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Research Paper

Trend Analysis of the Operational Costs of Domestic Airlines in Nigeria

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Abstract—Cost management practices are considered important for the sustainability of any business organization in modern society. The Nigerian domestic airlines have been facing an increase in operational costs, which may be a result of a lack of business processing. Based on the above assumption, this paper aims to analyze the operational costs of domestic airlines in Nigeria over a ten-year period. The specific objectives are to assess the cost center and determine the trend of operational costs for the Nigerian domestic airlines over a ten-year period. Therefore, the descriptive survey type of research design was used for the study. Both primary and secondary sources of data were employed. The population of the study was forty employees or senior staff of the selected Nigerian domestic airlines. The secondary data, which is data on operating costs for the selected airlines, was sourced from the databases of Arik Air, Air Peace, Overland Airways, and Dana Airlines for a period of ten years. Both Descriptive and Inferential methods of data analysis were employed for the analysis. The study revealed that aviation fuel is the major determinant in the cost center of Nigerian domestic airlines, followed by human resources and ground costs. The study also established that there is a steady increase in the cost of operations across all four airlines except in 2020, when the cost of operations declined due to the COVID-19 pandemic. The study recommends that airlines should share resources wherever possible and monitor venerable cost centers to remain sustainable.

Keywords— Airlines, domestic airlines, operational cost, cost centers, Nigeria

1. Introduction

Over the years, the aviation sector all over the world has been experiencing an increase in the cost of operation, despite the fact that it is one of the most important sectors that drive the national economy and development [1]. In Nigeria, the aviation industry has been growing since the pre-colonial days to the present [2]. Virtually all the capital states or cities in Nigeria that are commercial nerve centers have airports, and they are contributing immensely to the national development of the country. For instance, according to [3], the domestic airline had contributed more than N184 billion to the Nigerian Gross Domestic Product (GDP) and supported over 254,500 jobs within the country [4].

However, in keeping with global trends, several challenges, such as high costs of operation, among others, have adversely affected the sector. In 2016, due to poor performance recorded by Nigerian indigenous airlines, about forty-seven airline companies, approximately 80% of which operated international and local routes, liquidated their operations and went into extinction [5]. Many developed countries all over the world are making efforts to reduce airlines costs of operation. This is because aviation industry cannot compete on price without reducing their cost and overheads [6]. In Nigeria, the reverse is true; the multiple statutory charges introduced by the Nigerian government coupled with the high cost of aviation fuel have resulted in the rising cost of airlines operations in Nigeria [7] [8]. The airline industry relies on airport services, the provision of aviation fuel, labor, etc., which are very expensive and out of their (the airlines') control. Likewise, airlines' output, though significantly controlled by these airlines, is subject to the operations of airports and available slots at these airports, competition from other airlines and modes, costs of operations, and demand by passengers. All these services determine the cost of operation. In the aviation industry, operating expenses account for 75% of all non-fixed costs. During downturns, aviation managers resolved to reduce the cost of operation by laying off workers in order to remain in business. Since growing profits is difficult, companies are forced to cut costs to be more profitable. Apart from labor costs, the cost of fueling, maintenance, handling luggage, airport fees, taxes, marketing, promotions, and passenger expenses contribute significantly to the cost of operation. As a whole, these expenses account for about 55% of the total operating costs of airlines [9]. Airlines, like other business ventures, have the primary

purpose of producing goods or services that will make the firm profitable. With the already stated factors and hindrances that airlines face, producing outputs and reducing costs that meet shareholders' expectations can be difficult. With these problems at hand, this research work is out to assess airlines' operational costs and cost centers in the Nigerian aviation industry.

2. Related Work

The studies on operational cost and cost center were reviewed alongside their definitions. According to [10], operational cost is seen as the total cost of a unit of a product or service or the annual cost of an organization. Similarly, [11] defines operational costs as expenditures on products, services, and equipment. [12] defined operational costs as the charges that are related to the activities of a business. [13] defines the operational cost of the transport industry as a cost internally assumed by the providers of transport services. They come as fixed (infrastructure) and variable (operating) costs. Going by this definition, operational costs can be measured objectively (which refers to cash spent on each activity) or subjectively (apportionment of cost). The cost center is the expense incurred to run an organization. According to [14], defines cost center is defined as the various costs incurred to achieve a particular goal, which determine the cost of running a business.

In terms of the empirical review of the study, [15] studies the operational cost of the transport industry using intercity bus service as a case study. The study established that operational costs are high during festival periods such as the Christmas season. Similar to [16], it was established that operational costs depend on the capacity utilized and distance covered by the transport providers. [17] determine the airlines choice-making in Nigeria. The study established that socioeconomic characteristic, crew behavior, fare, and the power of monopolies were significant variables that strongly influenced the passenger's choice of airline in Nigeria. [18] analyzes the contribution of the aviation industry to the Nigerian gross domestic product (GDP) of the nation. The study revealed that the aviation industry's contribution to the Nigerian economy is low, despite its contribution toward foreign direct investment in Nigeria. [19] investigates the impact of the business reengineering process on the operational costs of indigenous airlines in Nigeria. The result established that business process reengineering affects the operational costs of the selected indigenous airline companies in Nigeria. [20] utilized a two-stage DEA analysis to review 21 airlines operating in the United States. The study measured an airline's ability to convert material and labor resources into capacity to serve passengers. Specifically, the inputs included fuel costs, the cost of benefits to passengers or employees, the operating cost per seat mile, as well as salaries and wages. [21] examines the challenges of air travel and airline operations in Nigeria. The cost of operation, such as grounding costs, service costs, and other related costs provided by airports, is one of the major challenges in the Nigerian aviation industry.

3. Methodology

The study adopts the survey research method as a means to collect information from the population of the study. A total of fifteen airlines were identified in Nigeria's domestic airspace, namely: Air Peace, Allied Air, Arik Air, Aero Contractors, Azman Air, Dana Air, Dornier Aviation Nigeria, Green Africa Airways, Ibom Air, Kabo Air, Max Air, Overland Airways, United Nigeria Airlines, West Link Airlines, and TAT Nigeria. In all, only four airlines, which include Air Peace, Arik Air, Dana Air, and Overland Air, were investigated because of the level of patronage and the vast number of routes they fly in Nigeria. The flying routes are:

- Arik Air: Lagos-Abuja, Lagos-Benin, Lagos-Maiduguri, Lagos-Kaduna, Lagos-Port-Harcourt, Lagos-Enugu, Lagos-Yola, Lagos-Akure, and Lagos-Owerri.
- Air peace: Lagos-Abuja, Lagos-Owerri, Lagos-Port-Harcourt, Lagos-Uyo, Lagos-Enugu, Abuja-Owerri, Abuja-Enugu, Abuja-Akure, Ilorin-Lagos, Abuja-Benin city, Lagos-Asaba, Lagos-Akure, Lagos-Benin city.
- Overland air: Lagos-Abuja, Lagos-Akure, Lagos-Bauchi, Dutse-Abuja, Lagos-Ibadan, Ilorin-Abuja, Abuja-Jalingo Abuja-Akure, Lagos-Ilorin, and Ibadan-Abuja.
- Dana air: Lagos-Port-Harcourt, Lagos-Abuja, Lagos-Uyo, Uyo-Abuja, Port-Harcourt-Abuja, Lagos-Owerri.

4. Study design

The study is designed to source raw data from the selected airlines through primary and secondary sources. For primary data collection, the target population of the study is the senior staff of the selected domestic airlines. Therefore, the population of the study is a total of forty senior staff or department heads in the four selected airlines. Some of the key professional departments are ground operations, flight operations, operations control center, finance and accounts, and engineering units. The choice of this group is because they would be best able to know the cost centers of Nigerian domestic airlines. For the secondary data, data on operating costs for the four airlines were sourced from the databases of Arik Air, Air Peace, Overland Airways, and Dana Airlines for a period of ten years, starting from 2012 to 2022. Both descriptive and inferential methods of data analysis were employed for the analysis.

5. Results and Discussion

A. Demographic Characteristic of the survey respondents

The demographic characteristics of the survey respondents in Table 4.1 show that the majority of the respondents are air traffic controllers, representing 25% of the sample population. The air traffic controllers are personnel responsible for the safe, orderly, and expeditious flow of air traffic in the global air traffic control system. Further analysis shows that the majority of the air traffic controller's working experience is between 6 and 10 years with a first or master's degree. It was also discovered that 20% represent flight instructors. The study observed only a pilot with 6–10 years

of aviation experience. Based on the result, it is acceptable that all the personnel in the aviation industry are well captured in the study, meaning that the study representative is in a position to contribute meaningfully. Secondly, it shows that the study representative is from a different department, meaning different views and knowledge of the aviation industry, which can result in more reliable information. The level of experience and intelligence is sufficiently high, and their ability to understand the study theme cannot be doubted, thus making their responses reliable. This finding on demographic characteristics collaborates with [22] and [23].

Tables 1: The demographic characteristics of the survey respondents

Position	P	FO	FI	ATC	AM	GO	MM	Total
	1	3	4	5	3	3	1	20
Year of the respondents								
16 -25	0	1	0	0	0	0	0	1
26 - 35	0	2	2	2	1	1	0	8
36 - 45	1	0	2	1	2	2	0	8
46 - 55	0	0	0	2	0	0	1	3
Level of Education								
professional degree	0	1	0	1	0	0	0	2
First Degree holder	1	2	1	2	1	2	0	9
Master's Degree	0	0	3	2	2	1	1	9
Doctor of Philosophy	0	0	0	0	0	0	0	0
Years of experience								
1 - 5 years	0	1	0	1	0	0	0	2
6- 10 Years	1	2	2	2	1	1	0	9
11 - 15 Years	0	0	2	2	2	1	1	8
16 - 20 Years	0	0	0	0	0	1	0	1
21 Years and above	0	0	0	0	0	0	0	0

Source: Authors finding, 2023

Note that P represent Pilot, FO represent Flight operator, FI represent Flight instructor, ATC represent Air traffic controller, AM represent Airport manager, GO represent Ground Officer and MM represent Maintenance manager

B. The cost centers of Nigeria domestic airlines

From the analysis in Figure 1, the result shows that 90% of the respondents agree (strongly agree and agree) that operational cost is determined by aviation fuel, with 10% disagreeing. This implied that aviation fuel was the most significant factor that determined `the operating cost. According to the U.S. Centennial of Flight Commission (2012), aviation fuels are petroleum-based (jet A and jet A-1) and used to power aircraft. This includes conventional aviation fuels, emerging aviation fuels, and compressed and liquified natural gas.

The second cost center observed is human resources, which include air crew and ground crew. According to Morgan (2015), aircrew, also referred to as flight crew, are personnel that include pilots, flight engineers, navigators, bombardiers, and navigators who operate an aircraft while in flight. The flight's crew depends on the type, purpose, and duration of the aircraft.

The last cost center observed in the study is ground costs. Ground costs, as one of the operating costs of the aviation industry, are directly related to the ground activities of an airline, such as airport charges, station costs, and ground (IATA, 2022). These grounds costs also include renting costs for lounges, landing fees, and parking fees. From the analysis, it shows that the majority of the respondents believed that maintenance costs did not determine the operation cost of the airline in Nigeria, with a percentage of disagreement of 65%. Maintenance costs are overhead and indirect operating expenses; they are not directly related to flight aviation costs, human costs, or ground costs. They include cabin attendants, passenger service, load insurance, reservations, ticketing, sales and promotion, IT and communications, and general and administrative.

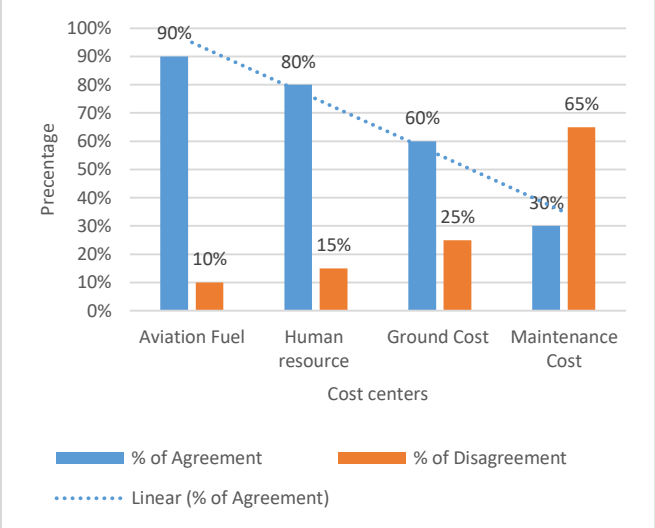

Figure 1 Cost centers analysis of Nigerian domestic airlines
Source: Authors finding, 2023

C. Operational cost of airlines over the past ten years.

i. Air peace

Air Peace's operational cost over the past ten years is presented in Figure 2. The airline is one of the newest private Nigerian airlines and a leading low-cost airline service provider in Nigeria when compared with the other three airlines examined in the study. Air Peace started operation in 2014 with less than three domestic routes, but in 2016, the airline expanded their coverage to 10 different destinations within Nigeria, which led to an increase in volume carried and increased costs of operation as seen from 2016 to 2019. With the additional Origin-Destination markets, the fleet size also increased, leading to increased human resources.

In 2020, there will be a decrease in the cost of operation of 57%. This was as a result of pandemic (Covid-19) that forced nations to lockdown and global flying literally seized. The cost of the operation later increases from #96,016,599.00 in 2020 to #479,423,446.00 in 2022 as a result of the reopening of economies and nations, making global flying an attempt to return to pre-pandemic levels.

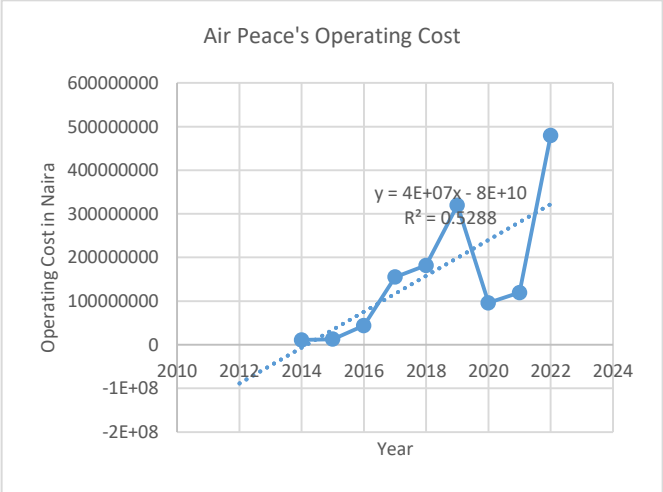

Figure 2: Air peace operational cost from 2010 to 2022
Source: Authors finding, 2023

ii. Dana air

For the analysis in Figure 3, the data obtained showed that Dana Air was in operation before 2012. The cost of operation rises from $149,659,556 in 2012 to $418,921,116 in 2019. The yearly increase was as a result of increased flying operations and spread to newer O-D markets, which has raised the costs in the various cost centers of this airline. Such cost centers are human resources, aviation fuel, and ground costs. The cost of operations dropped from $418,921,116.00 in 2019 to $167,612,737.00 in 2020, which was 11% different from the cost of operations in 2012. Again, the reduction was caused by the global pandemic (COVID-19). Dana Air has not been able to recover like Air Peace because it could not handle its costs very well and was not able to cross-subsidize like Air Peace because it was not able to get clearance and nomination to fly international routes. The sharp drop in 2022 may be a result of financial obligations. This analysis reflects the outcome of the financial and economic health audit conducted by the regulatory body, which revealed that Dana Airlines was not in a good position to meet its financial obligations for safe flight operations as of 2022.

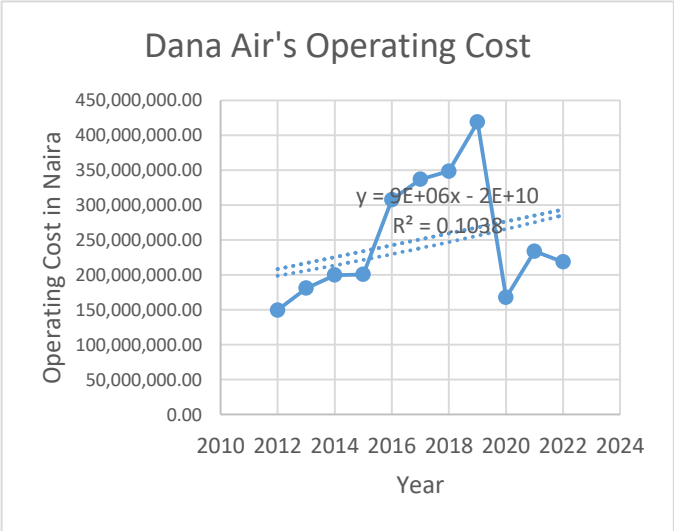

Figure 3: Dana air operational cost from 2010 to 2022
Source: Authors finding, 2023

iii. Arik air

Arik Air's growth was rapid when it started operation. The increased operating costs were due to the rapid expansion of O-Ds and their attendant costs. Arik Air started with smaller aircraft that enabled it to keep to its advertised schedules, which made it attract lots of patronage and later spread to other O-Ds, which subsequently increased its cost of operations, but it must be said that it was able to control its cost centers adequately with the incremental difference not being too obvious, unlike those of others. This was because it kept using its initial smaller aircraft meaningfully to achieve its market expansions. But from 2017, over 10 years after it started operating, its operation costs increased more rapidly until 2019 because it started using wide-bodied aircraft that are bigger and also increased O-Ds for longer hauls. Figure 4 shows the trend of its operating costs. Arik Air came back weaker after the COVID-19 pandemic and had to suspend most of its flight operations.

Figure 4: Arik Air operational cost from 2010 to 2022
Source: Authors finding, 2023

iv. Overland air

The operational cost of overland air travel over the past ten years is presented in Figure 5. The results revealed that in 2012, the base year for this study, the operational cost amounted to 78,342,865, increased to #238,342,865 in 2016, and dropped to #231,181,997 in 2017. The decrease in 2017 might be due to the fact that Overland started regional operations in 2017, which indirectly affected domestic routes in Nigeria. This implied that Overland Air did not purchase additional planes for regional flights but rather made use of the available planes that were made for domestic operations. In 2018, the operational cost increased to $266,569,556 before dropping to $72,002,170 in 2020 due to the COVID-19 pandemic.

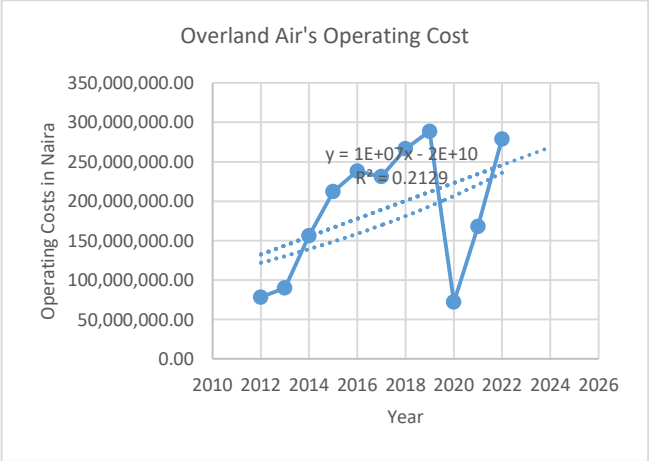

Figure 5: Overland Air's operational cost from 2010 to 2022
Source: Authors finding, 2023

Overland Air is known to identify promising O-Ds and be the pioneer airline to such O-Ds, not minding being the sole (monopoly) carrier to these O-Ds. This has made it survive over the years, and its operating cost growth rate has been gradual because it hardly acquires new aircraft but rather maintains the aircraft in its fleet and uses them optimally.

6. Conclusion and Future Scope

The study has established that the cost centers of Nigerian domestic airlines are determined by aviation fuel, human resources, and ground costs. The study also established that there is a steady increase in the cost of operations across all four airlines except in 2020, when the cost of operations declined due to the COVID-19 pandemic. The study finally established that airline output is largely determined by traffic demand along the major routes in Nigeria. The research work has contributed to the body of knowledge by providing trends in operating and providing opportunities to forecast into the future based on generated models. The study recommends that airlines should share resources wherever possible and monitor venerable cost centers to remain sustainable.

Data Availability (Size 10 Bold)
none.

Conflict of Interest
Authors declare that they do not have any conflict of interest.

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none

Authors' Contributions
Author- 1: wrote the proposal and literature and data collection of the study. Author- 2: Supervise and interpret results,
Author -3: full supervision of the work and editing.
Author- 4: assist in data collection.
The final version of the manuscript was examined and edited by all authors, who also gave their approval.

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