

The Governance and Financial Architecture of Laboratory Public-Private Partnership: Experience of A Tertiary Health Care Facility in Northern Nigeria

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ABSTRACT

The structural failure of health-care Public-Private Partnerships (PPPs) in developing nations is frequently attributed to weak governance, ambiguous risk allocation, and manual financial leakages rather than clinical incapacity. To analyze the governance framework and financial architecture of the strictly institutional revenue-sharing laboratory PPP at Barau Dikko Teaching Hospital (BDTH), Kaduna, Nigeria. This paper utilizes a structural case-study methodology to evaluate the administrative protocols, electronic financial routing, and risk-mitigation frameworks governing the BDTH laboratory contract. Baseline datasets from pre-implementation (2017) and post-implementation (2025) cycles were analyzed to measure fiscal transparency and accountability. The architecture successfully eliminated individual-level financial friction by implementing a strictly institutional "Clean Split" revenue system integrated into the hospital's Electronic Medical Records (EMR) central billing gate. Operational risk was entirely transferred to the private partners, resulting in zero public capital expenditure (CAPEX) for technical failures, while the hospital secured a steady 35% net share of laboratory profits for broader facility reinvestment. Joint monthly administrative reconciliation minimized accounting discrepancies to <1%. A rigid governance model that completely decouples individual staff incentives from the core institutional revenue split minimizes bureaucratic interference, prevents leakages, and offers a transparent, politically insulated model for sustainable tertiary health financing.

Keywords: Financial Architecture, Healthcare Governance, Health Economics, Nigeria, Public-Private Partnership, Revenue Sharing.

INTRODUCTION

The primary barrier to deploying sustainable medical infrastructure in Sub-Saharan Africa is not a lack of diagnostic technology, but the absence of robust institutional frameworks to manage it. Historically, public tertiary hospitals in Nigeria have relied on direct government budgetary allocations for laboratory equipment procurement¹. This centralized funding model often fails due to lengthy public procurement delays, a lack of preventative

maintenance cultures, and extensive revenue leakage from manual, paper-based ticketing systems.

Before the administrative reforms at Barau Dikko Teaching Hospital (BDTH), Kaduna, the laboratory's fiscal governance was highly fragmented. The institution frequently struggled with "untracked out-of-pocket payments," where fees collected for baseline chemistry or hematology profiles failed to reach the hospital's central treasury.

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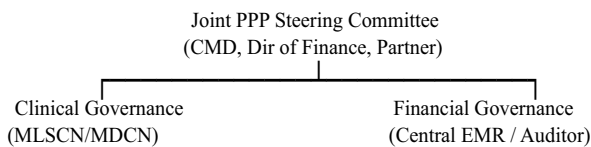
Furthermore, when high-throughput analyzers broke down, the financial liability fell entirely on the state government, leaving equipment non-functional for months.

To resolve this cycle of structural decay, the management of BDTH redesigned its laboratory business model. Rejecting conventional leasing models, the hospital pioneered a strictly institutional, two-party revenue-sharing governance architecture ². This paper provides a granular analysis of that financial framework, demonstrating how rigid contract enforcement and automated fiscal checkpoints can stabilize public health institutions.

MATERIALS AND METHODS

Governance Structure & Contractual Boundaries

The partnership operates under a legally binding Joint Operating Agreement (JOA) ratified by the Kaduna State Government, the hospital management, and a private diagnostic consortium ³. The governance architecture is intentionally top-heavy and institutionalized, consciously omitting departmental or individual staff bonuses from the financial split to eliminate conflicts of interest and maintain civil service neutrality.



The administrative hierarchy is managed by a Joint PPP Steering Committee comprising the hospital's Chief Medical Director (CMD), the Director of Finance, EMR representative and the private firm directors. This committee meets monthly to review operational KPIs and audit logs while a larger committee meets quarterly to evaluate operational and financial performance of all partners in the hospital.

The Financial Architecture & Revenue Routing

To ensure complete transparency, the financial routing follows a strict automated pipeline:

1. Point of Collection: All payments are processed through the hospital's centralized electronic payment portal linked to the Electronic Medical

Record (EMR) system⁴. No cash or direct POS payments are permitted within the physical laboratory space.

2. The Gross Pool: Fees collected are held in a dedicated escrow account.
3. The Clean Split: On the 4th day of each calendar month, the Joint Steering Committee reconciles the EMR data against the physical test counts logged by the automated analyzers. The net profit is split directly: 65% is routed to the firm (covering equipment amortization, technical overhead, and profit margins), and 35% is swept into the hospital's Internally Generated Revenue (IGR) account.

RESULTS

The transition from a loose, manual public system to an automated, auditable financial architecture significantly reduced revenue leakages and improved institutional recovery.

Table 1: Comparative Analysis of Governance and Fiscal Integrity

Fiscal Indicator	Pre -PPP Architecture (2017)	Post -PPP Architecture (2025)	Operational Impact
Billing System	Manual paper receipts	100% EMR Automated	Eliminated point -of-sale skimming
Financial Discrepancies	Estimated 15% to 22%	< 1% audited variance	Complete transaction visibility
Risk Allocation	100% Public Liability	100% Private Operational Risk	Zero public cost for downtime
Audit Frequency	Annual retrospective	Monthly automated reconciliation	Rapid course correction

The fiscal stability provided by the "Clean Split" structure allowed the hospital to generate reliable revenue while transferring the burdens of maintenance and procurement to the private partner.

Table 2: Institutional Capital Allocation Framework

Cost Center	Pre-PPP Fiscal Model (2017)	Post-PPP Fiscal Model (2025)	Governance Source
Analyzer CAPEX	NGN 45,000,000 (Govt Grant)	NGN 0	Fully absorbed by Partner
Emergency Repair Fund	NGN 13,500,000 (Hospital Deficit)	NGN 0	Fully absorbed by Partner
Reagent Logistics	Intermittent public budget	Managed Supply Chain	Partner Contractual Obligation
Net Hospital IGR Retained	Unstable	NGN 8,700,000 / month (Net)	Reinvested into facility upgrade

DISCUSSION

The financial and governance architecture deployed at BDTH provides insight into the mechanics of institutional sustainability in resource-constrained public healthcare systems. A key finding is that decoupling individual staff incentives from the revenue split protects the integrity of the partnership. In many public-private frameworks, a portion of the revenue is diverted to clinical or laboratory staff as an incentive. However, literature shows that this often introduces administrative friction, creates resentment among non-laboratory hospital staff, and leaves the model vulnerable to accusations of commercializing public health^{1,5}. By maintaining a "Clean Split" strictly between the firm and the hospital treasury, BDTH preserved public trust and kept the focus entirely on institutional milestones.

From an administrative standpoint, linking the contract to the hospital's central EMR gate addresses the issue of revenue leakage, a persistent challenge in public sector healthcare administration⁴. Because the automated analyzers record each test run digitally, any discrepancy between tests performed and payments captured in the EMR is flagged immediately during monthly reconciliations. This creates a transparent audit trail that satisfies both state auditors and the private partner's financial compliance teams.

Crucially, the governance architecture achieves a complete transfer of operational risk^{2,3}. In standard public hospitals, if a high-throughput chemiluminescence machine requires a specialized replacement part, the repair timeline is often delayed by budgetary approvals and public procurement laws. Within this PPP architecture, any hour of equipment downtime represents an immediate financial loss borne solely by the private firm. The partner is contractually incentivized to maintain an on-site inventory of critical backup parts and specialized engineers, ensuring continuous

diagnostic support for the hospital's clinical teams.

CONCLUSION

The governance and financial architecture of the BDTH laboratory PPP demonstrates that institutional self-reliance can be achieved through automated oversight and clear risk allocation. By implementing an EMR-locked, two-party institutional revenue split, the hospital removed the common structural vulnerabilities—such as manual leaks and maintenance delays—that often undermine public health initiatives. This framework provides a scalable model for healthcare administrators across emerging economies seeking to balance private-sector financial sustainability with the social mandates of public medicine.

RECOMMENDATIONS FOR HEALTH ADMINISTRATORS AND POLICYMAKERS

1. Enforce a Consolidated, EMR-Locked Payment Gateway

Transition completely away from localized, paper-receipt billing points within the laboratory itself. All diagnostic requests must be generated and paid for through a centralized **Electronic Medical Record (EMR)** financial system *prior* to sample collection.

This systemic barrier minimizes cash-handling at the bench level, completely closes historical avenues for point-of-sale revenue leakage, and creates an automated, immutable audit trail that satisfies both government auditors and private investors.

2. Maintain a Strictly Institutional "Clean Split" Fiscal Framework

Keep the revenue-sharing matrix structured entirely as a two-party transaction between the hospital's core treasury and the private consortium. Resist the urge to write individual, departmental, or clinical incentive bonuses directly into the percentage split.

Multi-stakeholder payout webs create internal bureaucratic friction, fuel resentment among non-

laboratory hospital staff, and leave the partnership vulnerable to claims of commercializing public health. Instead, use the hospital's net profit share to fund broader institutional upgrades, staff continuous development (CPD), and welfare systematically.

3. Mandate On-Site Biomedical Engineering Support

Contractually require the private partner to embed full-time, on-site biomedical engineers or application specialists directly inside the laboratory facility, rather than relying on standard on-call field technicians.

In a high-throughput tertiary facility, even a 12-hour delay in analyzer repair compromises clinical trust and halts clinical teaching. When the partner has an immediate commercial incentive tied to test volume, an on-site engineer ensures that the Mean Time to Repair (MTTR) consistently stays below 24 hours.

4. Tie Contracts to Managed Equipment Services (MES) and Equipment Refresh Clauses

Avoid plain equipment-leasing or simple procurement contracts. Utilize an MES layout where the private partner retains full ownership, calibration, and maintenance liabilities of the instrumentation, paired with a mandatory "technology refresh" clause (e.g., automated equipment replacement every 5 years).

This architecture effectively shifts the risk of technological obsolescence entirely to the private sector. It insulates the public hospital from sudden Capital Expenditure (CAPEX) shocks when complex modules fail or when newer diagnostic methodologies emerge globally.

5. Implement Tiered, Regulated Price Caps for Social Safety

Establish a joint hospital-private pricing committee to set fixed, competitive price ceilings on high-demand metabolic, endocrine, and oncology markers.

While the private entity requires a predictable pathway to Return on Investment (ROI), the teaching hospital's primary mandate is public service. Regulated price caps ensure that automated, high-precision diagnostics remain highly accessible and

affordable for the local patient populace compared to commercial standalone laboratories.

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REFERENCES

1. Obi C, Ahmed S. Healthcare financing in Sub-Saharan Africa: navigating the governance pitfalls of public-private partnerships. *African J Health Manage.* 2022;15(2):45-58.
2. Smith J. The Managed Equipment Services model in emerging markets: structural blueprints for fiscal sustainability. *J Med Econ.* 2020;8(4):112-119.
3. Infrastructure Concession Regulatory Commission (ICRC). National policy on public-private partnership: legal frameworks and concession guidelines. Abuja: Federal Government of Nigeria Press; 2021. URL: <https://www.icrc.gov.ng/portfolio-item/national-policy-on-public-private-partnership/> Date Accessed: June 20, 2026.
4. Ebenso B, Okusanya B, Okunade K, Akeju D, Ajepe A, Akaba GO, et al. What are the contextual enablers and impacts of using digital technology to extend maternal and child health services to rural areas? Findings of a qualitative study from Nigeria. *Front Glob Womens Health.* 2021;2:670494. doi:10.3389/fgwh.2021.670494.
5. World Health Organization. Governance of health public-private partnerships: managing risks, maximizing public value. Geneva: World Health Organization; 2024. Report No.: WHO/HGF/PPP/2024.1. URL: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4826025/>