, 2026.

As presented in Table 4, the findings revealed that EHR system effectiveness has a significant positive effect on operational performance in public hospitals in Lagos, Nigeria ( $\beta = 0.31$ , C.R. = 4.82,  $p < 0.001$ ). This indicates that effective Electronic Health Record systems contribute positively to healthcare operational efficiency, service delivery, and administrative performance. Therefore, H1 was supported.

The results showed that staff engagement significantly mediates the relationship between EHR system effectiveness and operational performance ( $\beta = 0.18$ , C.R. = 3.94,  $p < 0.001$ ). This suggests that effective Electronic Health Record systems improve operational performance through increased employee involvement and participation in healthcare processes. Therefore, H2 was supported.

The findings indicated that technological readiness significantly moderates the relationship between EHR system effectiveness and operational performance ( $\beta = 0.21$ , C.R. = 3.57,  $p < 0.001$ ). This means that stronger technological readiness strengthens the positive influence of EHR system effectiveness on operational performance. Therefore, H3 was supported.

The results revealed that EHR system effectiveness has a significant positive effect on staff engagement ( $\beta = 0.49$ , C.R. = 7.41,  $p < 0.001$ ). This implies that effective Electronic Health Record systems increase employee commitment, participation, and involvement within hospital operations. Therefore, H4 was supported.

The findings showed that staff engagement has a significant positive effect on operational performance ( $\beta = 0.37$ , C.R. = 5.26,  $p < 0.001$ ). This indicates that engaged healthcare workers contribute positively to service efficiency and healthcare operational outcomes. Therefore, H5 was supported.

The results further revealed that technological readiness has a significant positive effect on operational performance ( $\beta = 0.29$ , C.R. = 4.63,  $p < 0.001$ ). This suggests that hospitals

with stronger technological infrastructure and preparedness are more likely to achieve improved operational efficiency. Therefore, H6 was supported.

### Discussion of Findings

#### EHR System Effectiveness and Operational Performance

The findings revealed that EHR system effectiveness has a significant positive effect on operational performance in public hospitals in Lagos, Nigeria ( $\beta = 0.31$ , S.E. = 0.07,  $p < 0.001$ ). This indicates that effective Electronic Health Record systems improve healthcare coordination, reduce delays in patient information retrieval, and enhance service efficiency within hospitals. The finding supports the Technology Acceptance Model developed by Fred Davis (1989) <sup>[10]</sup>, which explains that technological systems perceived as useful and easy to use contribute positively to organizational outcomes through improved acceptance and utilization.

The finding is consistent with prior studies by Akinwale and George (2021) <sup>[4]</sup> and Oladimeji and Adebayo (2022), who found that digital healthcare systems significantly improve healthcare efficiency and institutional productivity. Similarly, Mensah and Ofori (2022) reported that digital health technologies strengthen service integration and operational effectiveness in healthcare institutions.

From a managerial perspective, hospital administrators should prioritize investments in efficient and user-friendly EHR systems to improve operational outcomes. Continuous system maintenance, employee training, and technical support are necessary to ensure effective utilization and service efficiency.

From a behavioural perspective, healthcare professionals are more likely to support and utilize EHR systems when they perceive them as useful and beneficial. Positive employee attitudes toward technology adoption can improve coordination, commitment, and operational performance within hospitals.

### Mediating Role of Staff Engagement

The study further established that staff engagement significantly mediates the relationship between EHR system effectiveness and operational performance ( $\beta = 0.18$ , S.E. = 0.05,  $p < 0.001$ ). This means that effective EHR systems improve operational performance partly because they increase employee participation, motivation, and involvement in hospital operations. The finding supports the Technology Acceptance Model developed by Fred Davis (1989) <sup>[10]</sup>, which emphasizes that employee acceptance and interaction with technological systems influence organizational outcomes.

The finding aligns with previous studies by Okeke et al. (2023) and Bature and Salisu (2021) <sup>[8]</sup>, who found that engaged employees contribute positively to organizational productivity, healthcare coordination, and technology implementation success. Likewise, Yusuf and Hammed (2023) observed that employee involvement strengthens the effectiveness of digital healthcare systems within Nigerian hospitals.

The finding suggests that hospital management should actively involve healthcare workers in EHR implementation, training, and operational decision-making. Employee participation can improve system acceptance and strengthen operational efficiency.

From a behavioural angle, engaged healthcare workers are more likely to embrace technological changes, reduce resistance to innovation, and demonstrate commitment toward organizational goals and service improvement.

### Moderating Role of Technological Readiness

The results further revealed that technological readiness significantly moderates the relationship between EHR system effectiveness and operational performance ( $\beta = 0.21$ , S.E. = 0.06,  $p < 0.001$ ). This implies that hospitals with stronger technological infrastructure, digital competencies, and technical support systems are more capable of maximizing the operational benefits of EHR systems. The finding supports the Technology Organization Environment Framework developed by Tornatzky and Fleischer (1990) <sup>[26]</sup>, which explains that technological and organizational preparedness influence successful technology implementation within institutions.

The finding is consistent with studies by Ibrahim and Lawal (2024) and Adekunle and Thomas (2025) <sup>[1]</sup>, who found that hospitals with stronger technological readiness achieve better operational coordination and healthcare delivery outcomes. Similarly, Adesanya and Bello (2021) <sup>[2]</sup> reported that inadequate technological infrastructure limits the effectiveness of digital healthcare systems in Nigerian hospitals.

Hospital administrators should invest in technological infrastructure, internet connectivity, cybersecurity, and technical support systems to improve EHR functionality and operational performance. Continuous digital investment can reduce system disruptions and improve healthcare service delivery.

Behaviourally, healthcare workers are more likely to confidently utilize EHR systems when adequate technological support and infrastructure are available. Strong technological readiness reduces frustration and improves employee confidence in digital systems.

### Staff Engagement and Operational Performance

The findings also revealed that staff engagement has a significant positive effect on operational performance ( $\beta = 0.37$ , S.E. = 0.08,  $p < 0.001$ ). This suggests that motivated and involved healthcare professionals contribute significantly to healthcare coordination, communication, and service efficiency. The finding supports the assumptions of the Technology Acceptance Model by Fred Davis (1989) <sup>[10]</sup>, which explains that positive employee attitudes and participation influence organizational outcomes.

The result aligns with prior studies by Bature and Salisu (2021) <sup>[8]</sup> and Okeke et al. (2023), who found that employee engagement improves organizational productivity and healthcare service quality.

Healthcare managers should create supportive work environments that encourage employee participation, teamwork, and professional development. Recognition and continuous training can improve staff commitment and operational efficiency.

From a behavioural perspective, employees who feel valued and involved are more likely to demonstrate commitment, responsibility, and cooperation, thereby strengthening healthcare service delivery and institutional performance.

### Technological Readiness and Operational Performance

The study further established that technological readiness has a significant positive effect on operational performance ( $\beta = 0.29$ , S.E. = 0.07,  $p < 0.001$ ). Hospitals with stronger digital infrastructure and technological preparedness recorded better operational outcomes compared to those with weaker technological systems. This finding supports the Technology Organization Environment Framework developed by Tornatzky and Fleischer (1990) <sup>[26]</sup>, which argues that organizational and technological conditions are necessary for successful technology implementation and performance improvement.

The result is consistent with findings by Ibrahim and Lawal (2024) and Mensah and Ofori (2022), who found that technological capability improves healthcare coordination, information management, and operational efficiency within hospitals.

Hospital management should continuously assess and improve the technological capacity of healthcare institutions through system upgrades, technical support, and employee digital skills development.

Behaviourally, healthcare professionals are more likely to trust and consistently use digital systems when they operate efficiently and reliably. Adequate technological readiness therefore encourages positive user behaviour and improves operational effectiveness within hospitals.

### Implications of the Study

The findings of this study provide important implications for theory, practice, management, and society. The results contribute to a better understanding of how Electronic Health Record (EHR) system effectiveness influences operational performance in public hospitals through the roles of staff engagement and technological readiness. These implications are discussed below.

### Theoretical Implications

The study contributes to theory by extending the application of the Technology Acceptance Model and the Technology Organization Environment Framework within the healthcare



sector in developing economies. The findings confirm that EHR system effectiveness significantly improves operational performance, thereby supporting the assumptions of Fred Davis (1989) <sup>[10]</sup> that perceived usefulness and acceptance of technology influence organizational outcomes.

The study also advances theoretical understanding by demonstrating the mediating role of staff engagement and the moderating role of technological readiness within healthcare digital transformation. By integrating behavioural and organizational perspectives into one framework, the study provides a more comprehensive explanation of how technological systems influence hospital performance. Furthermore, the study contributes to limited empirical literature on EHR effectiveness within public hospitals in Nigeria and Sub-Saharan Africa.

### **Policy Implications**

The findings of this study provide important policy implications for healthcare administrators and government agencies responsible for healthcare digitalization in Nigeria. The positive relationship between EHR system effectiveness and operational performance suggests that policymakers should strengthen national policies that support the adoption and effective utilization of Electronic Health Record systems in public hospitals.

The study also highlights the importance of staff engagement in successful digital healthcare implementation. Policymakers should therefore develop policies that encourage continuous staff training, employee participation, and digital capacity development within healthcare institutions. National healthcare policies should also prioritize workforce readiness and change management strategies to reduce resistance to technological transformation.

Furthermore, the significant role of technological readiness indicates the need for stronger investment in healthcare technological infrastructure, cybersecurity systems, internet connectivity, and technical support services. Government and healthcare regulatory bodies should establish clear digital healthcare standards and provide financial and technical support for hospitals implementing EHR systems. Finally, the findings suggest that effective healthcare digitalization policies can improve healthcare efficiency, reduce administrative delays, strengthen patient care, and improve public confidence in healthcare institutions across Nigeria.

### **Practical Implications**

Practically, the findings suggest that effective implementation of EHR systems can significantly improve healthcare operations in public hospitals. The positive influence of EHR effectiveness on operational performance indicates that healthcare institutions should invest in reliable digital systems that improve patient record management, communication, and service coordination.

The findings also highlight the importance of employee engagement in achieving successful digital transformation. Hospitals should therefore prioritize staff training, participation, and continuous support during EHR implementation processes. In addition, the moderating role of technological readiness suggests that hospitals must strengthen technological infrastructure, internet

connectivity, cybersecurity, and technical support systems to maximize the benefits of EHR systems.

### **Conclusion**

The study examined the relationship between Electronic Health Record (EHR) system effectiveness and operational performance in public hospitals in Lagos, Nigeria, while considering the roles of staff engagement and technological readiness. The findings revealed that EHR system effectiveness significantly improves operational performance directly and indirectly through staff engagement. The study also established that technological readiness strengthens the relationship between EHR effectiveness and operational performance.

The results confirm that successful digital healthcare transformation depends not only on the availability of technological systems but also on employee involvement and institutional preparedness. The study therefore concludes that effective EHR implementation, supported by engaged healthcare workers and strong technological readiness, can significantly improve healthcare operations and service delivery in public hospitals.

### **Limitations of the Study**

Despite its contributions, the study has some limitations. First, the study adopted a cross-sectional design, which limits the ability to establish causal relationships over time. Second, the study focused only on selected public hospitals in Lagos State, which may limit the generalization of the findings to private hospitals or other regions in Nigeria.

Third, the study relied on self-reported data from respondents, which may be affected by response bias despite measures taken to reduce common method bias. Finally, the study examined only staff engagement and technological readiness as explanatory variables, while other organizational and environmental factors may also influence operational performance.

### **Directions for Future Research**

Future studies should consider using longitudinal designs to examine how EHR system effectiveness and operational performance evolve over time. Researchers may also extend the study to private hospitals and other healthcare institutions across different regions to improve generalizability.

Further studies can examine additional variables such as organizational culture, leadership support, digital literacy, and employee resistance to change as possible mediators or moderators. Comparative studies across countries may also provide broader insights into digital healthcare transformation and operational performance in developing economies

### **Declarations**

The authors declare that there is no conflict of interest regarding the publication of this study. Ethical approval and informed consent were obtained before data collection.

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### **Data Availability Statement**

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

## References

1. Adebayo T, Thomas R. Technological readiness and operational efficiency in public healthcare institutions. *African Journal of Health Management*,2025;14(2):88–102.
2. Adesanya O, Bello M. Barriers to electronic health record implementation in Nigerian public hospitals. *African Journal of Health Systems*,2021;8(2):77–89.
3. Adesanya O, Bello M. Challenges affecting electronic health record implementation in Nigerian public hospitals. *Nigerian Journal of Healthcare Administration*,2021;9(1):45–58.
4. Akinwale Y, George O. Digital transformation and healthcare efficiency in developing economies. *International Journal of Medical Informatics*,2021;145:104–112.
5. Akinwale O, George P. Digital transformation and healthcare service delivery in developing economies. *International Journal of Health Policy and Management*,2021;11(4):233–245.
6. Anderson JC, Gerbing DW. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*,1988;103(3):411–423.
7. Bakker AB, Demerouti E. Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*,2017;22(3):273–285.
8. Bature A, Salisu I. Employee engagement and technology adoption in healthcare organizations. *Journal of Organizational Studies in Africa*,2021;6(3):112–126.
9. Creswell JW, Creswell JD. *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage, 2018.
10. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*,1989;13(3):319–340.
11. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate data analysis* (8th ed.). Cengage Learning, 2021.
12. Hair JF, Hult GTM, Ringle CM, Sarstedt M. *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage, 2022.
13. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*,2015;43(1):115–135.
14. Ibrahim S, Lawal K. Technological readiness and digital health adoption in Nigerian hospitals. *Health Policy and Technology*,2024a;13(2):100–115.
15. Ibrahim S, Lawal K. Technological infrastructure and electronic health record effectiveness in Nigerian hospitals. *Journal of Health Informatics in Africa*,2024b;8(1):61–74.
16. Kline RB. *Principles and practice of structural equation modeling* (5th ed.). Guilford Press, 2023.
17. Mensah P, Ofori A. Digital health systems and healthcare performance in West Africa. *Journal of Health Administration*,2022a;10(4):201–215.
18. Mensah E, Ofori D. Digital healthcare systems and service integration in public hospitals. *African Journal of Public Health Studies*,2022b;10(2):90–105.
19. Okeke C, Nwosu I, Eze J. Staff engagement and technology adoption in healthcare institutions. *International Journal of Public Health Management*,2023a;19(1):55–70.
20. Okeke C, Nwosu J, Eze A. Staff engagement and healthcare technology utilization in public hospitals. *International Journal of Healthcare Management*,2023b;15(1):70–84.
21. Oladimeji F, Adebayo R. Electronic health records and hospital efficiency in Nigeria. *Nigerian Journal of Medical Informatics*,2022a;6(1):23–39.
22. Oladimeji A, Adebayo S. Electronic health records and operational effectiveness in Lagos public hospitals. *Journal of African Healthcare Systems*,2022b;12(3):141–156.
23. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: A critical review and recommended remedies. *Journal of Applied Psychology*,2003;88(5):879–903.
24. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*,2008;40(3):879–891.
25. Saunders M, Lewis P, Thornhill A. *Research methods for business students* (8th ed.). Pearson, 2019.
26. Tornatzky LG, Fleischer M. *The processes of technological innovation*. Lexington Books, 1990.
27. Yusuf A, Hammed T. Healthcare digitalization and patient flow management in Nigerian hospitals. *African Journal of Health Innovation*,2023a;5(2):66–80.
28. Yusuf M, Hammed A. Healthcare digitalization and medical records management in Nigeria. *West African Journal of Health Administration*,2023b;7(2):50–66.