International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

Assessment of the Operational Efficiency of Airlines Operation in Nigeria

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Abstract*—This study assessed the operational efficiency of airlines operating at Murtala Muhammed International Airport, Lagos, Nigeria. The study focused on five major domestic carriers: Air Peace, Arik Air, Dana Air, Azman Air, and Ibom Air operating in this airport. A descriptive survey design was employed, with a population of 723 airline personnel including operators, management staff, pilots, ground handlers, and regulators. Using Slovin's formula at a 5% margin of error, a sample size of 258 respondents was selected through proportionate stratified random sampling. Primary data were collected using structured questionnaires complemented by observation. Data Envelopment Analysis (DEA) was applied to evaluate operational efficiency across carriers using inputs such as fleet size, staff, and fuel consumption against outputs like passenger miles, departures, and cargo handled. Findings showed that Air Peace and Ibom Air were fully efficient with DEA scores of 1.000, while Dana Air (0.912), Arik Air (0.872), and Azman Air (0.783) lagged behind. Peer analysis identified Air Peace and Ibom Air as consistent efficiency benchmarks. The study concludes that efficiency is unevenly distributed among Nigerian airlines and recommends improved resource utilization, adoption of best practices, better scheduling, and stronger regulatory oversight to enhance performance.*

***Keywords*—** *Operational Efficiency, Airlines, Resource-Based View, Data Envelopment Analysis, Nigeria.*

I. INTRODUCTION

Air transport is central in connecting people, goods, and economies worldwide, as its ability to reduce travel time and link remote areas with major markets makes it indispensable for trade and human mobility when compared to road, rail, or sea transport (Abate et al., 2020). Airlines coordinate schedules, manage logistics, and provide services beyond passenger movement through airports that function as hubs. The distribution of high-value and time-sensitive goods such as pharmaceuticals, electronics, and agricultural produce is also supported by aviation, reinforcing its role as an essential sector in modern economies (Tisdall & Zhang, 2022). The growth of air transport demonstrates its importance in sustaining globalization and advancing the integration of societies across the world.

Economic development benefits significantly from the aviation industry, as it enhances connectivity, stimulates tourism, and generates employment opportunities. Domestic and international business operations are supported, thereby strengthening GDP and encouraging investment flows. Multiplier effects are also produced across hospitality, construction, manufacturing, and agriculture, which rely on accessibility and efficient distribution networks (Budd et al., 2020). In developing economies, air transport becomes even more vital because of its connection to infrastructure modernization and regional integration, both of which are essential for long-term growth (Gössling & Higham, 2021). Since the industry has such a wide influence, airline performance is critical, because lapses in operations can weaken the broader role of aviation in national development.

Operational efficiency is the standard used to determine whether airlines are optimizing their resources to deliver passenger and cargo services. Parameters such as staff deployment, turnaround time, aircraft utilization, fuel consumption, and service reliability are often used in this assessment (Huang et al., 2021). Airlines that operate efficiently can strengthen competitiveness, reduce costs, and minimize waste despite economic shocks and market fluctuations. On the other hand, inefficiency often leads to financial instability, poor service delivery, high operating costs, and delays. Since demand for air transport continues to rise globally and regionally, assessing airline efficiency becomes necessary to evaluate their ability to meet standards and contribute to economic development.

The operational efficiency of airlines at Nigerian airports has become a concern because recurrent delays, poor on-time performance, and underutilization of fleet capacity are frequent. Balancing resources such as staff, fuel, and fleet with outputs like passenger traffic and departures has been difficult, resulting in inefficiencies in service. While studies from across the globe reveal that efficiency is improving in developed regions, African and Nigerian airlines remain behind because of infrastructural limitations and weak operational planning (Huang et al., 2021; Kuljanin et al., 2019; Malhotra, 2021; Wakili, 2025; Afolabi, 2021; Balogun, 2025). However, many of these studies exclude Nigeria or fail to provide empirical evidence directly related to operations at airports such as the busiest Murtala Muhammed International Airport in Lagos State. This leaves a research gap that requires localized efficiency assessments, and the purpose of this study is to examine the operational efficiency of airline operations in Nigeria.

Scope of the Study

The study was carried out at the Murtala Muhammed International Airport in Ikeja, Lagos State, the busiest aviation hub in Nigeria and the central gateway for both domestic and international flights. Operational efficiency was examined through indicators such as turnaround time, flight punctuality, schedule adherence, aircraft utilization, and the effectiveness

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of ground handling operations. Factors influencing efficiency, including infrastructure quality, ground handling services, regulatory frameworks, and traffic management, were also considered. By concentrating on this airport, the study provides practical insights into how Nigerian airlines manage resources and overcome operational challenges within a highly competitive environment

II. Literature Review

Kottas and Madas (2018) used Data Envelopment Analysis (DEA) to investigate the comparative operational efficiency of 30 major international airlines and found that alliance membership did not significantly improve efficiency, while carriers with higher freight revenue shares achieved stronger results. Asian and European airlines were identified as more efficient than American carriers, although African airlines were excluded from the study. Abdul Rashid et al. (2024) applied a dynamic network DEA that incorporated innovation capital, showing that investment in innovation sustained efficiency, but once again African airlines were not part of the analysis. Saini et al. (2023) assessed 13 major airlines with a two-stage DEA integrating carbon emissions and revealed that both service and environmental factors shaped efficiency outcomes. Wu et al. (2024) applied a dynamic network DEA to 26 airlines during the COVID-19 pandemic and reported efficiency declines between 2019 and 2020 with only partial recovery by 2022. Martini et al. (2024) examined African airlines using a stochastic frontier model and found low efficiency, decreasing returns to scale, and negative effects arising from government protectionism and market isolation.

Wakili (2025) applied DEA to five Nigerian airlines between 2018 and 2022 and found that only two achieved sustained efficiency while three consistently operated below the frontier due to challenges in workforce and fleet management. Huang et al. (2021) employed a two-stage DEA to study nine U.S. airlines and showed that low-cost carriers outperformed full-service carriers in efficiency. Kuljanin et al. (2019) used fuzzy DEA on Central and South-East European airlines and revealed lower efficiency compared to Western Europe, but with gradual improvement driven by technical gains. Malhotra (2021) examined six U.S. airlines using DEA and found that legacy carriers remained close to the frontier but struggled with cost control and aircraft utilization. Sohail et al. (2022) investigated Asian airlines using stochastic frontier analysis and identified efficiency gains linked to modern fleets and high passenger load factors. Adegboye (2023) used regression analysis to examine Nigerian airlines from 2015 to 2020 and showed inefficiencies arising from high fuel costs, delays, and overstaffing.

Truong (2025) presented Southwest Airlines as a case study of a U.S. low-cost carrier and attributed its efficiency to strong labor productivity and simple route networks. Okonkwo (2022) surveyed Nigerian airline staff and identified weak management practices and outdated processes as major causes of inefficiency. Lee and Chen (2020) applied stochastic frontier analysis to global airlines and reported that Asian carriers were the most efficient because of effective cost control. Afolabi (2021) examined Nigerian airlines and highlighted inefficiencies in daily aircraft utilization when compared to international standards. Kimura (2019) analyzed Japanese airlines using the Malmquist productivity index and demonstrated that operational improvements sustained long-term efficiency. Balogun (2025) applied DEA to Nigerian domestic airlines and found generally low efficiency, though smaller carriers with leaner operations recorded stronger outcomes.

Theoretical Framework

This study adopted the Resource-Based View (RBV) of the firm as its guiding theory. The RBV, originally developed by Barney (1991), emphasizes that organizational performance is determined by the effective use of unique internal resources and capabilities. In the context of airline operations, the theory explains how carriers can achieve sustained operational efficiency by leveraging resources such as modern fleets, skilled personnel, efficient ground handling systems, and advanced technology. The framework is relevant to this study as it highlights how airlines at Murtala Muhammed International Airport utilize their resources relative to external constraints in achieving performance outcomes.

III. Methodology

This study was conducted at the Murtala Muhammed International Airport (MMIA), Ikeja, Lagos State, the busiest and most strategic aviation hub in Nigeria. MMIA handles the highest volume of passengers and cargo in the country and serves as the main base for both local and international airlines, making it the ideal location for examining airline operations and efficiency. Five major commercial airlines formed the study population: Arik Air, Air Peace, Dana Air, Azman Air, and Ibom Air. Together, these carriers represent a significant share of passenger and cargo movement within Nigeria's aviation sector.

The research adopted a descriptive survey design, which enabled the collection of quantitative data on operational efficiency directly from airline operators and related stakeholders. The study population consisted of 723 personnel involved in airline operations, including operators, airport management staff, pilots, crew, ground handling personnel, regulatory officials, and financial analysts. Using Slovin's formula at a 5% margin of error, a sample size of 258 respondents was determined and proportionately allocated across the groups through stratified random sampling.

Data were collected using structured questionnaires designed on a five-point Likert scale, complemented by observational checks of ground handling, scheduling, and turnaround practices. Descriptive statistics summarized the responses, while Data Envelopment Analysis (DEA) was employed to assess operational efficiency by comparing inputs such as fleet, staff, and fuel consumption with outputs including passenger miles, cargo handled, and departures

IV. Results

Socio-economic Characteristics of the Respondents

Table 1 shows that airline operations at Murtala Muhammed International Airport are dominated by male

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personnel, with 64.2% of respondents being men compared to 35.8% women, which reflects the gender imbalance commonly reported in the aviation industry, especially in technical and operational roles. The age distribution indicates that 38.3% of respondents fall within the 30–39 years bracket, followed by 25.0% in the 40–49 years group, suggesting that a large share of personnel are in their prime working years with sufficient maturity and experience to contribute effectively to operational efficiency. Educational qualifications reveal that nearly half of the respondents (49.2%) possess HND/B.Sc degrees, while 22.5% hold postgraduate qualifications, showing the presence of a relatively well-educated workforce capable of meeting the technical and managerial requirements of the aviation sector. Work experience further supports this profile, with 36.7% of respondents having 5-10 years of service and 26.7% having 11–15 years, which demonstrates a balance between early and mid-career professionals and indicates that the study relied on respondents with strong practical exposure, making their contributions credible for evaluating operational efficiency.

TABLE 1: Socio-Economic Characteristics of Respondents

Categories	Category	Frequency	Percentage (%)
Gender	Male	154	64.2
	Female	86	35.8
	Total	240	100.0
Age	20–29 years	58	24.2
	30–39 years	92	38.3
	40–49 years	60	25.0
	50 years and above	30	12.5
	Total	240	100.0
Educational Qualification	SSCE	20	8.3
	Diploma/OND	48	20.0
	HND/B.Sc	118	49.2
	M.Sc/Ph.D	54	22.5
	Total	240	100.0
Years of Experience	Less than 5 years	52	21.7
	5–10 years	88	36.7
	11–15 years	64	26.7
	Above 15 years	36	15.0
	Total	240	100.0

Source: Field Survey (2025)

Operational Efficiency of Airlines Operation

Table 4.2 analysis shows that Air Peace and Ibom Air operated fully on the efficiency frontier with scores of 1.000, while Dana Air with 0.912, Arik Air with 0.872, and Azman Air with 0.783 performed below the frontier, which means that to reach best practice levels they would need to reduce resource use by 8.8%, 12.8%, and 21.7% respectively. This demonstrates the uneven operational performance among Nigerian carriers operating within the same airport environment. Peer analysis showed that Air Peace and Ibom Air consistently acted as benchmarks for the inefficient airlines, which indicates that the operating models of these two carriers were closest to best practice within the sample and that Dana Air, Arik Air, and Azman Air could be guided by their resource-use patterns through managerial adjustments. The classification of returns-to-scale revealed that Dana Air and Arik Air experienced decreasing returns, requiring reorganization or input reductions, while Azman Air showed increasing returns, which suggests that efficiency improvements could be achieved through scaling up services or consolidating operations. The findings overall suggest that inefficiencies stemmed from both managerial practices and scale effects, with staff utilization, delays in departures, and ground handling processes identified as areas for practical intervention. The repeated role of Air Peace and Ibom Air as efficient benchmarks reinforces their significance as models of best practice for other Nigerian airlines.

V. Discussion of Findings

The first objective assessed operational efficiency across selected airlines, and DEA results showed that Air Peace and Ibom Air operated fully on the efficiency frontier while Dana Air, Arik Air, and Azman Air lagged behind. This indicates that efficiency varied significantly across carriers because of differences in staffing levels, fleet utilization, scheduling discipline, and ground handling practices. International evidence supports these disparities, as Tone and Tsutsui (2014) and Gillen and Morrison (2021) reported that variations in input allocation and managerial practices explain why some carriers consistently achieve frontier efficiency while others remain below benchmark standards. Wakili (2025) observed that among Nigerian carriers only a few operate consistently at the efficient frontier, while most remain below efficiency benchmarks due to weak planning and poor resource management. Martini et al. (2024) also showed that African airlines face efficiency challenges linked to underutilized inputs, fragmented markets, and government interference. Kuljanin et al. (2019) reported similar inefficiencies among smaller European carriers, attributing them to structural constraints such as limited networks and fragmented markets, which parallel the Nigerian situation. Abdul Rashid et al. (2024) further highlighted the importance of innovation capital in sustaining efficiency, suggesting that Nigerian airlines could improve their competitive position by investing in service quality and modern technologies. The findings confirm that inefficiency is widespread but unevenly distributed across Nigerian airlines and reinforce the Resource-Based View, which emphasizes that organizational performance depends on how effectively unique internal resources are utilized. Air Peace and Ibom Air demonstrate that the efficient deployment of skilled staff, fleets, and operational processes can position airlines on the efficiency frontier and serve as practical benchmarks for others to follow.

VI. Conclusion

Using Data Envelopment Analysis, this study assessed the operational efficiency of selected Nigerian airlines at Murtala Muhammed International Airport and revealed that Air Peace and Ibom Air achieved full efficiency while Dana Air, Arik Air, and Azman Air operated below the efficiency frontier. The efficiency gaps were attributed to differences in scheduling, staffing, fleet utilization, and ground handling practices. These results confirm that operational efficiency in Nigeria's aviation sector is uneven, with some carriers displaying best practice and others struggling to optimize resources. This shows that inefficiency is a systemic issue, but one that manifests differently across airlines depending on their operational models, scale of operations, and managerial

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decisions.

TABLE 2: DEA Efficiency Results for Selected Airlines

DMU	Eff. Score (VRS_TE)	Rank	Peers (Lambdas)	RTS	Staff Slack	Fuel Slack	Fleet Slack	Pax-km Slack	Cargo-km Slack	Departures Slack	Total Input Excess	Total Output Shortfall	Scale Efficiency (SE)	Peer Frequency
Air Peace	1.000	1	Air Peace (1.000)	CRS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.98	11
Ibom Air	1.000	1	Ibom Air (1.000)	IRS →CRS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.96	9
Dana Air	0.912	3	Air Peace (0.58), Ibom (0.27)	DRS	7.4	0.0	0.2	0.0	0.0	1.2	7.6	1.2	0.93	0
Arik Air	0.872	4	Air Peace (0.44), Ibom (0.36)	DRS	11.1	0.8	0.3	0.0	0.35	2.1	12.2	2.45	0.90	0
Azman Air	0.783	5	Air Peace (0.31), Ibom (0.55)	IRS	18.6	1.1	0.5	0.0	0.62					

Source: Field Survey (2025)

VII. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made to the airlines:

- Benchmarking Best Practice: Inefficient airlines should adopt the operational strategies of efficient carriers such as Air Peace and Ibom Air, particularly in fleet utilization, staff management, and turnaround processes.
- Resource Optimization: Dana Air and Arik Air need to improve workforce planning and streamline ground handling operations, while Azman Air should consolidate or expand operations to exploit economies of scale.
- Operational Discipline: Airlines should strengthen adherence to schedules, reduce departure delays, and improve turnaround times, as these were recurring areas of inefficiency.
- Managerial and Technological Investment: Investment in modern fleet, staff training, and digital operational tools can help improve decision-making and resource use, aligning with evidence from global studies that link innovation with efficiency.
- Regulatory Oversight: Agencies such as NCAA and FAAN should promote efficiency-focused policies, including stricter monitoring of performance indicators and incentives for airlines that achieve benchmark efficiency levels.

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