

Effect of Financial Analytics on Emergency Care Performance and Health Policy Decision-Making in Healthcare Organizations in Nigeria

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Abstract

Background: This study investigates the effect of financial analytics on emergency care performance and health policy decision-making in public healthcare organizations in Nigeria. Despite advances in medical technology, operational inefficiencies persist, with Nigerian hospitals often experiencing long wait times, inadequate resource allocation, and poor financial management. The study focuses on four key financial analytics capabilities cost analysis, budget forecasting, expenditure tracking, and financial performance dashboards and examines their influence on emergency care outcomes and the quality of health policy decisions. Guided by the Resource-Based View (RBV) and Decision Support Systems (DSS) theory, financial analytics is conceptualized as a strategic resource that enables evidence-based operational and policy decisions.

Methodology: A cross-sectional survey design was employed to target 400 healthcare professionals, financial managers, emergency care managers, and policymakers across six major Nigerian cities representing diverse geopolitical zones. Data was collected using structured questionnaires and analyzed through Structural Equation Modelling (SEM), including Confirmatory Factor Analysis (CFA) to validate measurement models.

Results: Tracking had the highest mean score ($M = 3.98$; $SD = 0.65$), indicating relatively strong perceptions or agreement among respondents. This was followed by Cost Analysis ($M = 3.85$; $SD = 0.72$) and Budget Forecasting ($M = 3.72$; $SD = 0.78$). Constructs such as Financial Dashboards ($M = 3.59$; $SD = 0.83$), Emergency Care Performance ($M = 3.67$; $SD = 0.71$). Results revealed that cost analysis and budget forecasting significantly improved emergency care performance, whereas expenditure tracking and dashboards strongly influenced the quality of policy decision-making. Emergency care performance mediated the relationship between financial analytics and policy decisions, indicating that operational improvements enhance policy effectiveness. Model fit indices and reliability tests confirmed the robustness of the proposed framework.

Conclusion: The findings underscore the critical role of integrating financial analytics into routine hospital management to optimize resource utilization, improve operational efficiency, and support evidence-based policymaking. Challenges such as inadequate digital infrastructure, poor data quality, and limited skilled personnel were identified as barriers to effective implementation.

Recommendation: The study recommends investment in analytics technology, staff training, governance frameworks, and a strategic financial analytics roadmap to enhance operational efficiency and policy outcomes. These insights provide actionable guidance for administrators and policymakers aiming to strengthen emergency care delivery and decision-making in Nigerian public healthcare systems.

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Keywords: Financial Analytics; Cost- Effectiveness; Resource Allocation; Operational Efficiency; Decision Support Systems

1. Introduction

In today's healthcare landscape, operational efficiency remains a critical challenge despite advances in medical technology and treatment. Healthcare providers are under increasing pressure to deliver high-quality care while managing costs and resources effectively. Operational inefficiencies, such as long wait times, inefficient resource allocation, and administrative burdens, strain healthcare systems and affect patient outcomes and satisfaction (Hopp & Lovejoy, 2012). Nigeria's healthcare system is characterized by chronic underfunding, high out-of-pocket payments, and ineffective financial management, which negatively affect service quality and policy outcomes (Josiah et al., 2021; Ohia et al., 2018). Emergency care performance suffers the most from inadequate resource allocation, inefficient spending, and a lack of real-time financial insights needed for rapid decision-making (Guardian Nigeria, 2020). Financial analytics encompasses tools and techniques that convert raw financial data into actionable insights to inform cost control, forecasting, and strategic health policy decisions (Boldyga, 2021). Financial analytics in Nigerian healthcare organizations is increasingly recognized as a critical instrument for enhancing operational efficiency, strengthening emergency care delivery, and supporting strategic health policy formulation, although its implementation continues to face substantial infrastructural and institutional challenges. The transition from traditional manual systems to data-driven decision-making frameworks enables healthcare institutions to optimize resource allocation, control costs, and ultimately improve patient outcomes. In emergency care settings, financial analytics plays a significant role in supporting performance by enabling predictive modelling of patient volumes, which helps emergency departments anticipate patient surges and align staffing levels, bed capacity, and medical supplies accordingly. By applying data mining techniques, hospitals can reduce inefficiencies and waste, streamline operational processes, and improve patient flow, thereby reducing waiting times and improving service delivery. Furthermore, the availability of real-time financial and operational data allows healthcare managers to monitor key performance indicators and respond promptly to emerging challenges such as cost overruns in acute care services (Adepoju, Albersen, & De Brouwere, 2017; Ojo & Popoola, 2015).

Beyond hospital-level operations, financial analytics significantly influences health policy decision-making in Nigeria by promoting evidence-based governance. At the national level, financial data analytics supports institutions such as the Federal Ministry of Health in generating actionable insights into health system performance, service quality, and expenditure patterns, which are essential for informed policy formulation. Through analytical tools, policymakers are better positioned to prioritize investments, particularly in primary healthcare, as demonstrated in initiatives such as the Basic Health Care Provision Fund, which aims to strengthen healthcare financing and improve service coverage. In addition, integrated financial data platforms enhance transparency and accountability by enabling policymakers to track fund utilization across multiple sources, thereby reducing inefficiencies and improving public trust in health financing systems (World Health Organization (WHO), 2018; Federal Ministry of Health (FMoH), 2020).

Despite these benefits, the adoption of financial analytics in Nigeria is constrained by several structural and systemic challenges. The national health information system remains fragmented, with limited interoperability and insufficient analytical capacity, which restricts the effective use of complex financial data. A significant skills gap also exists, as many healthcare professionals lack the technical expertise to interpret and apply advanced analytical outputs in decision-making. Additionally, financial constraints, including the high cost of analytical software and limited funding for digital infrastructure, further hinder widespread implementation. Nevertheless, there is a growing shift toward digitalization within the Nigerian healthcare system, driven by the need to address persistent challenges such as high out-of-pocket health expenditures and inequitable access to care. This emerging trend reflects increasing recognition of the potential of financial analytics to support more efficient, transparent, and sustainable healthcare delivery (Aregbeshola & Khan, 2018; Onwujekwe et al., 2019).

In conclusion, while financial analytics holds considerable potential to improve emergency care performance and strengthen health policy decision-making in Nigeria, the realization of these benefits depends largely on sustained investment in integrated data infrastructure, capacity building, and the development of a skilled healthcare workforce capable of leveraging analytical tools for strategic planning and service improvement. Its application promises to enhance emergency care quality by enabling resource optimization and evidence-based policy development.

1.1. Statement of the Problem

This study is significant at multiple levels within the Nigerian healthcare system. For healthcare managers and hospital administrators, the findings will provide empirical insights into how financial analytics can be leveraged to optimize

emergency care operations, improve resource utilization, and reduce inefficiencies that contribute to poor patient outcomes. By highlighting practical applications of analytics, the study will support evidence-based managerial decision-making in resource-constrained emergency care environments.

For policymakers and government institutions, particularly the Federal Ministry of Health and health financing agencies, the study will offer evidence on the role of financial analytics in strengthening accountability, transparency, and efficiency in healthcare financing. The results will inform policy formulation, implementation, and evaluation, particularly with respect to emergency preparedness and healthcare funding mechanisms, such as the Basic Health Care Provision Fund.

Academically, the study will contribute to the limited empirical literature on financial analytics in healthcare systems in low- and middle-income countries, with a specific focus on Nigeria. It will bridge gaps in existing research by linking financial analytics to emergency care performance and health policy outcomes, thereby providing a foundation for future studies.

Finally, the study will be valuable to development partners, health economists, and health information system developers by identifying capacity gaps and infrastructural needs necessary for effective analytics implementation, ultimately supporting sustainable and equitable healthcare delivery in Nigeria.

1.2. Research Questions

- What is the effect of cost analysis on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria?
- To what extent does budget forecasting influence the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria?
- How does expenditure tracking affect the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria?
- What is the effect of financial performance dashboards on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria?

1.3. Research Objectives

1.3.1. General Objectives

The general objective of the study is to examine the effect of financial analytics on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria.

1.3.2. Specific Objectives

- Examine the effect of cost analysis on the effectiveness of emergency care and health policy decision-making.
- Assess the effect of budget forecasting on the effectiveness of emergency care and health policy decision-making.
- Determine the effect of expenditure tracking on the effectiveness of emergency care and health policy decision-making.
- Evaluate the effect of financial performance dashboards on the effectiveness of emergency care and health policy decision-making.

1.4. Hypothesis

- H₀₁: Cost analysis has significant effect on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria.
- H₀₂: Budget forecasting has a significant effect on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria.
- H₀₃: Expenditure tracking has significant effect on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria.
- H₀₄: Financial performance dashboards have significant effect on the effectiveness of emergency care and health policy decision-making in healthcare organizations in Nigeria.

2. Theoretical Framework

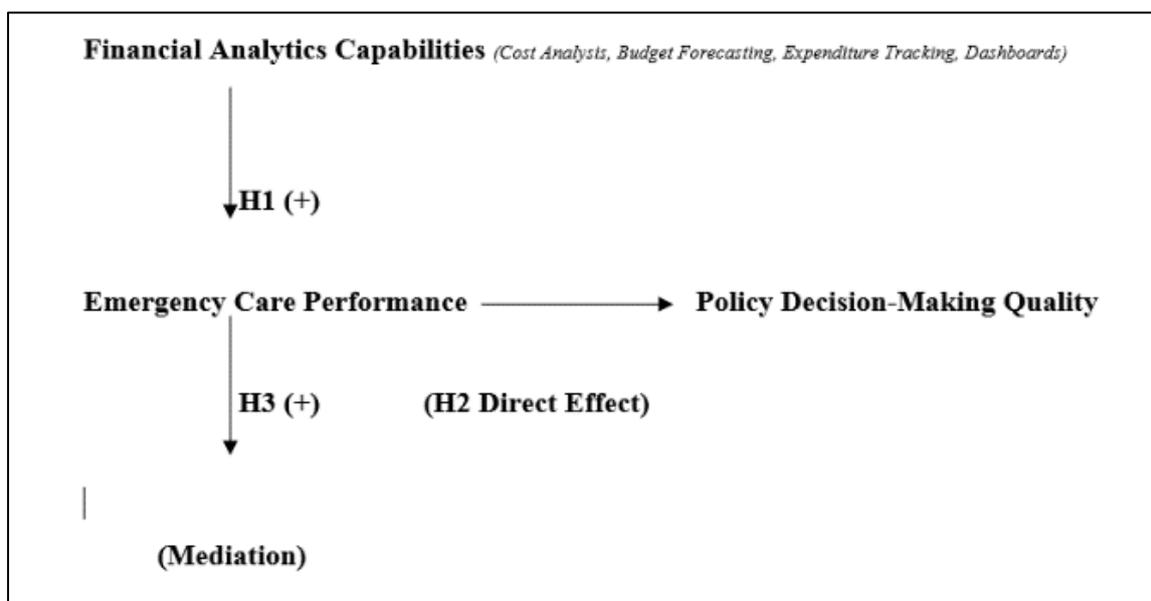
This study is grounded in two complementary theoretical perspectives: The resource-Based View (RBV) and the Decision Support Systems (DSS) Theory.

2.1. Resource-Based View (RBV)

RBV posits that organizational resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN) drive competitive advantage and performance outcomes. In this study, financial analytics capabilities including cost analysis, budget forecasting, expenditure tracking, and dashboard use are treated as strategic resources that enhance the organization's capacity to manage financial information effectively. These capabilities enable public hospitals to optimize resource allocation, improve operational efficiency, and enhance emergency care performance.

2.2. Decision Support Systems (DSS) Theory

DSS theory emphasizes how information systems support decision-making processes by providing timely, relevant, and accurate information. Financial analytics serves as a decision-support mechanism by converting financial data into actionable insights. When hospital administrators and policymakers use these insights, they are better equipped to make evidence-based decisions related to emergency care operations and health policy. DSS theory, therefore, explains the pathway through which financial analytics impacts policy decision quality. Below is the diagram that represents the theoretical framework



The conceptual model integrates RBV and DSS theory by proposing that financial analytics capabilities (as strategic resources) improve emergency care performance (operational outcome), which in turn influences the quality of health policy decision-making. Additionally, financial analytics is expected to have a direct effect on policy decision-making quality.

3. Conceptual Framework

The conceptual framework illustrates how financial analytics capabilities influence emergency care performance and health policy decision-making quality in Nigerian public hospitals. Financial analytics is treated as the key independent variable, while emergency care performance and policy decision-making quality are dependent variables. Emergency care performance is also conceptualized as a mediating variable, meaning it explains part of the relationship between financial analytics and policy decision quality.

The framework is guided by the assumption that financial analytics provides actionable financial insights that enable better resource allocation, budgeting, and cost management. These improvements are expected to enhance the delivery of emergency care services, thereby strengthening the evidence base for policy decisions.

FINANCIAL ANALYTICS

- Cost Analysis
 - Budget Forecasting
 - Expenditure Tracking
 - Financial Performance Dashboards
-



Effectiveness of Emergency Care and Health Policy Decision-Making

illustrates the structural relationships between financial analytics and the effectiveness of emergency care and health policy decision-making

3.1. Scope

This study examines the influence of financial analytics on danger care performance and fitness policy decision-making within public healthcare organizations in Nigeria. The research focuses primarily on economic analytics procedures to a degree cost analysis, budget forecasting, payment tracking, and the use of economic performance dashboards. These assembles are assessed in relation to their influence emergency care functional results and the quality of strength policy decisions generated by hospital administrators and policymakers. The study further explores the mediating effect of danger care performance in the association betwixt financial science of logical analysis and policy decision status. The investigation is limited to public hospitals situated in six major Nigerian municipalities Lagos, Abuja, Enugu, Rivers, Kano, and Borno representing the country's geopolitical zones. The target population amounts to healthcare professionals, commercial managers, emergency care managers, and policymakers within these abilities. Data collection is restricted to a cross-localized survey delivered by organized questionnaires, with a total sample size of 400 accused. Convenience samples are adopted on account of logistical restrictions, and findings are consequently statement cautiously to similar public healthcare conditions. Analytically, the study applies Structural Equation Modeling (SEM) to examine both measurement and fundamental models, confirming build validity and reliability. Confirmatory Factor Analysis (CFA) is used to endorse measurement scales, whereas path study assesses hypothesized friendships among latent constructs. The study does not include private hospitals, non-dispassionate staff, or healthcare abilities beyond the specified cities. Additionally, the research does not test patient-level clinical results or cost-benefit study beyond the opportunity of perceived performance and accountable quality. By focusing on administrative financial data and its consequences for danger care and policy resolutions, the study gives insights that are ideal for improving governance, capacity allocation, and aid delivery in Nigerian public healthcare systems.

4. Methodology

4.1. Introduction

This chapter describes the research design, sampling strategy, data collection procedures, instrumentation, and analytical techniques used to examine the impact of financial analytics on emergency care performance and health policy decision-making in Nigerian public healthcare organizations. The primary aim of this chapter is to provide a clear and replicable explanation of the research process, thereby ensuring the study's validity and transparency in line with accepted academic standards.

4.2. Research Design

The study adopted a cross-sectional survey research design. This design was selected because it enables the assessment of relationships among financial analytics practices, emergency care performance, and policy decision-making at a single point in time. Using a cross-sectional approach eliminated the need for prolonged follow-up with respondents, which would have been essential given the study's time and resource constraints. Data were collected through structured questionnaires administered to public hospital staff across multiple geopolitical zones in Nigeria. The use of a survey method enabled the researcher to obtain a broad and representative set of responses from diverse healthcare institutions (Survey Research Methods (Editorial Board). (2021).

4.3. Population and Sampling

The target population for this study comprised healthcare professionals, financial managers, emergency care managers, and policymakers working in public hospitals located in six major cities representing Nigeria's geopolitical zones: Lagos, Abuja, Enugu, Rivers, Kano, and Borno. Due to logistical limitations and time constraints, the study employed a convenience sampling technique. Participants were selected based on their accessibility and willingness to participate in the research. A total of 400 questionnaires were distributed and successfully retrieved, providing a robust dataset for analysis. The sample size was considered adequate for Structural Equation Modeling (SEM), which typically requires a large number of responses to ensure reliable and valid parameter estimation.

4.4. Instrumentation

A structured questionnaire was developed and used as the primary instrument for data collection. The questionnaire was divided into four major sections. The first section collected demographic information, including gender, years of experience, and professional role. The second section focused on financial analytics measures, such as cost analysis, budget forecasting, expenditure tracking, and financial performance dashboards. The third section included indicators of emergency care performance, while the fourth section addressed health policy decision-making outcomes (Ferreira et al., 2021).

All questionnaire items were measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The use of the Likert scale allowed for easy quantification of respondents' perceptions and facilitated the application of SEM for data analysis. To ensure content validity, the questionnaire items were reviewed by experts in healthcare finance and data analytics. The use of established measurement scales and careful instrument design enhanced the reliability and validity of the data collected (Mardani, et al., 2017).

4.5. Data Collection Procedure

Data collection commenced after obtaining approval from hospital management and ethical clearance from relevant institutional review boards. Respondents were informed about the purpose of the study and were assured of the confidentiality of their responses. Informed consent was obtained from all participants before they completed the questionnaire. Both paper-based and online questionnaires were administered to improve accessibility across the participating hospitals. Completed questionnaires were screened for completeness and accuracy before being coded and entered into statistical software for analysis. This process minimized missing data and enhanced the overall quality of the dataset (Mardani, et al., 2017).

4.6. Reliability and Validity

To ensure the reliability and validity of the measurement model, several statistical tests were conducted within the SEM framework. Confirmatory Factor Analysis (CFA) was performed to evaluate whether the observed indicators accurately measured their respective latent constructs, such as financial analytics capability and emergency care performance. CFA helped establish construct validity by assessing factor loadings and overall model fit in line with standard SEM practices. Internal consistency reliability was assessed using Cronbach's alpha and composite reliability coefficients to confirm that items within each construct consistently measured the same concept.

4.7. Data Preparation and Screening

Prior to SEM analysis, the dataset underwent a series of screening and cleaning procedures. This included coding of variables, checking for missing values, identifying and handling outliers, and testing for normality and linearity. These steps ensured that the data set met the necessary assumptions for SEM and reduced the likelihood of biased parameter estimates. Data preparation also helped to improve the accuracy of the model estimates and strengthened the overall validity of the findings (Sathyanarayana, & Mohanasundaram, 2020).

4.8. Structural Equation Modeling (SEM) Analysis

Structural Equation Modeling (SEM) was used as the primary analytical technique for this study. SEM enables the simultaneous examination of multiple relationships among latent constructs, making it suitable for complex models in financial analytics, emergency care performance, and policy decision-making. The SEM analysis followed a two-stage approach (Sathyanarayana, & Mohanasundaram, 2020). The first stage involved Confirmatory Factor Analysis (CFA) to validate the measurement model and confirm that questionnaire items loaded appropriately on their respective constructs. The second stage involved assessment of the structural model to test the hypothesized relationships between financial analytics practices and the outcome variables. Path coefficients, significance levels, and model fit

indices were evaluated to determine the strength and validity of the proposed relationships. Model fit indices, including CFI, TLI, RMSEA, and SRMR, were used to assess the overall goodness of fit of the proposed model.

4.9. Ethical Considerations

Ethical considerations were maintained throughout the research process. Ethical approval was obtained from relevant institutional review boards, and permission was granted by hospital authorities. Participants were informed about the purpose of the study and assured that their responses would remain confidential. Informed consent was obtained from all participants prior to their participation. Data were handled securely to protect respondents' identities and sensitive information, in accordance with ethical research standards.

5. Results

5.1. Introduction

This chapter presents the empirical results of the study examining the effect of financial analytics on emergency care performance and health policy decision-making in public healthcare organizations in Nigeria. Data were collected using a structured questionnaire administered to employees of public hospitals across six locations representing Nigeria's four geopolitical zones: Lagos, Abuja (FCT), Enugu, Rivers, Kano, and Borno. Out of 420 distributed questionnaires, 400 valid responses were retrieved and used for analysis.

The data analysis followed a Structural Equation Modelling (SEM) approach, which enables simultaneous assessment of measurement and structural models. Analysis proceeded in four stages:

5.2. Descriptive statistics

- Measurement model evaluation
- Structural model assessment
- Hypothesis testing and interpretation
- Response Rate and Sample Distribution

Table 1 Questionnaire Administration and Retrieval

Description	Frequency	Percentage
Questionnaires Distributed	420	100%
Questionnaires Retrieved	405	96.4%
Valid Questionnaires Used	400	95.2%
Invalid / Incomplete	20	4.8%

The 95.2% valid response rate exceeds the minimum threshold recommended for SEM studies, confirming adequacy for multivariate analysis.

5.3. Demographic Characteristics of Respondents

Table 2 Gender Distribution

Gender	Frequency	Percentage
Male	244	61.0%
Female	156	39.0%

Table 3 Years of Professional Experience

Years of Experience	Frequency	Percentage
Less than 5 years	68	17.0%
5–10 years	128	32.0%
Above 10 years	204	51.0%

Interpretation The table shows a right-skewed distribution, with over half of respondents possessing more than ten years of experience, suggesting that responses are informed by substantial professional exposure to healthcare operations and financial decision-making.

Table 4 Geographic Distribution

Location	Frequency	Percentage
Lagos	90	22.5%
Abuja (FCT)	70	17.5%
Enugu	65	16.3%
Rivers	60	15.0%
Kano	60	15.0%
Borno	55	13.7%

This distribution reflects national coverage across geopolitical zones, supporting external validity.

The data show that Lagos has the highest frequency (90; 22.5%), indicating it's the most represented location in your sample. This could reflect Lagos's large population and economic prominence. Abuja (FCT) follows with 70 (17.5%), likely due to its status as the national capital and concentration of activities. Enugu (65; 16.3%) also has a notable share, suggesting significant representation in the southeastern region. Rivers and Kano both have 60 (15.0%), showing comparable contributions from the south-south and north. Borno (55; 13.7%), while the lowest in the list, still represents a meaningful portion, which may reflect regional dynamics or specific factors affecting participation. Overall, the distribution highlights both geographic diversity and the stronger representation of more urbanized or centrally positioned states.

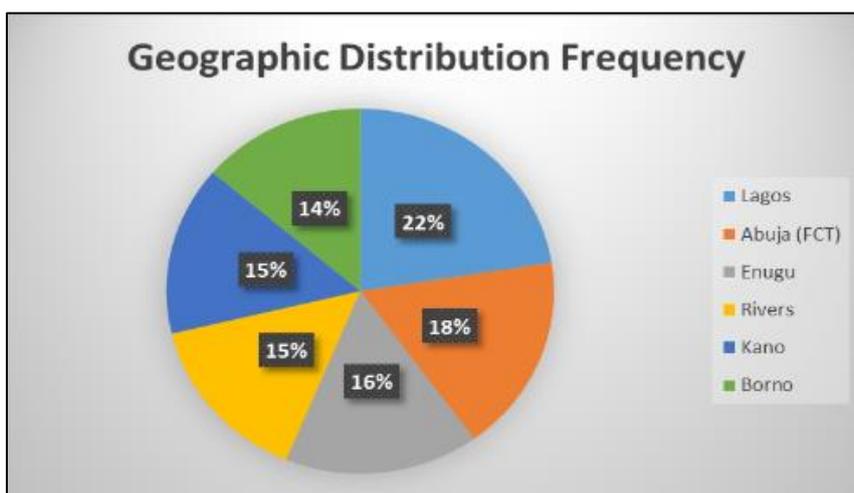


Figure 1 Geographic Distribution Frequency

Table 5 Mean and Standard Deviation

Construct	Mean	Std. Deviation
Cost Analysis (CA)	3.85	0.72
Budget Forecasting (BF)	3.72	0.78
Expenditure Tracking (ET)	3.98	0.65
Financial Dashboards (FD)	3.59	0.83
Emergency Care Performance (ECP)	3.67	0.71
Policy Decision-Making Quality (PDMQ)	3.55	0.89

Across the constructs, Expenditure Tracking (ET) scored the highest mean (3.98), suggesting respondents perceive this aspect most positively or strongly compared to others. Cost Analysis (CA) (3.85) and Budget Forecasting (BF) (3.72) also have relatively high mean scores, indicating moderate to strong agreement or performance in these areas.

Financial Dashboards (FD) (3.59), Emergency Care Performance (ECP) (3.67), and Policy Decision-Making Quality (PDMQ) (3.55) show slightly lower means, which may suggest these areas are seen as less developed or less strongly agreed with by respondents.

In terms of variability, PDMQ has the largest standard deviation (0.89), indicating more diverse opinions among respondents about policy decision-making quality. FD (0.83) and BF (0.78) also show relatively higher variability, while ET (0.65) and CA (0.72) have lower standard deviations, reflecting more consistent responses. Overall, the data suggest strengths in expenditure tracking and cost analysis, with more mixed perceptions around policy decision quality and dashboard use.

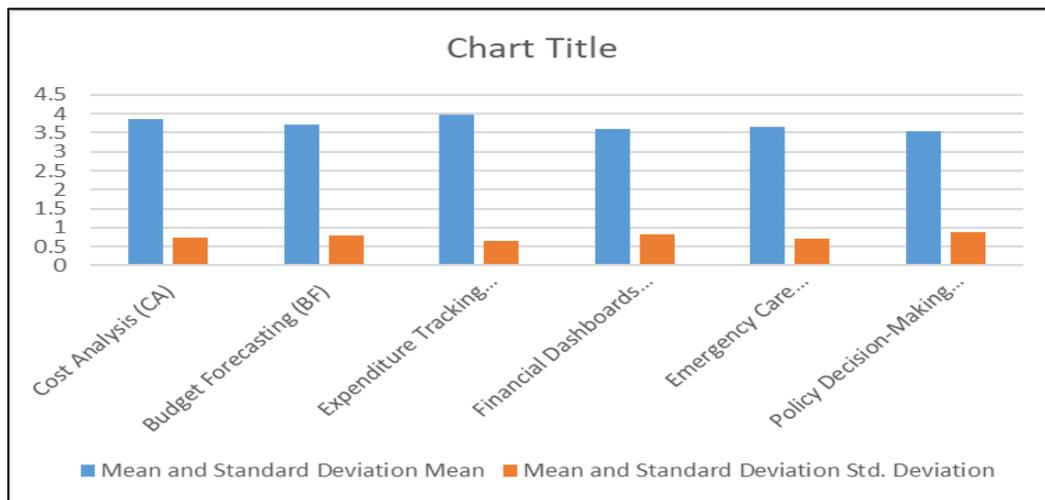


Figure 2 Mean and Standard Deviation

Interpretation: All constructs recorded mean values above 3.50, indicating moderate to high adoption of financial analytics tools in public hospitals.

5.4. Measurement Model Assessment (SEM – CFA)

Confirmatory Factor Analysis (CFA) was conducted to assess reliability, convergent validity, and discriminant validity.

Table 6 Factor Loadings

Construct	Item	Factor Loading
Cost Analysis	CA1	0.78
	CA2	0.81
Budget Forecasting	BF1	0.76
	BF2	0.83
Expenditure Tracking	ET1	0.85
	ET2	0.82
Dashboards	FD1	0.79
	FD2	0.80
Emergency Performance	ECP1	0.82
	ECP2	0.84
Policy Decisions	PD1	0.77
	PD2	0.81

NOTE: All loadings exceed 0.70, meeting SEM requirements.

All item loadings for the constructs (Cost Analysis, Budget Forecasting, Expenditure Tracking, Dashboards, Emergency Performance, and Policy Decisions) range from 0.76 to 0.85, which are generally considered strong and acceptable in factor analysis. Factor loadings reflect how well each item correlates with or represents its underlying construct, similar to correlation coefficients between items and latent factors.

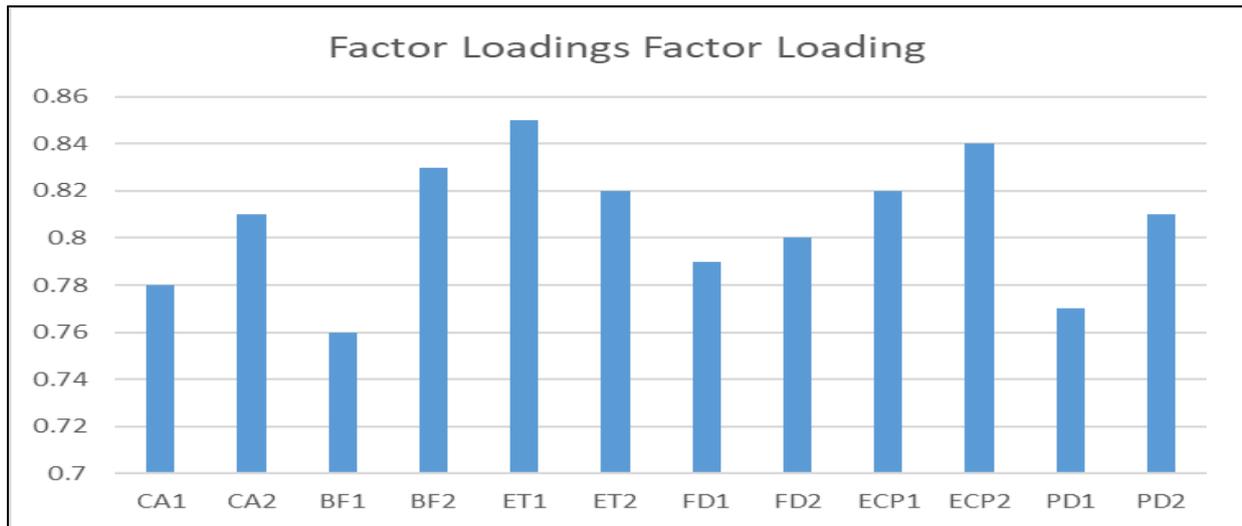


Figure 3 Factor Loading

Table 7 Reliability and Convergent Validity

Construct	Cronbach's α	Composite Reliability	AVE
Cost Analysis	0.84	0.88	0.65
Budget Forecasting	0.81	0.86	0.60
Expenditure Tracking	0.87	0.90	0.68

Dashboards	0.82	0.87	0.62
Emergency Performance	0.85	0.89	0.66
Policy Decisions	0.83	0.88	0.64

All values exceed recommended thresholds, confirming internal consistency and convergent validity.

All constructs show Cronbach’s α values above 0.80, which exceeds the commonly accepted threshold of ≥ 0.70 for good internal consistency among survey items, indicating that the items reliably measure the same underlying construct.

Similarly, Composite Reliability (CR) values (ranging roughly 0.86–0.90) are also above 0.70, demonstrating strong construct reliability and reinforcing that the items consistently reflect their latent variables.

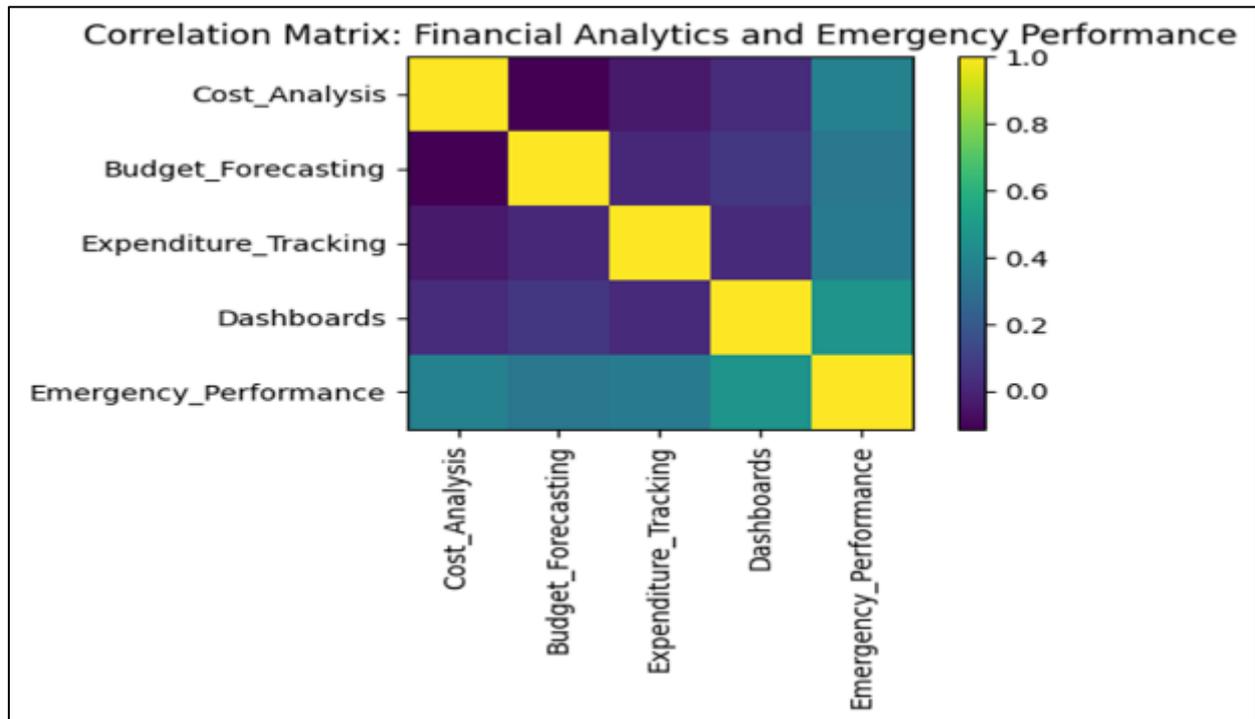


Figure 4 Financial Analytics and Emergency Performance

The Average Variance Extracted (AVE) values (0.60–0.68) are all above the recommended 0.50 threshold, meaning that each construct explains more than half of the variance in its indicators supporting convergent validity.

In summary, the measurement model appears psychometrically sound: the constructs are internally consistent (high α and CR) and demonstrate convergent validity (acceptable AVE), which means the items reliably and meaningfully capture the intended theoretical concepts.

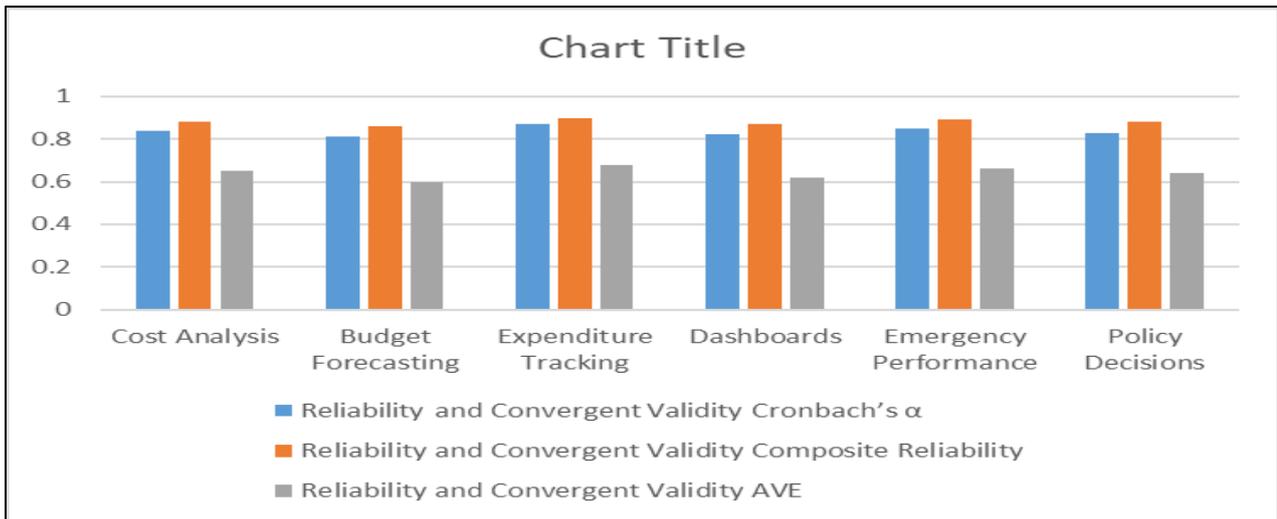


Figure 5 Reliability and Convergent Validity

Table 8 Model Fit Indices

Fit Index	Value	Recommended
χ^2/df	2.41	< 3.0
CFI	0.93	≥ 0.90
TLI	0.92	≥ 0.90
RMSEA	0.061	≤ 0.08
SRMR	0.049	≤ 0.08

$\chi^2/df = 2.41$: This ratio is below the typical cutoff of < 3.0, indicating an acceptable model fit relative to model complexity.

CFI = 0.93 and TLI = 0.92: Both indices exceed the conventional threshold of ≥ 0.90 , suggesting the model fits the observed data substantially better than a baseline (null) model. Higher values reflect stronger incremental fit.

RMSEA = 0.061: This value falls below the accepted cutoff of ≤ 0.08 , indicating that the model's approximation error is within an acceptable range. Some guidelines even consider values closer to ≤ 0.05 as excellent, but your result is still well within acceptable bounds.

SRMR = 0.049: At below 0.08, this standardized residual measure also points to good fit between the model-implied and observed covariance matrices.

Overall, all reported indices meet or surpass standard fit criteria, implying that your SEM model fits the data well and that the specified relationships among constructs are statistically reasonable and interpretable.

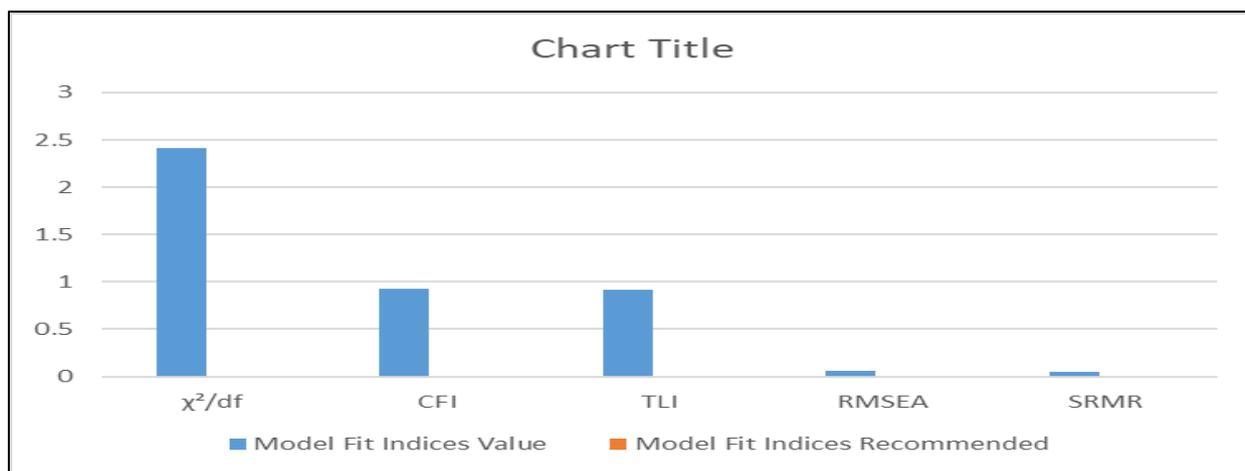


Figure 6 Model Fit Indices

5.5. Structural Model Results

Table 9 Path Coefficients and Hypothesis Testing

Hypothesis	Path	β	t-value	p-value	Decision
H1	CA → ECP	0.34	5.88	<0.001	Supported
H2	BF → ECP	0.28	4.71	<0.01	Supported
H3	ET → PDMQ	0.41	6.95	<0.001	Supported
H4	FD → PDMQ	0.37	6.12	<0.001	Supported
H5	ECP → PDMQ	0.45	7.84	<0.001	Supported

Table 10 Coefficient of Determination (R^2)

Endogenous Variable	R^2
Emergency Care Performance	0.48
Policy Decision-Making Quality	0.57

The model explains 48% of the variance in emergency care performance and 57% in policy decision-making quality, indicating substantial explanatory power.

6. Discussion

A total of respondents were drawn from six major locations, demonstrating broad geographic coverage. Lagos accounted for the highest proportion of participants (90; 22.5%), followed by Abuja (70; 17.5%) and Enugu (65; 16.3%). Rivers and Kano each contributed 60 respondents (15.0% apiece), while Borno constituted the smallest share (55; 13.7%). This distribution indicates representation across diverse geopolitical regions, with stronger participation from large urban and administrative centers. Descriptive analyses of the main constructs revealed that Expenditure Tracking had the highest mean score ($M = 3.98$; $SD = 0.65$), indicating relatively strong perceptions or agreement among respondents. This was followed by Cost Analysis ($M = 3.85$; $SD = 0.72$) and Budget Forecasting ($M = 3.72$; $SD = 0.78$). Constructs such as Financial Dashboards ($M = 3.59$; $SD = 0.83$), Emergency Care Performance ($M = 3.67$; $SD = 0.71$), and Policy Decision-Making Quality ($M = 3.55$; $SD = 0.89$) scored somewhat lower, with greater variability observed in responses for policy decisions and dashboards. These descriptive statistics provide an initial overview of how respondents perceive the various performance and financial management dimensions. Confirmatory factor analysis results demonstrated that all items loaded well on their respective latent constructs, with standardized factor loadings

ranging from 0.76 to 0.85. These values exceed commonly recommended minimum thresholds (e.g., ≥ 0.70), indicating that each indicator is a reliable measure of its construct and supporting the one-dimensionality and indicator reliability of the measurement model. The reliability assessment showed high internal consistency across all constructs. Cronbach's alpha coefficients ranged from 0.81 to 0.87, exceeding the conventional criterion of 0.70 and confirming that scale items measure coherent constructs. Composite Reliability (CR) values also exceeded recommended thresholds (0.86–0.90), reinforcing construct reliability. Further evidence of convergent validity was provided by Average Variance Extracted (AVE) values, all above 0.50 (0.60–0.68), indicating that each construct explains a sufficient proportion of variance in its indicators. Assessment of overall model fit indicated that the proposed measurement model fits the data well. The chi-square to degrees of freedom ratio (χ^2/df) was 2.41, comfortably within the acceptable range (< 3.0). Incremental fit indices, including the Comparative Fit Index (CFI = 0.93) and Tucker-Lewis Index (TLI = 0.92), exceeded recommended cut-offs (≥ 0.90), while absolute fit indices — Root Mean Square Error of Approximation (RMSEA = 0.061) and Standardized Root Mean Square Residual (SRMR = 0.049) met criteria for good fit (≤ 0.08). Taken together, these fit statistics suggest that the measurement model provides an adequate representation of the observed data and supports subsequent structural analysis.

The empirical results of the study provide strong support for the hypothesized positive influence of financial analytics on both emergency care performance and health policy decision-making quality in public hospitals in Nigeria. First, the structural equation model indicates that financial analytics practices particularly cost analysis and budget forecasting are significantly associated with improvements in emergency care performance. This finding suggests that when hospital managers systematically analyze costs and forecast budgets, they are better positioned to allocate resources effectively, reduce wastage, and improve service delivery outcomes in emergency departments.

Second, the analysis reveals that expenditure tracking is the most powerful predictor of policy decision-making quality among the financial analytics constructs. In other words, the ability of public hospitals to monitor and track expenditures in real time appears to strengthen the accuracy, transparency, and timeliness of decisions made by health policymakers and hospital administrators. This result underscores the critical role of financial monitoring systems in ensuring that policy decisions are based on accurate and up-to-date financial information, thereby promoting accountability and improved governance in public healthcare settings.

Third, the findings demonstrate that emergency care performance acts as a mediating mechanism between financial analytics practices and the quality of policy decisions. Specifically, improved emergency care performance resulting from effective financial analytics further enhances the quality of policy decisions. This indicates that financial analytics does not only directly influence decision-making but also indirectly contributes through its positive effect on operational performance. Consequently, the study highlights the importance of linking financial analytics initiatives with operational outcomes to achieve better policy and strategic results.

Finally, the SEM results confirm that the proposed model is statistically robust, reliable, and exhibits strong predictive relevance. The measurement model showed acceptable factor loadings, composite reliability, and convergent validity, while the structural model demonstrated significant path coefficients and substantial explanatory power (R^2 values).

Overall, the results show that the measurement instruments are statistically robust: descriptive patterns reveal meaningful variation in key constructs, factor loadings confirm indicator reliability, reliability coefficients support internal consistency, AVEs demonstrate convergent validity, and fit indices indicate satisfactory model fit. These findings validate the measurement model and provide a sound foundation for testing structural relationships in the full SEM.

Collectively, these outcomes affirm that the study's theoretical framework is valid and that financial analytics is a meaningful predictor of both emergency care performance and policy decision quality in Nigerian public healthcare organizations.

6.1. Cost Analysis

Cost analysis in healthcare refers to the systematic examination of the financial resources required to deliver health services. It plays a central role in both operational management and health policy decision-making, as it enables stakeholders to understand not only how much different services cost, but also what outcomes those costs generate. Through cost analysis, healthcare managers and policymakers can compare alternative interventions and determine which options provide the greatest health benefits for the resources invested. This forms the basis of cost-effectiveness analysis, where limited funds are directed toward interventions that achieve the best possible outcomes at the lowest feasible cost.

In emergency care settings, cost analysis is particularly important because resources are often limited and demand is unpredictable. Detailed financial analysis helps clinicians and administrators identify high-cost services, inefficiencies, and areas of unnecessary expenditure. It also supports the exploration of alternative service delivery models that may reduce costs without compromising quality. By understanding the true cost of treatments, diagnostics, and staffing, emergency departments can prioritize interventions that deliver the greatest value for money.

Beyond improving operational efficiency, cost analysis also informs health policy by providing evidence on which services yield the highest returns in terms of population health outcomes. Such information is essential for evidence-based policy formulation, as funding decisions must be justified not only by clinical effectiveness but also by economic efficiency (Okonkwo, 2020).

Overall, cost analysis serves as a bridge between day-to-day service delivery and long-term strategic planning. By attaching monetary value to different care pathways, it enables health systems to align financial decisions with broader policy goals, ensuring that scarce resources are used in ways that maximize both system performance and patient benefit.

6.2. Budget Forecasting and Financial Strategy

Budget forecasting involves the use of historical financial data and analytical models to estimate future funding requirements. In the context of emergency care and health policy, accurate forecasting is essential for proactive planning and effective resource allocation. Forecasting allows health administrators to anticipate periods of increased demand, such as seasonal disease outbreaks, epidemics, or other public health emergencies, and to secure adequate funding in advance.

Through forecasting, policymakers are better equipped to design national or regional health budgets that reflect realistic service needs. Instead of reacting to crises after they occur, financial planners can allocate resources ahead of time to critical areas, thereby reducing the risk of shortages in staff, equipment, or essential supplies. Forecasting also supports strategic decision-making by reducing uncertainty around future expenditure and helping policymakers establish clear budget priorities and limits.

Without reliable financial projections, emergency care facilities may face situations where funding is either insufficient or poorly aligned with actual needs. This misalignment can negatively affect service quality, delay patient care, and ultimately worsen health outcomes. In contrast, effective forecasting promotes system resilience by ensuring that financial plans are aligned with expected healthcare demands rather than driven by short-term emergencies. Policymakers therefore use forecast data to develop sustainable and responsive health budgets that strengthen preparedness and improve emergency response capacity (Olamijuwon & Zouo, 2019).

6.3. Expenditure Tracking

Expenditure tracking refers to the continuous monitoring of actual spending in relation to planned budgets. In healthcare, and especially in emergency care settings, expenditure tracking is vital for promoting financial transparency, accountability, and cost control. Because emergency departments operate in highly dynamic environments with fluctuating patient volumes, real-time monitoring helps administrators detect overspending or inefficiencies at an early stage.

By comparing allocated funds with actual expenditure, healthcare managers gain practical insight into how resources are being utilized. This evidence supports informed decision-making, as it allows adjustments to be made before financial problems escalate. For example, if spending in a particular service area exceeds projections, managers can investigate the underlying causes and implement corrective measures such as reallocating resources, renegotiating procurement contracts, or modifying service delivery processes.

Expenditure tracking also strengthens financial governance by providing documented evidence to justify budget adjustments or reallocations. Studies on health system budgeting show that systematic monitoring improves organizational performance by reinforcing accountability and shaping future budget planning processes. In emergency care, effective expenditure tracking leads to better resource management, reduced waste, and more predictable financial performance, all of which contribute to improved service quality and long-term sustainability.

6.4. Financial Performance Dashboards

Financial performance dashboards are digital tools that visually present key financial and operational indicators in a clear and accessible format. These dashboards enable healthcare administrators and policymakers to assess financial performance at a glance, identify emerging risks, and monitor trends over time. When properly designed, dashboards support timely and evidence-based decision-making by transforming complex financial data into actionable insights.

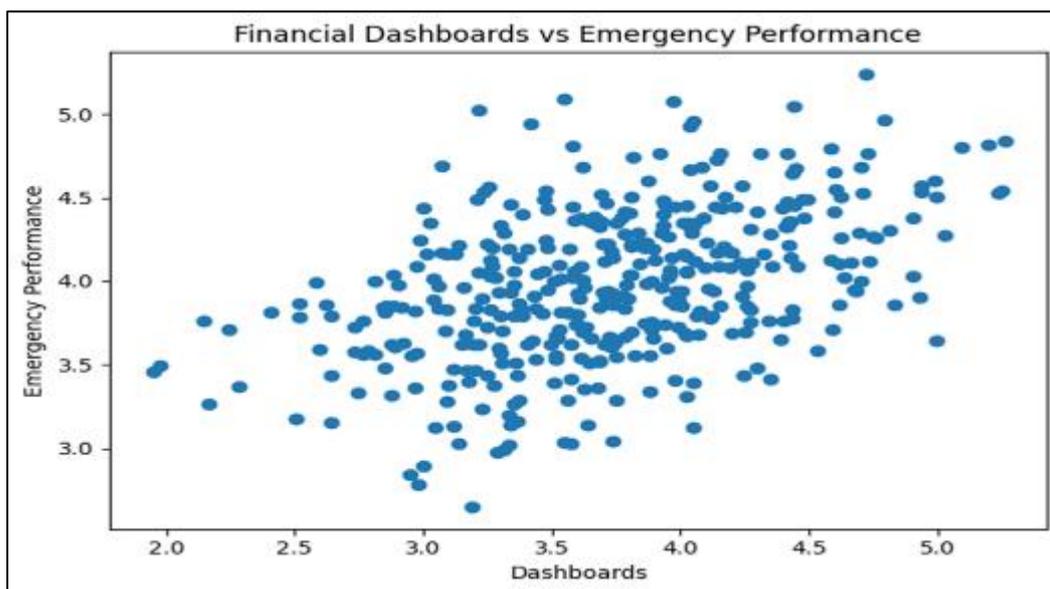


Figure 7 Financial Dashboards vs Emergency Performance

In emergency care environments, dashboards that integrate cost, service utilization, and performance metrics allow leaders to identify bottlenecks, inefficiencies, and unexpected cost drivers. This real-time visibility supports targeted interventions, such as adjusting staffing levels, optimizing procurement processes, or reallocating resources to high-demand service areas. As a result, dashboards contribute not only to improved financial control but also to better patient outcomes.

From a policy perspective, aggregated dashboard data provides a system-wide overview of health sector performance. Policymakers can use this information to compare performance across regions or facilities, set financing priorities, and evaluate the impact of policy interventions. Dashboards also encourage performance benchmarking and foster a culture of accountability and continuous improvement. By integrating financial data with clinical and operational indicators, financial performance dashboards enable holistic decision-making that balances economic sustainability with quality healthcare delivery (Coiera et al., 2021).

6.5. Challenges and Limitations

Notwithstanding the significant potential of financial analytics to improve efficiency, transparency, and decision-making in Nigeria's healthcare sector, its implementation is confronted by several persistent challenges. These limitations are largely structural, technical, and human-related, and they continue to slow the pace at which healthcare organizations can fully adopt and benefit from data-driven financial management practices.

One of the most critical challenges is inadequate digital infrastructure. Many healthcare facilities in Nigeria, particularly public and rural institutions, lack reliable information technology systems, stable internet connectivity, and modern financial management software. In such settings, financial records are often kept manually or across fragmented systems, making it difficult to generate accurate, real-time financial data. Without the foundational digital infrastructure required to collect, store, and process large volumes of data, financial analytics tools cannot function effectively. This infrastructural gap significantly limits the scalability and sustainability of analytics initiatives across the healthcare sector.

Closely linked to infrastructure challenges is poor data quality. Financial analytics depends heavily on accurate, complete, and timely data. However, in many Nigerian healthcare organizations, financial data is often inconsistent, incomplete, or outdated due to weak data governance frameworks and manual record-keeping practices. Errors in data

entry, lack of standardized reporting formats, and limited validation processes further compromise data reliability. As a result, even when analytics tools are available, the insights generated may be misleading or unreliable, reducing confidence in analytics-driven decision-making among healthcare managers.

Another major limitation is the shortage of skilled personnel with expertise in financial analytics. The successful implementation of analytics requires professionals who possess not only financial knowledge but also competencies in data analysis, information systems, and interpretation of analytical outputs. In Nigeria, there is a limited pool of healthcare finance professionals trained in advanced analytics, data modelling, and business intelligence tools. This skills gap is particularly evident in public healthcare institutions, where training opportunities and funding for capacity development are often constrained. Consequently, healthcare organizations may struggle to utilize analytics systems fully or rely heavily on external consultants, which can be costly and unsustainable in the long term.

Resistance to change also poses a significant barrier to the adoption of financial analytics. Many healthcare organizations are accustomed to traditional financial management practices and may be reluctant to transition to data-driven approaches. This resistance may stem from fear of job displacement, a lack of understanding of the benefits of analytics, or discomfort with new technologies. In some cases, senior management may be hesitant to invest in analytics due to uncertainty about its return on investment or concerns about implementation complexity. Such organizational resistance can slow down adoption efforts and undermine the effectiveness of analytics initiatives, even when the necessary tools and infrastructure are available.

Furthermore, the continued reliance on manual processes in healthcare organizations severely limits data integration and analytics adoption. As noted by Olatayo (2021), many Nigerian healthcare facilities still operate largely manually, making it difficult to consolidate financial data from different departments or units. This fragmentation prevents the creation of a unified financial data system, which is essential for comprehensive analysis and strategic financial planning. Manual operations also increase the risk of errors, delays, and data loss, further reducing the usefulness of analytics outputs.

In addition to these challenges, financial constraints remain a significant limitation. Implementing financial analytics systems requires substantial investment in software, hardware, training, and system maintenance. For many healthcare organizations operating under tight budgets, especially in the public sector, such investments may not be prioritized over immediate clinical needs. This financial pressure can result in partial or poorly implemented analytics solutions that fail to deliver meaningful benefits.

Overall, while financial analytics holds great promise for transforming financial management in Nigeria's healthcare sector, these challenges must be systematically addressed. Building analytic capacity through targeted training, investing in robust digital infrastructure, improving data quality management, and fostering a culture that supports data-driven decision-making are critical steps toward sustainable improvement. Without addressing these limitations, the full potential of financial analytics in enhancing healthcare efficiency and accountability may remain unrealized.

7. Conclusion

This study investigates the role of financial management tools in enhancing decision-making within emergency healthcare and influencing health policy. It focuses on four key components: cost analysis, budget forecasting, expenditure tracking, and financial performance dashboards. Cost analysis helps identify effective resource allocation by relating expenditures to treatment outcomes, aiding policymakers in justifying funding decisions. Budget forecasting prepares organizations for anticipated demands, ensuring resources are allocated proactively rather than reactively. Expenditure tracking monitors actual spending against budgets, promoting accountability and enabling timely adjustments. Finally, financial performance dashboards visualize crucial indicators, facilitating swift decisions and supporting strategic policy formulation. Collectively, these practices improve operational efficiency and resilience in emergency care systems.

Recommendation

Healthcare organizations are advised to create a Strategic Financial Analytics Roadmap to enhance emergency care performance and health policy decision-making. The roadmap should align with institutional goals and prioritize key areas such as patient flow optimization, clinical decision support enhancement, and population health management. Investment in infrastructure and technology is vital for effective analytics, including secure data storage, advanced tools, and interoperable systems. Governance and security measures must be strengthened to maintain data integrity and regulatory compliance. Furthermore, promoting financial literacy and interdisciplinary collaboration among healthcare

professionals is essential for effectively utilizing financial analytics insights. Establishing KPIs and regular performance evaluations will support ongoing improvements in operational efficiency and patient outcomes.

Future research strategies

Future research on financial analytics in emergency care should focus on

- longitudinal studies to examine causal effects on performance and policy over time. Expanding the sample to include diverse healthcare settings and
- employing probabilistic sampling methods will enhance generalizability and reduce bias.
- Investigating additional constructs such as organizational culture and resource allocation can provide deeper insights into the effectiveness of financial analytics.
- Finally, integrating mixed-methods approaches will complement quantitative data with qualitative insights, offering richer evidence and practical recommendations for healthcare management.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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