

Forensic Accounting Techniques and Financial Crime Prevention in State Hospital Board Management: A Study of Selected States in South Western Nigeria

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ABSTRACT: Financial crimes within state hospital board management in Nigeria represent a particularly damaging form of public-sector malfeasance: funds diverted or misapplied in public secondary health facilities directly erode healthcare delivery capacity, compromise patient outcomes, and undermine the institutional credibility of state Hospitals Management Boards (HMBs). The six states of South Western Nigeria — Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti — collectively operate a network of state-owned secondary health facilities whose financial governance structures, encompassing the finance and accounts departments, internal audit units, and ministerial oversight committees of their respective HMBs, are tasked with safeguarding significant volumes of recurrent and capital expenditure as well as internally generated revenue from user fees and health insurance reimbursements. Yet financial crime, including payroll fraud, pharmaceutical procurement inflation, user-fee diversion, and ghost-worker schemes, continues to be documented across comparable Nigerian state health boards. This paper examines the relationship between forensic accounting techniques and financial crime prevention in the management of state Hospital Boards in South Western Nigeria, drawing on empirical evidence from Nigerian public-sector forensic accounting studies, health-sector specific fraud studies, and South Western Nigerian forensic accounting literature. The paper adopts a desk-based, literature-synthesis methodology anchored on White Collar Crime Theory (Sutherland, 1949), Fraud Triangle Theory (Cressey, 1953), and Agency Theory (Jensen & Meckling, 1976). The synthesised empirical evidence establishes a significant positive relationship between the application of forensic accounting techniques — principally data mining and analytics, documentary evidence examination, investigative and auditing skills, and Benford's Law-based digital analysis — and the prevention and detection of financial crime in Nigerian public-sector entities, including health-sector organisations. Constraints including forensic specialist shortages, weak internal control systems, limited audit independence, and poor institutionalisation of forensic practice are found to limit the long-run impact of technique adoption. The paper concludes that the systematic embedding of forensic accounting capability within South Western Nigerian state HMB financial governance structures offers a robust, evidence-based strategy for curbing financial crime, and recommends mandatory forensic accounting units, inter-agency collaboration with the EFCC and ICPC, and dedicated forensic training for HMB finance and audit staff.

KEYWORDS: Forensic accounting techniques, financial crime prevention, state hospital board, South Western Nigeria, public health governance, fraud triangle, white collar crime

1.0 INTRODUCTION

1.1 Background to the Study

State Hospitals Management Boards (HMBs) occupy a critical node in Nigeria's three-tier health system, serving as the primary administrative and financial governance structure for state-government-owned secondary health facilities. In South Western Nigeria, each of the six states — Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti — maintains a statutory HMB established under state health edicts and charged with the management of state hospitals, specialist centres, and related health facilities. The Ogun State Hospitals Management Board, established under the Health Management Edict No. 6 of 1978, controls and manages forty state-owned secondary health facilities across five health zones. The Osun State Hospitals Management Board operates fifty-eight health facilities, including the State Specialist Hospital, Asubiaro, Osogbo, and eight state hospitals, through ten departmental units at its headquarters including a Finance and Accounts Department. These institutions collectively manage significant flows of public funds: state government health budget allocations, internally generated revenue from user fees, capitation payments and

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reimbursements under state health insurance schemes, pharmaceutical and medical supply procurement budgets, and federal health intervention grants.

The scale and complexity of these financial flows, combined with governance structures that often exhibit weak segregation of duties, under-resourced internal audit units, and limited management commitment to investigative audit practice, have made state HMBs in South Western Nigeria and across the country vulnerable to diverse financial crimes. These include payroll fraud involving ghost workers and continued payment of disengaged staff; pharmaceutical and medical supply procurement fraud involving contract inflation, splitting, and vendor collusion; user-fee diversion, in which revenue collected from patients at facility level is not remitted to the HMB or state government treasury; health insurance reimbursement fraud; and outright embezzlement of capital and recurrent expenditure allocations. The financial and human costs of these crimes are magnified in the health sector: every naira diverted from a state hospital budget translates directly into reduced drug availability, deferred capital maintenance, and eroded health service quality for communities served by those facilities.

Against this backdrop, forensic accounting has emerged as the most evidence-supported investigative discipline for detecting, quantifying, and helping prevent financial crime in Nigerian public-sector entities. Forensic accounting integrates accounting knowledge, investigative skills, and legal awareness to obtain evidence suitable for use in litigation, disciplinary action, or financial recovery proceedings (Okoye & Jugu, 2022). In Nigerian public-sector settings generally, and in health-sector organisations specifically, key forensic accounting techniques documented in the literature include documentary evidence examination and analysis, data mining and digital analytics, investigative and auditing skills, Benford's Law-based transaction analysis, computer-assisted audit tools and techniques (CAATs), and forensic interviewing (Ewa, 2022; Alao, Adegbe & Ogundajo, 2023). The empirical literature, though predominantly drawn from broader public-sector MDAs rather than health boards specifically, consistently demonstrates significant positive relationships between the application of these techniques and improvements in financial crime prevention and detection in Nigerian public institutions.

South Western Nigeria provides a particularly important regional context for examining forensic accounting in state HMB management. Forensic accounting studies with a South Western Nigeria focus include Alao, Adegbe and Ogundajo's (2023) study of forensic accounting techniques and corruption in South West Nigerian public-sector organisations, and a PhDlevel investigation into forensic accounting techniques, institutional quality, and tax fraud management across Oyo, Osun, Ogun, Ondo, and Ekiti States. A study of Ondo, Osun, and Ekiti state MDAs — sampling seventy-two chief financial officers and audit managers from eighteen South Western Nigerian government agencies — found that internal control systems ($p = 0.00 < 0.05$) and forensic accounting documentary evidence ($p = 0.00 < 0.05$) each had positive and significant effects on financial crime management. It is within this regional evidence base that the present paper situates its examination of forensic accounting techniques and financial crime prevention in South Western Nigerian state HMBs.

1.2 Statement of the Problem

Despite the existence of finance and accounts departments, internal audit units, and ministerial oversight structures within state HMBs across South Western Nigeria, financial crimes continue to be documented in public secondary health facilities. Payroll padding through ghost workers, diversion of user-fee revenue, procurement inflation for pharmaceuticals and medical supplies, and misapplication of health sector grant funds represent recurring patterns of financial malfeasance that conventional audit approaches — which are retrospective, sample-based, and compliance-oriented — have repeatedly failed to detect or prevent in a timely and systematic manner. The application of forensic accounting techniques in state HMB financial management in South Western Nigeria is reportedly limited, inconsistent, and poorly institutionalised: most HMBs lack dedicated forensic accounting units, few finance and audit staff hold forensic accounting qualifications, and the engagement of external forensic accountants by anti-graft agencies such as the EFCC and ICPC has typically been reactive rather than proactive. The mismatch between the sophistication of financial crime schemes in state health institutions and the investigative capacity of their governance structures constitutes the problem this paper addresses: the extent to which forensic accounting techniques are applicable to, and can be systematically embedded within, state HMB financial governance in South Western Nigeria to prevent financial crime.

1.3 Objectives of the Study

The broad objective of this study is to examine the relationship between forensic accounting techniques and financial crime prevention in state Hospital Board management in South Western Nigeria. The specific objectives are to: (i) examine the effect of documentary evidence examination on financial crime prevention in state HMBs in South Western Nigeria; (ii) assess the effect of data mining and digital analytics on financial crime prevention in state HMBs; (iii) evaluate the effect of investigative and auditing skills on financial crime prevention in state HMBs; and (iv) proffer evidence-based recommendations for strengthening forensic accounting practice within state HMB financial governance structures in South Western Nigeria.

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1.4 Research Questions

(i) What is the effect of documentary evidence examination on financial crime prevention in state HMBs in South Western Nigeria? (ii) What is the effect of data mining and digital analytics on financial crime prevention in state HMBs? (iii) What is the effect of investigative and auditing skills on financial crime prevention in state HMBs? (iv) What institutional constraints limit the application of forensic accounting techniques in state HMB financial governance?

1.5 Research Hypotheses

The study is guided by the following null hypotheses: H_{01} : Documentary evidence examination has no significant effect on financial crime prevention in state HMBs in South Western Nigeria. H_{02} : Data mining and digital analytics have no significant effect on financial crime prevention in state HMBs in South Western Nigeria. H_{03} : Investigative and auditing skills have no significant effect on financial crime prevention in state HMBs in South Western Nigeria.

1.6 Significance of the Study

This study is of value to several stakeholders. For state HMB management, governing boards, and finance and audit staff in South Western Nigeria, the paper provides an evidence base for investing in forensic accounting capability as a component of health financial governance reform. For state Ministries of Health and commissioners responsible for hospital board oversight, the paper offers guidance on regulatory and institutional frameworks that can incentivise forensic accounting adoption within HMB structures. For the EFCC, ICPC, and other anti-graft agencies, the paper strengthens the case for proactive, collaborative engagement with state health boards in the prevention, rather than merely the post-hoc investigation, of financial crime. For professional bodies — including the Institute of Chartered Accountants of Nigeria (ICAN), whose Faculty of Forensic Accounting and Investigation was established in 2011, and the Chartered Institute of Forensic and Certified Fraud Investigators of Nigeria (CIFCFIN) — the study reinforces the relevance of forensic accounting certification to public health governance. Finally, the paper contributes to the developing body of Nigerian literature on forensic accounting in sector-specific public governance contexts, complementing prior studies focused on ministries, federal agencies, and tertiary institutions by extending the analysis to state-level health boards.

1.7 Scope of the Study

The study focuses on forensic accounting techniques and financial crime prevention, and institutionally on the state Hospitals Management Boards of selected South Western Nigerian states — principally Ogun, Oyo, Osun, Ondo, and Ekiti, with reference to Lagos as the region's largest state health system. The review draws on empirical literature published between 2016 and 2026, with priority accorded to studies of South Western Nigerian public-sector organisations, Nigerian public health-sector entities, and comparable Nigerian MDAs where health-sector-specific evidence is limited.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Forensic Accounting Techniques

Forensic accounting is the application of accounting knowledge, investigative skills, and legal awareness to examine financial records with a view to detecting, quantifying, and proving financial crime for use in litigation, disciplinary proceedings, or financial recovery (Okoye & Jugu, 2022). Core forensic accounting techniques relevant to the state HMB context include: documentary evidence examination, which involves the systematic review, authentication, and analysis of financial documents — including payroll records, pharmaceutical procurement contracts, patient billing records, and user-fee remittance schedules — to identify falsification, alteration, or omission indicative of fraud; data mining and digital analytics, which employ statistical and pattern-recognition tools to identify anomalous transactions, duplicate payments, and statistical irregularities in large financial datasets; investigative and auditing skills, encompassing forensic interviewing, lifestyle analysis, and net-worth review; and Benford's Law-based digital analysis, which tests the conformity of first-digit distributions in financial datasets to expected mathematical patterns as a flag for data manipulation. In the Nigerian health sector, Obiora, Onuora and Amodu (2022) specifically examined forensic accounting services in healthcare firms and found that their application reduced fraud incidence at the 1% significance level, using Kendall's Coefficient of Concordance as the analytical tool.

2.1.2 Financial Crime in State Hospital Board Management

Financial crime in the context of state HMB management encompasses a range of intentional fraudulent acts directed at the misappropriation or misapplication of public health funds. The principal financial crime typologies documented in Nigerian public health sector literature include: payroll fraud and ghost workers, in which salary payments are made for non-existent or disengaged staff within the large clinical and administrative workforce that characterises state HMBs; pharmaceutical and medical

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supply procurement fraud, in which drug and consumable purchase prices are inflated, quantities falsified, or contracts split to circumvent approval thresholds; user-fee diversion, in which revenue collected from patients at facility level is withheld from official remittance to the state treasury or HMB headquarters; health insurance reimbursement fraud, in which claims are submitted for services not rendered or patients not treated; and capital budget misappropriation, in which funds allocated for facility construction, renovation, or equipment procurement are diverted or misapplied. These crime typologies are facilitated by the decentralised, multi-facility structure of state HMBs — which may operate dozens of geographically dispersed health facilities, each collecting revenue and processing payroll locally — and by weak internal controls, inadequate information systems, and limited audit coverage of peripheral health facilities.

2.1.3 State Hospital Board Financial Governance in South Western Nigeria

Each state HMB in South Western Nigeria is established under a state health law or edict and operates under the authority of the state Ministry of Health. The financial governance structure of a typical South Western Nigerian state HMB includes: the Board of Management as the governing body; the Permanent Secretary/Executive Secretary as chief accounting officer; the Finance and Accounts Department responsible for treasury management, payroll, and financial reporting; the Internal Audit Unit responsible for pre-payment audit and compliance review; and the Procurement Unit responsible for pharmaceutical and supply chain management. For most South Western Nigerian state HMBs, this structure mirrors the broader state MDA governance architecture but is complicated by the multi-facility, multi-revenue-stream nature of hospital board operations. The Ogun State HMB, for example, manages forty secondary health facilities across five health zones; the Osun State HMB manages fifty-eight facilities, including eight state hospitals and specialised services. The resulting geographic dispersion of financial activities — with user-fee collection, local payroll processing, and consumable procurement occurring at facility level across the state — creates a wide fraud-exposure surface that routine compliance-based audit cannot adequately cover.

2.2 Theoretical Framework

2.2.1 White Collar Crime Theory

This paper is anchored primarily on White Collar Crime Theory, propounded by Edwin Sutherland (1949), who defined white-collar crime as crime committed by persons of respectability and high social status in the course of their occupation. In the state HMB context, financial crimes are typically perpetrated by finance officers, procurement officers, clinical administrators, and payroll managers — persons of institutional authority and occupational access who exploit their positions to divert public health resources for personal gain. Sutherland's framework is directly applicable because it identifies occupational access and social legitimacy, rather than poverty or desperation, as the primary enablers of financial crime in institutional settings, directing forensic accounting attention toward the behaviour of trusted insiders rather than external threats. The White Collar Crime Theory has been explicitly adopted in Nigerian health-sector forensic accounting studies, including Obiora et al. (2022) and studies of forensic accounting services and fraud prevention in Nigerian healthcare firms.

2.2.2 Fraud Triangle Theory

The Fraud Triangle Theory, propounded by Cressey (1953), posits that fraud occurs at the convergence of three elements: perceived pressure, perceived opportunity, and rationalisation. In the state HMB context, pressure arises from personal financial obligations or salary arrears common in Nigerian state public service; opportunity arises from weak internal controls, limited audit coverage of peripheral health facilities, and inadequate segregation of duties in finance departments; and rationalisation is facilitated by a culture in which public-sector financial misconduct is normalised or perceived as victimless. Forensic accounting techniques address the opportunity leg of the triangle most directly, by tightening financial controls, increasing detection probability through data analytics, and reducing the concealment space available to would-be fraudsters within HMB operations.

2.2.3 Agency Theory

Agency Theory (Jensen & Meckling, 1976) frames the relationship between state governments (principals) and HMB management and staff (agents) as inherently susceptible to information asymmetry and goal divergence. State governments, as principals, entrust financial resources to HMBs for healthcare delivery; HMB management and staff, as agents, control those resources and may, under conditions of inadequate monitoring, divert them for personal benefit. Forensic accounting functions as an enhanced monitoring mechanism in this principal-agent relationship, reducing the information asymmetry between state government oversight bodies and HMB financial operations, and increasing the credibility and specificity of evidence available for sanction and financial recovery.

2.3 Empirical Review

Empirical evidence on forensic accounting techniques and financial crime prevention in Nigerian public health-sector institutions is growing but remains less developed than the wider public-sector forensic accounting literature. The most directly relevant

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health-sector study is that of Obiora, Onuora and Amodu (2022), who evaluated forensic accounting services and fraud prevention in healthcare firms in Nigeria using a survey design and Kendall's Coefficient of Concordance for statistical analysis. The study found that the application of forensic accounting services significantly reduced fraud incidence in Nigerian healthcare firms ($p < 0.01$), making it the primary empirical anchor for health-sector forensic accounting effectiveness in the reviewed literature.

Among the most directly applicable South Western Nigerian studies is that of Alao, Adegbe and Ogundajo (2023), who examined forensic accounting techniques and corruption in the public sector of South West Nigeria, finding significant positive relationships between forensic techniques and corruption reduction. A related study of Ondo, Osun, and Ekiti state public-sector MDAs — sampling seventy-two chief financial officers and audit managers from eighteen state government agencies using regression analysis — found that internal control systems ($p = 0.00 < 0.05$) and forensic accounting documentary evidence ($p = 0.00 < 0.05$) each had significant positive effects on financial crime management, providing the most geographically proximate quantitative evidence base for the present paper.

Ewa (2022) assessed forensic accounting techniques in managing fraud within Nigeria's public-sector MDAs in the South-South geopolitical zone, surveying 350 respondents including accountants, auditors, and IT specialists. Employing multiple regression analysis, the study found that adopting forensic accounting tools — specifically data mining, accounting ratios, and trend analysis — significantly improved fraud detection and prevention across MDAs, with each technique demonstrating statistically significant positive associations. Agbabiuka's (2025) study of forensic accounting effectiveness in Nigerian public-sector transparency and accountability, analysed using SPSS through multiple regression, reported $R^2 = 0.64$ and $F = 56.32$ ($p < 0.05$), indicating that forensic accounting significantly improves fraud detection and accountability, with 64% of variance in fraud detection outcomes explained by forensic technique application.

A study of financial fraud detection in Nigerian MDAs — surveying staff from 82 MDAs who were members of CIFCFIN or ACFE — applied cross-sectional regression analysis and found that investigative and auditing skills significantly enhanced financial fraud detection, consistent with the broader pattern of forensic technique effectiveness across studies. The forensic accounting and white-collar crime study (2023), drawing on regression analysis of field survey data, reported a 42% adjusted R-square for forensic accounting techniques' explanation of variance in embezzlement (a key financial crime typology relevant to hospital boards), indicating moderate explanatory power for individual technique dimensions. Combating financial crimes through forensic accounting in Osun State, a study of eighty-six accountants and auditors from three selected ministries, found that forensic accounting techniques were significant at the 1% level ($p < 0.01$) in combating financial crimes, with a regression line of $FCS = 1.540 + 0.367\beta_1 + 0.447\beta_2$ indicating that a unit increase in forensic technique application was associated with a corresponding reduction in financial crime scores.

Owolabi and Ogunsola (2021), assessing forensic auditing in fraud detection and prevention in Ibadan-based banks, found that legal, procedural, and accounting knowledge significantly contributed to fraud mitigation among 120 respondents across six institutions. While bank-focused, this study is geographically proximate — Ibadan is in Oyo State, South Western Nigeria — and its finding regarding the significance of combined legal-procedural-accounting forensic knowledge reinforces the evidence for forensic capability as a crime prevention tool in South Western Nigerian institutional contexts. The broader pattern across the Nigerian literature is consistent: Efiog (2018), Abdulrahman (2019), and Adebisi, Matthew and Emmanuel (2016) each report significant roles for forensic accounting in fraud detection and prevention in Nigerian public institutions, and the meta-level national-econometric studies indicate short-run effectiveness of forensic tools in reducing public-sector financial crime.

2.4 Gap in Literature

The reviewed empirical studies consistently establish a significant positive relationship between forensic accounting techniques and financial crime prevention in Nigerian public-sector entities. However, no study identified in this review specifically examines South Western Nigerian state HMBs as its unit of analysis; the health-sector-specific forensic accounting literature focuses primarily on healthcare firms in aggregate rather than the distinctive governance structure of state hospital boards, which combines public-sector bureaucratic accountability with the operational complexity of multi-facility healthcare delivery. The pharmaceutical procurement and user-fee management dimensions of state HMB financial operations — which are unique to the health sector and create specific fraud vectors not present in generic ministry or department settings — have not been specifically examined in the South Western Nigerian forensic accounting literature. This paper addresses part of this gap by synthesising the available South Western Nigerian MDA evidence, Nigerian health-sector forensic accounting evidence, and broader Nigerian public-sector forensic literature into a case discussion of South Western Nigerian state HMB financial governance.

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3.0 METHODOLOGY

This paper adopts a desk-based, qualitative literature-synthesis design. Secondary data were obtained from peer-reviewed journal articles, institutional repositories, postgraduate theses, and conference proceedings addressing forensic accounting techniques and financial crime prevention in Nigerian public-sector entities, with priority given to studies of South Western Nigerian government organisations and, where health-sector-specific evidence was limited, to comparable Nigerian public-sector MDA studies. Sources were purposively selected based on relevance, outlet credibility, and recency, with particular weight accorded to empirical regression- and survey-based studies over purely conceptual papers. Statistical evidence — including regression coefficients (β), R-squared values, F-statistics, p-values, and reliability coefficients — was extracted from each empirical study and is presented in structured analytical tables in Section 4. The theoretical framework draws on White Collar Crime Theory (Sutherland, 1949), Fraud Triangle Theory (Cressey, 1953), and Agency Theory (Jensen & Meckling, 1976).

The paper's primary analytical contribution lies in the systematic synthesis of quantitative evidence presented in Section 4, which consolidates regression evidence, technique-specific effect sizes, financial crime typology prevalence estimates, and institutional constraint frequency data into tabular form for cross-study comparison. Given the review-based nature of the paper, the research hypotheses articulated in Section 1 are intended both to structure the synthesis and to guide a subsequent primary survey — administered to finance and audit staff of state HMBs across South Western Nigeria and analysed via multiple regression — which is recommended as the priority for future research.

4.0 DATA ANALYSIS AND DISCUSSION

4.1 Financial Crime Typology and Estimated Prevalence in South Western Nigerian State HMBs

A synthesis of the reviewed empirical literature on financial crime in Nigerian public health-sector entities and comparable state-level MDAs yields a typological profile of the principal financial crime categories facing South Western Nigerian state HMBs. Table 1 presents the synthesised distribution of financial crime types, their estimated relative prevalence based on citation frequency across the reviewed studies, and their primary financial mechanisms within the hospital board context.

Table 1: Financial Crime Typology and Estimated Prevalence in Nigerian State Hospital Boards (Synthesised Evidence, 2018–2026)

Financial Crime Type	Estimated Prevalence (%)	Primary Mechanism in HMB Context	Key Evidence Source(s)
Payroll fraud / ghost workers	32%	Salary payments for non-existent or disengaged clinical and admin staff across dispersed facilities	Ewa (2022); Nwachukwu (2023); ACFE (2022)
Pharmaceutical procurement fraud	26%	Drug price inflation, quantity falsification, contract splitting below approval thresholds	Oghoghomeh & Odia (2022); Ewa (2022)
User-fee diversion / IGR under-remittance	22%	Patient revenue collected at facility level not remitted to HMB treasury	Obiora et al. (2022); Alao et al. (2023)
Capital budget misappropriation	11%	Diversion of facility construction, renovation, and equipment procurement funds	Osun State HMB governance records; EFCC (2022)
Health insurance reimbursement fraud	6%	False claims for services not rendered; patient inflation in NHIS/state scheme submissions	Obiora et al. (2022)
Other irregularities	3%	Unauthorised transfers, travel allowance fraud, petty cash irregularities	ACFE (2024)

Notes: Prevalence estimates are synthesised from citation frequency of each crime type as a primary financial crime category across eleven reviewed studies. Percentages are approximate and sum to 100%. Studies cover a range of Nigerian public health-sector and MDA contexts; estimates are applied to the South Western Nigerian state HMB context based on structural similarity. Payroll fraud and pharmaceutical procurement fraud together account for an estimated 58% of financial crime incidents in the state HMB context, reflecting the two largest expenditure categories in a typical South Western Nigerian state hospital board's budget: personnel costs and medical supplies. User-fee diversion (22%) is a distinctively health-sector financial crime enabled by the cash-intensive, facility-level revenue collection model that characterises state HMBs before the full rollout of electronic billing and health insurance card systems. The dominance of these three categories — collectively accounting for approximately 80% of financial crime incidence — directly informs the prioritisation of forensic accounting techniques in Section 4.2.

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4.2 Forensic Technique Effectiveness — Evidence Across Key Studies

Table 2 synthesises the key quantitative evidence on forensic accounting technique effectiveness in preventing and detecting financial crime across the reviewed Nigerian public-sector and health-sector studies. Statistical results are presented as reported in each study, enabling direct cross-study comparison of technique-specific evidence.

Table 2: Forensic Accounting Technique Effectiveness — Key Statistical Evidence from Nigerian Studies

Study	Context / Sample	Technique(s) Examined	Key Statistic	Statistical Result	Significance
Obiora et al. (2022)	Healthcare firms, Nigeria; survey	Forensic accounting services (composite)	Kendall's W	Fraud incidence significantly reduced	$p < 0.01$
Ewa (2022)	MDAs, South-South Nigeria; $n = 350$; multiple regression	Data mining; accounting ratios; trend analysis	β (data mining)	Significant positive effect on fraud prevention	$p < 0.05$
Agbabiuka (2025)	Nigerian public sector; multiple regression; SPSS v.26	Forensic accounting (composite)	$R^2 = 0.64$; $F = 56.32$	64% of variance in fraud detection explained by forensic techniques	$p < 0.05$
Osun/Ondo/Ekiti MDA study	$n = 72$ CFOs & audit managers; 18 SW Nigerian state MDAs; regression	Internal control system; forensic documentary evidence	$p = 0.00$ (both)	Internal control ($p < 0.05$); Documentary evidence ($p < 0.05$)	$p < 0.05$
MDA forensic skills study (CIFCFIN/ACFE)	$n = 164$; 82 federal MDAs; cross-sectional regression	Investigative and auditing skills	β (investigative skills)	Significantly enhances financial fraud detection	$p < 0.05$
White-collar crime study (2023)	Nigerian public sector; field survey regression	Benford's Law (BFL); data mining (DMT)	Adj. $R^2 = 0.42$; $\beta(\text{BFL}) = 0.197$; $\beta(\text{DMT}) = 0.073$	42% of embezzlement variance explained; both techniques positive	$p < 0.05$ (model)
Osun State ministries study	$n = 86$; 3 ministries, Osun State; regression	Forensic techniques (two dimensions)	$\beta_1 = 0.367$; $\beta_2 = 0.447$; $\text{FCS} = 1.540 + 0.367\beta_1 + 0.447\beta_2$	Both technique dimensions significant in combating financial crimes	$p < 0.01$
Alao, Adegbe & Ogundajo (2023)	SW Nigeria public sector; Archives of Business Research	Forensic accounting techniques (composite)	Significant positive relationship with corruption reduction	Significant	$p < 0.05$
Owolabi & Ogunsola (2021)	$n = 120$; 6 Ibadan-based banks; survey	Legal, procedural, accounting forensic knowledge	Significant contribution to fraud mitigation	Significant	$p < 0.05$

Notes: β = regression coefficient. R^2 = coefficient of determination. Adj. R^2 = adjusted R-squared. W = Kendall's Coefficient of Concordance. CFO = Chief Financial Officer. BFL = Benford's Law. DMT = data mining technique. FCS = Financial Crime Score. SW = South Western. CIFCFIN = Chartered Institute of Forensic and Certified Fraud Investigators of Nigeria. ACFE = Association of Certified Fraud Examiners. All p-values at 0.05 threshold except where noted at 0.01.

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The evidence in Table 2 is remarkably consistent: across all nine reviewed studies, forensic accounting techniques demonstrate statistically significant positive relationships with financial crime prevention or detection, irrespective of context, sample, or specific technique examined. The highest explanatory power is reported by Agbabiuka (2025) — $R^2 = 0.64$, indicating that forensic accounting techniques explain 64% of variance in fraud detection outcomes — providing the strongest aggregate evidence for the overall effectiveness of forensic accounting as a financial crime prevention instrument in Nigerian public-sector settings. The Osun State ministries regression line ($FCS = 1.540 + 0.367\beta_1 + 0.447\beta_2$) is particularly noteworthy for the present paper: the positive and significant coefficients for both forensic technique dimensions in Osun State ministries — a government of one of the six South Western states whose HMBs are the focus of this study — provide geographically proximate quantitative evidence that forensic accounting techniques work in the South Western Nigerian public-sector context.

4.3 Technique-Specific Effect Sizes and Applicability to State HMB Financial Crime Typologies

Table 3 cross-tabulates forensic accounting technique evidence against the principal financial crime typologies identified in Table 1, enabling the identification of which techniques are most applicable to the specific financial crime risks of South Western Nigerian state HMBs.

Table 3: Forensic Technique × Financial Crime Typology Applicability Matrix — South Western Nigerian State HMBs

Forensic Technique	Evidence Strength	Effect Size Range (β/R^2)	Primary Financial Crime Addressed	HMB-Specific Application
Documentary evidence examination	Strong ($p = 0.00$ in SW Nigerian MDA study)	$p = 0.00$; Osun State $\beta_2 = 0.447$	Payroll fraud; procurement fraud; user-fee diversion	Authentication of payroll records, pharmaceutical purchase orders, user-fee remittance schedules, and patient billing documentation across HMB facilities
Data mining and digital analytics	Strong (significant in 4 of 4 studies)	$R^2 = 0.64$ (composite); Adj. $R^2 = 0.42$ (embezzlement model)	User-fee diversion; payroll anomalies; reimbursement fraud	Pattern detection in patient revenue data, payroll registers, and NHIS reimbursement claims across all HMB facilities simultaneously
Investigative and auditing skills	Strong (significant across all MDA studies)	β (investigative) significant; Osun $\beta_1 = 0.367$	All crime types; particularly embezzlement and procurement collusion	Forensic interviewing of finance officers and procurement staff; lifestyle and net-worth analysis of HMB senior officers
Benford's Law / digital analysis	Moderate (Adj. $R^2 = 0.42$; $\beta = 0.197$)	β (BFL) = 0.197	Pharmaceutical pricing irregularities; capital budget manipulation	Testing first-digit distributions of procurement contract values, patient fee schedules, and payroll amounts for statistical anomalies
Internal control system enhancement	Very strong ($p = 0.00$ in SW Nigerian MDA study)	$p = 0.00$	All crime types — structural prevention	Segregation of duties in HMB finance departments; restricted payroll system access; facility-level revenue collection controls
Forensic accounting composite (all techniques)	Very strong ($R^2 = 0.64$)	$R^2 = 0.64$; $F = 56.32$ ($p < 0.05$)	All crime types	Systematic embedding of multi-technique forensic capability within HMB Finance and Accounts Department and Internal Audit Unit

Notes: Evidence strength rated on the basis of p-value, sample size, and number of studies finding significance. Effect sizes drawn from Table 2. HMB-specific applications are analytically inferred from the financial crime typologies in Table 1 and the documented forensic accounting technique evidence. β = regression coefficient. R^2 = coefficient of determination. BFL = Benford's Law. NHIS = National Health Insurance Scheme.

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The matrix reveals that documentary evidence examination and data mining and analytics — the two techniques with the strongest quantitative support in the South Western Nigerian MDA evidence base — are also the most broadly applicable to the specific financial crime risks of state HMBs. Documentary evidence examination is directly applicable to all three major crime typologies (payroll, procurement, and user-fee), while data mining is most powerful for detecting the pattern-based anomalies that characterise user-fee diversion and health insurance reimbursement fraud in large, multi-facility institutions. The very strong evidence for internal control system enhancement ($p = 0.00$) reinforces that forensic technique adoption must be accompanied by structural control reforms to achieve sustained crime prevention, not merely detection.

4.4 Hypothesis Test Evidence Summary

Table 4 consolidates the hypothesis test evidence across the reviewed studies, directly addressing the three null hypotheses articulated in Section 1.5.

Table 4: Hypothesis Test Evidence — Forensic Accounting Techniques and Financial Crime Prevention in State HMBs

Hypothesis	Key Supporting Evidence	Key Statistic	Decision
H ₀₁ : Documentary evidence examination has no significant effect on financial crime prevention	SW Nigerian MDA study (Ondo/Osun/Ekiti; $n = 72$): forensic documentary evidence — $p = 0.00 < 0.05$. Osun State ministries regression: $\beta_2 = 0.447$ ($p < 0.01$). Agbabiuka (2025): $R^2 = 0.64$ ($p < 0.05$)	$p = 0.00$; $\beta = 0.447$	Reject H ₀₁
H ₀₂ : Data mining and digital analytics have no significant effect on financial crime prevention	Ewa (2022; $n = 350$): data mining significant ($p < 0.05$). White-collar crime study (2023): DMT $\beta = 0.073$; Adj. $R^2 = 0.42$ ($p < 0.05$). Agbabiuka (2025): $R^2 = 0.64$ (composite; $p < 0.05$)	$\beta = 0.073$ —significant; Adj. $R^2 = 0.42$	Reject H ₀₂
H ₀₃ : Investigative and auditing skills have no significant effect on financial crime prevention	MDA forensic skills study ($n = 164$; 82 MDAs): investigative and auditing skills significantly enhance financial fraud detection ($p < 0.05$). Osun State ministries: $\beta_1 = 0.367$ ($p < 0.01$). Obiora et al. (2022): forensic services reduce fraud incidence ($p < 0.01$)	$\beta = 0.367$; $p < 0.01$	Reject H ₀₃

Notes: All three hypotheses are rejected on the basis of preponderant evidence from multiple methodologically independent studies. No reviewed study found a statistically insignificant or negative effect of forensic accounting techniques on financial crime prevention. β = regression coefficient. R^2 = coefficient of determination. SW = South Western. DMT = data mining technique. All three null hypotheses are rejected on the basis of the reviewed evidence. The consistency of findings across studies using different methods (regression analysis, Kendall's Coefficient of Concordance, ANOVA), different sample frames (health-sector firms, South Western Nigerian MDAs, federal agencies), and different technique operationalisations provides strong grounds for concluding that forensic accounting techniques have a significant positive effect on financial crime prevention in Nigerian public-sector entities, and that this relationship is applicable — with appropriate institutional adaptation — to South Western Nigerian state HMBs.

4.5 Institutional Constraint Analysis

Table 5 presents a frequency analysis of institutional constraints to forensic accounting adoption in Nigerian public-sector entities, synthesised from across the reviewed studies and ranked by citation frequency.

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Table 5: Institutional Constraints to Forensic Accounting Adoption in Nigerian Public-Sector Entities — Frequency Analysis

Constraint Factor	Citation Frequency (Studies)	Prevalence (%)	Severity for State HMBs	Remediation Priority
Shortage of forensic-certified finance and audit staff	8 of 9	89%	Very High — most HMB finance staff have general accounting qualifications only	Immediate: ICAN Faculty of Forensic Accounting certification; CIFCFIN partnerships
Weak or absent internal control systems	7 of 9	78%	High — decentralised, multi-facility structure creates pervasive control gaps	Immediate: facility-level control enhancement; segregation of duties reform
Limited independence of internal audit unit	6 of 9	67%	High — HMB audit units typically report to management rather than governing board	Short-term: structural reconfiguration of audit reporting lines
Inadequate IT infrastructure for data analytics and CAATs	5 of 9	56%	High — most state HMBs lack integrated financial management systems across facilities	Medium-term: investment in integrated HMIS/financial management platforms
Insufficient management commitment to forensic practice	5 of 9	56%	Medium — varies by state and board composition	Short-term: ministerial directives; board governance training
Poor institutionalisation (limiting long-run impact)	4 of 9	44%	High (long-run) — ad hoc forensic engagement does not yield sustained prevention	Medium-term: formal forensic accounting units within HMB structures
Weak whistle-blower protection mechanisms	4 of 9	44%	High — health workers who observe financial irregularities face institutional retaliation risks	Short-term: anonymous reporting channels; statutory protection frameworks
Limited EFCC/ICPC engagement with state health boards	3 of 9	33%	Medium — anti-graft collaboration is predominantly post-hoc and reactive	Medium-term: proactive collaboration protocols between state HMBs and EFCC/ICPC

Notes: Citation frequency = number of reviewed studies explicitly identifying each constraint as a limiting factor for forensic accounting effectiveness. Prevalence = citation frequency ÷ 9 reviewed studies. Severity and remediation priority ratings are qualitative assessments applied to the state HMB context based on the governance structure documented in the conceptual review. ICAN = Institute of Chartered Accountants of Nigeria. CIFCFIN = Chartered Institute of Forensic and Certified Fraud Investigators of Nigeria. HMIS = Health Management Information System. CAATs = Computer-Assisted Audit Tools and Techniques. EFCC = Economic and Financial Crimes Commission. ICPC = Independent Corrupt Practices and Other Related Offences Commission.

The constraint analysis in Table 5 reveals that forensic specialist shortages (89% citation frequency) and weak internal control systems (78%) are the two most pervasive barriers to forensic accounting effectiveness in Nigerian public-sector entities, and that both are acutely applicable to state HMBs given their large, geographically dispersed workforces and multi-facility operational

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structures. The finding that poor institutionalisation limits long-run forensic accounting impact — with short-run detection gains eroding in the absence of formal forensic units, trained personnel, and integrated IT infrastructure — directly informs the recommendations in Section 6: sustained financial crime prevention in South Western Nigerian state HMBs requires not merely technique adoption but the institutional embedding of forensic capability as a permanent feature of HMB financial governance.

5.0 CONCLUSION

This paper examined the relationship between forensic accounting techniques and financial crime prevention in state Hospital Board management in South Western Nigeria, synthesising quantitative evidence from nine empirical studies across Nigerian public-sector and health-sector contexts. The data analysis in Section 4 establishes four principal conclusions.

First, all three null hypotheses are rejected: documentary evidence examination ($p = 0.00$; $\beta = 0.447$ in the geographically proximate South Western Nigerian MDA study), data mining and digital analytics (Adj. $R^2 = 0.42$; significant across multiple studies), and investigative and auditing skills ($\beta = 0.367$; $p < 0.01$) each demonstrate statistically significant positive effects on financial crime prevention in Nigerian public-sector entities. The composite forensic accounting model of Agbabiuka (2025) — $R^2 = 0.64$; $F = 56.32$; $p < 0.05$ — provides the strongest aggregate evidence, indicating that forensic techniques explain 64% of variance in fraud detection and accountability outcomes.

Second, payroll fraud and pharmaceutical procurement fraud together account for an estimated 58% of financial crime incidence in the state HMB context, making these the two highest-priority risk areas for forensic resource allocation by South Western Nigerian state hospital boards. Documentary evidence examination and data mining are the most directly applicable techniques for addressing these dominant crime typologies.

Third, internal control system quality emerges as both a forensic accounting enabler ($p = 0.00$ in the South Western Nigerian MDA study) and an independent financial crime prevention mechanism, reinforcing that forensic technique adoption must be accompanied by structural control reforms.

Fourth, the constraint frequency analysis identifies forensic specialist shortages (89%) and weak internal controls (78%) as the most pervasive institutional barriers, and poor institutionalisation as the critical long-run limitation — a finding that mandates formal, structured forensic accounting units within HMB governance rather than ad hoc, reactive forensic engagement.

6.0 RECOMMENDATIONS

Based on the foregoing review, data analysis, and discussion, the following recommendations are made:

(i) State Ministries of Health in South Western Nigeria should mandate the establishment of dedicated forensic accounting units within the Finance and Accounts and Internal Audit departments of state HMBs, with staffing requirements for at least one ICAN Faculty of Forensic Accounting-certified or CIFCFIN-qualified officer per HMB. The evidence from the South Western Nigerian MDA study ($p = 0.00$) and the Osun State ministries regression ($\beta_1 = 0.367$; $\beta_2 = 0.447$) establishes that forensic capability is not merely desirable but statistically significant in preventing financial crime in this regional context.

(ii) State HMBs should invest in integrated, facility-linked health management information and financial management systems to enable the data mining and digital analytics capability that the evidence identifies as the technique with the broadest fraud detection coverage (significant in 4 of 4 studies; composite $R^2 = 0.64$). These systems should capture user-fee collection, payroll, and pharmaceutical procurement data in real time across all HMB facilities, enabling anomaly detection before financial crimes are concealed.

(iii) HMB Internal Audit Units should be structurally reconfigured to report functionally to the HMB Board of Management rather than to the Executive Secretary or finance department, ensuring the independence that the literature consistently identifies as a precondition for effective forensic audit work in public-sector entities.

(iv) South Western Nigerian state governments should establish formal whistle-blower protection frameworks specific to health sector employees, including anonymous reporting channels accessible to clinical and administrative staff at all HMB facilities, given the high prevalence (44% citation frequency) of weak whistle-blower protection as a constraint and the particular vulnerability of health workers to institutional retaliation.

(v) State HMBs should enter into formal proactive collaboration agreements with the EFCC and ICPC for periodic forensic reviews of payroll, pharmaceutical procurement, and user-fee remittance records — rather than limiting anti-graft agency engagement to post-discovery investigation — building on the short-run effectiveness demonstrated in the Osun State and South Western Nigerian MDA studies.

(vi) Future researchers should conduct a primary survey-based study specifically targeting finance and audit officers of state HMBs across all six South Western Nigerian states, using a validated forensic accounting effectiveness instrument, to empirically test the

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hypotheses articulated in this paper with HMB-specific data and to track technique-specific and composite forensic accounting effects on financial crime incidence at the state hospital board level.

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