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AIRPORT TERMINAL INFRASTRUCTURE AND OPERATIONAL PERFORMANCE IN LAGOS AND PORT HARCOURT

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ABSTRACT

This article examined the relationship between airport terminal infrastructure and operational performance in Lagos and Port Harcourt using Objective One of Wilcox Belema's dissertation. The study adopted a correlational research design and analyzed 300 valid questionnaire responses. The first objective examined whether adequate terminal facilities improve airport operating efficiency and whether modern terminal infrastructure contributes to overall operational performance. The reported Pearson Product Moment Correlation coefficient was $r = 0.153$, with $p = 0.008$ and $N = 300$. Since $p < 0.05$, the first null hypothesis was rejected. The result therefore indicates a positive and statistically significant relationship between airport terminal infrastructure and operational performance. The finding is discussed through Modernization Theory and Infrastructure-Led Development Theory and related to the dissertation's literature on terminal modernization, passenger processing, service efficiency and airport infrastructure.

KEYWORDS: Air Transport Infrastructure; Airport Infrastructure; Operational Performance; Lagos; Port Harcourt; Airport Terminals; Runways; Taxiways; Aircraft Handling.

1. INTRODUCTION

1.1 Background to the Study

Air transport infrastructure constitutes an important component of modern transportation systems because it supports the movement of passengers, cargo and services across geographical boundaries. Airports, terminals, runways, taxiways, navigation and communication systems, cargo facilities, passenger-processing equipment and safety and security installations collectively determine the capacity and efficiency with which air services are provided.

The dissertation focuses on Lagos and Port Harcourt, two strategically important aviation locations. Murtala Muhammed International Airport (MMIA), Lagos, is described as Nigeria's principal international gateway, while Port Harcourt International Airport (PHIA), Omagwa, serves Rivers State and the wider Niger Delta. Their different operating environments provide a basis for examining whether individual infrastructure dimensions have similar relationships with operational performance.

The source study reports continuing infrastructure investment. MMIA has undergone terminal modernization and rehabilitation, while PHIA is included in runway, taxiway and lighting improvement programmes. These interventions create an important empirical setting because the existence of investment does not necessarily establish the same operational effect for every infrastructure category.

Operational performance in the dissertation includes passenger-processing efficiency, aircraft movement and turnaround, waiting and processing time, baggage and cargo handling, service reliability, safety and security. The study therefore treats operational performance as a multidimensional outcome influenced by physical facilities, technology, utilization, management and coordination.

The distinction between the first two objectives is analytically important. Terminal infrastructure mainly supports passenger-facing and processing functions, while runway, taxiway and aircraft-handling infrastructure supports aircraft movement and ground operations. Testing them separately allows the study to determine whether their relationships with overall operational performance are empirically similar.

1.2 Statement of the Problem

The central problem addressed by the study is the uncertain extent to which specific airport infrastructure dimensions translate into operational performance. Nigeria has continued to invest in airport modernization, yet the dissertation identifies continuing rehabilitation and improvement needs at MMIA and PHIA. It is therefore necessary to examine whether

individual infrastructure components demonstrate measurable relationships with operational performance rather than treating all infrastructure as one undifferentiated variable.

For terminal infrastructure, the problem concerns the capacity and functionality of passenger terminals, check-in areas, boarding gates, waiting areas and related systems. For runway, taxiway and aircraft-handling infrastructure, the problem concerns the condition, availability and utilization of facilities supporting aircraft movement, parking and ground operations. These infrastructure groups can influence performance through different mechanisms.

1.3 Objective, Research Question and Hypothesis

To examine the effect of airport terminal infrastructure on operational performance in Lagos and Port Harcourt.

Research Question: To what extent does airport terminal infrastructure affect operational performance in Lagos and Port Harcourt?

Research Hypothesis: H_{01} : Airport terminal infrastructure has no significant effect on operational performance in Lagos and Port Harcourt.

2. Literature Review

2.1 Airport Infrastructure and Operational Performance

The dissertation conceptualizes airport infrastructure as the physical structures, operational facilities and technological systems located within the airport environment. These include runways, taxiways, aprons, terminals, baggage systems, cargo warehouses, navigation equipment, communication systems, lighting and security installations. Operational performance refers to the effectiveness and efficiency with which these facilities support aircraft, passenger and cargo activities.

2.2 Airport Terminal Infrastructure

Airport terminals are facilities for passenger processing, ticketing, immigration and customs clearance, security screening, boarding and baggage handling. The dissertation discusses modern terminal technologies such as electronic check-in, biometric verification, digital information systems and automated baggage systems. Such facilities can increase processing capacity and reduce friction when appropriately maintained and integrated.

2.3 Runway, Taxiway and Aircraft-Handling Infrastructure

Runways provide the operational surfaces for aircraft takeoff and landing, while taxiways enable aircraft movement between runways, terminals and parking areas. Aircraft-handling infrastructure supports parking and ground operations. The dissertation recognizes these as

important airport facilities while also emphasizing that operational outcomes can depend on maintenance, scheduling, utilization, air-traffic management and institutional coordination.

2.4 Empirical Literature

The dissertation's empirical review includes studies on airport operational efficiency, passenger traffic and passenger satisfaction. Samuel (2022) is cited in relation to airport operational efficiency and passenger traffic, while Okon (2024) addresses passenger satisfaction and airport infrastructure. The source study also draws on wider evidence concerning airport modernization, infrastructure investment, connectivity and service performance.

3. Theoretical Framework

3.1 Modernization Theory

Modernization Theory, associated in the dissertation with Rostow (1960), emphasizes technological and infrastructural transformation. In airport operations, modernization can involve improved terminals, digital passenger systems, aircraft-movement infrastructure and upgraded operational processes. The theory supports the expectation that modern facilities can improve the efficiency of established transport systems.

3.2 Infrastructure-Led Development Theory

Infrastructure-Led Development Theory, represented through Aschauer (1989), treats infrastructure as an enabling input into productive activity. Infrastructure can improve efficiency by providing the physical conditions required for people, goods and services to move. The theory therefore provides a basis for testing the relationship between airport infrastructure and operational performance.

4. METHODOLOGY

The study adopted a correlational research design. The study area comprised MMIA, Lagos and PHIA, Omagwa, Rivers State. The stated population was 1,200 stakeholders across FAAN management/operations, NCAA/regulatory personnel, airline operators, customs and immigration, ground-handling/cargo operators, aviation security/safety personnel and logistics/travel or other aviation service providers.

Table 1: Population Distribution Used in the Study.

Category	MMIA	PHIA	Total	%
FAAN management/operations	150	90	240	20.0
NCAA/regulatory	70	40	110	9.2
Airline operators/staff	190	100	290	24.2
Customs/Immigration	100	60	160	13.3
Ground-handling/cargo	120	70	190	15.8
Security/safety	80	50	130	10.8
Logistics/travel/other	50	30	80	6.7
Total	760	440	1,200	100.0

Source: Field Survey (2026), as reported in the uploaded dissertation.

Three hundred questionnaires were administered, all 300 were retrieved, and all were reported as valid for analysis. The study used a structured questionnaire and analyzed responses using descriptive statistics and Pearson Product Moment Correlation in SPSS. Hypotheses were tested at the 5% significance level.

Table 2: Questionnaire Retrieval and Validity.

Measure	Frequency	Percentage
Administered	300	100.0
Retrieved	300	100.0
Not retrieved	0	0.0
Invalid	0	0.0
Valid	300	100.0

Source: Field Survey (2026), as reported in the uploaded dissertation.

5. RESULTS AND ANALYSIS

The dissertation's hypothesis tests for Objectives One and Two are based on paired questionnaire statements representing each infrastructure dimension and operational performance. The source document does not provide a separate mean table for these two objective-specific pairs in the same form as the broader univariate tables. Accordingly, this article reports the inferential statistics exactly as supplied rather than creating unsupported descriptive values.

Table 3: PPMC Analysis of Airport Terminal Infrastructure and Operational Performance.

Measure	N	r	p-value	Decision
Adequate terminal facilities ↔ improved efficiency	300	0.153	0.008	Reject H ₀₁
Modern terminal infrastructure ↔ overall performance	300	0.153	0.008	Reject H ₀₁

Source: Field Survey (2026), as reported in the uploaded dissertation.

The reported PPMC result was $r = 0.153$, $p = 0.008$, $N = 300$. The positive coefficient indicates a positive association, and the p-value below 0.05 indicates statistical significance. The dissertation therefore rejected H_{01} .

6. DISCUSSION OF FINDINGS

The finding indicates that respondents who perceived terminal facilities as adequate and modern also tended to report better operational performance. The association was statistically significant, although its magnitude was modest. The result should therefore be read as evidence of a significant relationship, not as proof that terminal infrastructure alone determines airport performance.

The finding is consistent with the dissertation's conceptual treatment of terminals as operational interfaces for passenger processing, security screening, boarding, waiting and baggage-related activities. Inadequate capacity or poorly maintained facilities can create bottlenecks, while modern and functional facilities can support smoother processing.

The discussion in the dissertation links the finding with Samuel (2022), which addresses airport operational efficiency and passenger traffic, and Okon (2024), which addresses passenger satisfaction and airport infrastructure. These citations provide contextual support for the role of airport facilities in operational outcomes.

Infrastructure-Led Development Theory, represented in the dissertation by Aschauer (1989), explains infrastructure as an enabling input to productive activity. Adequate terminal infrastructure provides the physical and technological environment in which airlines, passengers, airport authorities, regulators and handlers interact.

Modernization Theory, associated with Rostow (1960), emphasizes technological and infrastructural transformation. Modern terminal systems embody such transformation through improved capacity, passenger flow, information systems and service processes.

The result should also be interpreted with the other objectives. The dissertation found that not all infrastructure dimensions had statistically significant relationships with operational performance. This indicates that the infrastructure-performance relationship is dimension-specific and can depend on utilization, maintenance, technology and institutional coordination.

7. Practical Implications

Sustain terminal modernization and regular preventive maintenance.

Monitor passenger processing time, passenger flow and service reliability as operational performance indicators.

Integrate terminal infrastructure with staffing, ICT, security and baggage-handling systems.

Plan terminal investment around expected traffic growth and facility lifecycle requirements.

Evaluate completed terminal projects against measurable operational outcomes.

8. Conclusion

The study concludes that airport terminal infrastructure has a positive and statistically significant relationship with operational performance in Lagos and Port Harcourt. Adequate and modern terminal facilities are associated with improved airport operations. Terminal infrastructure should therefore remain a major component of airport modernization planning, accompanied by maintenance, effective utilization and integrated operational management.

9. Recommendations

Sustain terminal modernization and regular preventive maintenance.

Monitor passenger processing time, passenger flow and service reliability as operational performance indicators.

Integrate terminal infrastructure with staffing, ICT, security and baggage-handling systems.

Plan terminal investment around expected traffic growth and facility lifecycle requirements.

Evaluate completed terminal projects against measurable operational outcomes.

10. Contribution to Knowledge

The article contributes by isolating a specific airport infrastructure dimension and connecting it directly to the reported operational-performance test. Together, Objectives One and Two demonstrate that the infrastructure-performance relationship is dimension-specific. This provides an empirical basis for planning infrastructure according to operational function and for investigating complementary factors that determine whether physical infrastructure produces measurable performance outcomes.

11. Source and Interpretation Note

This article is derived from the uploaded dissertation and preserves its terminology, sample size, statistical coefficients, significance values and cited publications. The dissertation contains inconsistencies in the numbering of some tables between the list of tables and

Chapter Four. The article identifies the analysis by substantive content and does not alter the reported statistics. External publications in the reference list have not been independently verified here.

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