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Passenger movements development and structure at Murtala Muhammed International Airport, Lagos

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Abstract Murtala Muhammed International Airport (MMIA) is a primary international airport in Nigeria in terms of passenger movements and availability of facilities and services. As a result of this, the study seeks to assess passenger movements in MMIA for the last ten years and the passenger composition today. Due to the research objectives, the study employs both quantitative and qualitative techniques for data acquisition and analysis. The quantitative aspect of this work deals with the quantitative techniques that are used in collecting the data and the follow up statistics for the analysis. The study relies heavily on both primary and secondary sources of data. The research employs an accidental sampling technique since the target population was in transit at the airport. The analysis of the data reveals that the number of passengers increased by 90.2 % between 2000 and 2008, and dropped by 2.7 % between 2008 and 2009; 87.6 % of the passengers had attained tertiary education; 34.2 % traveled for educational purpose; 50 % of the airlines operated African countries. The study will help the airport marketing to identify target groups, and it will also help policy makers not only in Nigeria but all over the sub-continent to think about long-term strategies towards establishing a viable international airport.

Keywords Airport · Passengers · MMIA · Nigeria

1 Introduction

Nigeria is by far the most populated of Africa's countries, with more than one-seventh of the continent's people. The population consists of many different ethnic

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groups. These groups give the country a rich culture, but they also pose major challenges to nation building. Nigeria covers an area of 923,768 km² (or 356,669 square miles). It is bounded by Cameroon to the east, Chad to the northeast, Niger to the north, Benin to the west, and the Gulf of Guinea on the Atlantic Ocean to the south. Until 1991, the capital of Nigeria was the largest city, Lagos, on the southwestern coast; from that time on, the city of Abuja, in the country's interior, became capital (Encarta 2009).

The 2008 UN estimate of Nigeria puts its population at 138,283,240 with a population growth rate of 2.38 % and a projected number of 206,165,946 in 2025. The 2013 data reveals a number of 178,571,721 people (World Population Review, 2014). Murtala Muhammed International Airport (MMIA) is located in Ikeja, Lagos State, one of the three giant agglomerations in Africa, which had 9.6 million inhabitants in 2007 (UN-Habitat 2008) and would have 12.4 million in 2015 making it among the 20th world's largest metropolitan regions in the world.

MMIA is the major airport serving the city of Lagos, south-western Nigeria and the nation. Originally known as Lagos International Airport, it was renamed midway during construction after the former Nigeria Military Head of State Murtala Muhammed. The international terminal was modeled after Amsterdam's Schiphol Airport (FAAN 2010). The Airport opened officially on March 15, 1979.

MMIA consists of an international and a domestic terminal, located about one kilometer from each other. Both terminals share the same runways. MMIA is managed by the Federal Airport Authority of Nigeria (FAAN), a department of the Federal Ministry of Aviation. The Federal Government of Nigeria is encouraging Public Private Participation in the aviation industry which has resulted in the relocation to the old Lagos domestic terminal in 2000 after a fire. A new domestic terminal (named MMA2) has thus been constructed and was commissioned on April 7, 2007. In 2009, the airport served 5,653,412 passengers (FAAN 2010).

A passenger is described here as someone who arrives in, departs from, or transfers through the airport on a given day. Globalization has made it even more necessary for everyone to have the possibility to travel everywhere at any time. Over 2.1 billion passengers departed on scheduled journeys in 2006 (IATA 2007). Popular economists saw international passenger demand grow by 5.9 % (Chikwendu et al. 2012).

The world's busiest airports are measured by their total number of passengers, and Hartsfield-Jackson International Airport in Atlanta has been the world's busiest airport every year since 2000. This is based on the results from 9.8 million questionnaires completed by 100 different nationalities of airline passengers in 2009/2010, covering more than 210 airports worldwide (http://www.en.wikipedia.org/wiki/World%27s_busiest_airports_by_passenger_traffic; ACI 2010 Statistics).

Passengers leaving on a trip normally want to spend as little time as possible in the terminal. They want to have baggage carts readily available, a fast check-in and short waiting times before and quick boarding prior to a timely departure. These passengers do not appreciate long queues, repetitive security checks, crowded departure areas, queuing for boarding and a delayed departure. The rise in terrorist or religious fundamentalist or ethnic militia activities has resulted in more stringent security measures. Passengers' identity must be verified, luggage must be x-rayed,

metal detectors and other security techniques must be used. As a result, passengers must arrive early at the terminal hours before departure, line up at the security checkpoint, and show their boarding passes and passport numerous times and wait while luggage is matched with boarded passengers in MMIA. Passengers are specifically advised to arrive at the departure lounge some hours before departure. This is due to the traffic jam that characterizes the entrance to the airport from 7 to 9 am in the morning and 3 to 5 pm in the afternoon.

2 Objectives of the Study

The main aim of this paper is to assess passenger movements through MMIA in Lagos, Nigeria, for the past ten years. The following objectives were identified to achieve the aim of the study:

1. To identify the differences in the volume of incoming and outgoing passengers over a ten-year period.
2. To identify the structure of the transit passengers.
3. To find out the number of airlines and their destinations, and
4. To proffer recommendations for efficient service delivery.

The hypothesis tested in this paper is that ‘there is a significant difference in the volume of incoming and outgoing passengers over the 10-year period.

3 Methodology

The study was conducted in the form of a passenger assessment and opinion survey. The first phase of the study utilized desk research, observations, and informal discussions with knowledgeable individuals to assess the situation and arrive at a hypothesis to be tested, in line with the stated objectives. The hypothesis postulated is mentioned along with the test results later. The second phase concentrated on the data collection and analysis. Data were obtained on the characteristics of passengers’ gender, age group, educational status, marital status and so on.

Available data from the Statistics Units of MMIA reveals that 2,333,309 passengers used the international wing of MMIA in 2009. The researcher therefore used the data for 2009. Hence, the sample frame for the study is 2,333,309. 0.01 % of the sample frame, constituting 234 passengers was thus selected (Agbola et al. 2003). Since the targeted population was in transit, an accidental random sampling method was adopted and only passengers that were willing and ready to provide the required information were sampled. Four research assistants were trained for the exercise and were asked to administer 10 questionnaires each day with the researcher for seven days to airport users equally divided between the departure and arrival lounges. This was done to ensure that at least 234 of the filled questionnaires were usable.

Information from the MMIA management reveals that August is the busiest of all months based on passengers and airlines movements. It was also revealed that all kinds of passengers use the airport during this period more than during other months in the year. Therefore, the research was then held in mid-August.

The data were analyzed using social package for service solutions (SPSS) version 17. The reliability of the scales was tested using the Cronbach “alpha” score. Cronbach’s alpha determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability, where higher scores indicate higher reliability of the generated scale (Santos 1999). The Cronbach alpha in this study scored 0.6160, somewhat lower than the most widely referred score of 0.7. However, an alpha of 0.5 or above is considered by Bowling (1997) as an indication of good internal consistency, while a much higher alpha score may suggest a high level of item redundancy. Hence, it can be argued that measurement scale used in this study met its purpose.

Both descriptive and inferential statistics were used for data analysis. Statistical tools such as frequencies, tables, independent student *t* tests and percentages were used to explain the result of field works and relationships were established by cross tabulations, and independent student-*t* tests.

4 Analysis of findings

The analysis of the 234 copies of pre-tested questionnaires revealed that 55.1 % of the passengers were male and 48.9 % were female. 23.3 % of the men were single, 67.4 % were married, 7.4 % were divorced and 1.9 % was widowed. 16.2 % of the women were single, 67.6 % were married, 6.3 % were divorced and the remaining were widowed.

Table 1 indicates that 50 % of the airlines (namely Arik, Aero Contractors, Air France, Air Ivoire, Egypt Air, Ethiopian Airways, Asky Airlines, Kenya Airlines, Afriquah Airways, Royal Air Maroc, and South Africa Airways) operated flights to African countries, 31.8 % of airlines [namely Virgin Atlantic Airways, Turkish Airlines, Air France, Alitalia, British Airways (which has its own lounge within the airport), KLM and Lufthansa] operated flights to European countries, 13.6 %

Table 1 Number of Airlines and Destinations

Index	Air destination	Number of airlines	Percentage
1	Africa	11	50.0
2	Europe	7	31.8
3	North America	1	4.5
4	Asia	3	13.6
5	South America	0	0
6	Oceania	0	0
Total		22	100

Source: FAAN 2010

airlines (namely China Southern Airlines, Middle East Airlines and Qatar airlines) operated flights to the Middle East and China and the remaining 4.5 % airlines (Arik Airlines) operated flights to North America. There were no direct airline flights operating to Oceania and Latin America. The passengers intending traveling to these two continents are on connecting flights. The analysis reveals that half of the passenger traffic by airlines is to African countries.

Table 2 indicates that there were three forms of passengers in MMIA- outgoing, incoming and transit passengers. The analysis reveals that there was a significant decline in number of passengers between 1999 and 2000. The number of passengers in 2000 was almost half of 1999. The reason adduced by the statistical units of the airport were the cases of air accidents recorded during that period. The main reason accounting for this was the rate of domestic air accidents in the country. Most air patrons were scared of possible international air accidents. With the reassurance from FAAN, there was a considerable increase in 2001 where a total of 1,389,337 passengers used the airport.

There were less passengers between 2002 and 2004 due to a series of air accidents in Nigeria (e.g. Sisoliso aircrash). Despite the air accidents in 2005 involving Bellview Airline, there was a considerable increase in the number of passengers. The trend remained in 2007, where the number of passengers almost equaled the one of 1999. There was a considerable increase in 2008 to 2,398,281 passengers at MMIA. The present development represents an upward trend of annual passengers in the country. This trend is tied to the concerted efforts by the management and the aviation sector reforms which have put the facilities and amenities in good order. From the trend graph, it was observed that the number of outgoing passengers was increasing. From January to August, outgoing passengers recorded the highest on the graph. It finally reached its peak in August and its lowest point was recorded in February. It was increasing steadily in June, July and August and started recording low levels after August (that is September, October and November) and increased again in December.

Table 2 International passengers at MMIA from 1999–2008

Year	Arrival	Departure	Transit	Total
1999	1,032,968	1,095,889	246,511	2,375,368
2000	509,644	544,799	206,408	1,260,851
2001	593,861	655,973	139,503	1,389,337
2002	623,291	665,693	91,944	1,380,928
2003	618,933	646,446	86,913	1,352,292
2004	654,465	689,930	128,887	1,473,282
2005	760,044	804,391	109,554	1,673,989
2006	854,255	852,836	65,084	1,772,175
2007	1,164,055	1,075,122	55,423	2,220,501
2008	1,164,055	1,201,782	32,444	2,398,281
Total	7,901,472	8,232,861	1,162,671	17,297,004

Source: Airport Statistical Office 2010

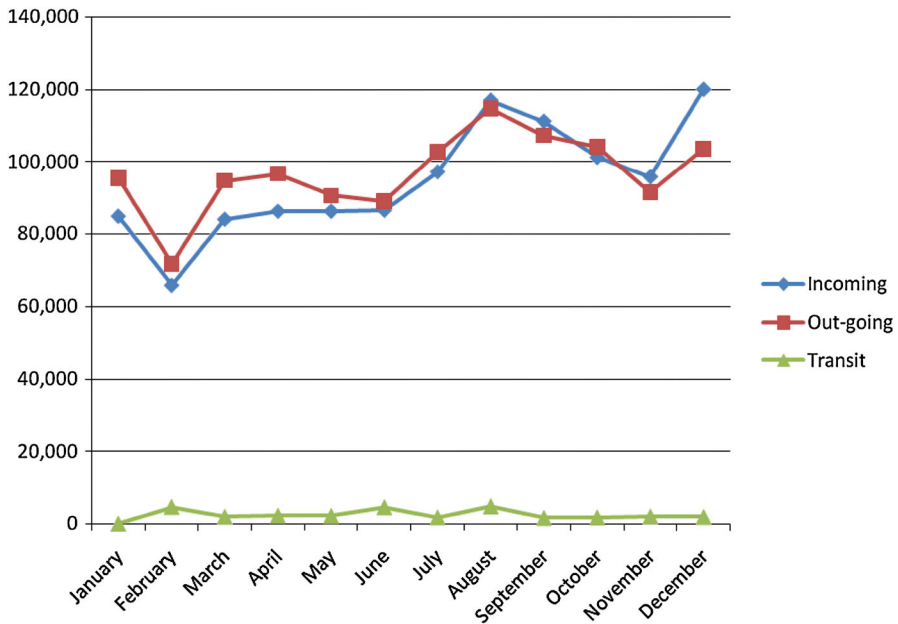


Fig. 1 Monthly international passengers at MMIA in 2009. Source: computed from FAAN 2010

Figure 1 shows that arriving passengers closely follow the pattern of departing passengers. It was observed from the graph that anytime the number of outgoing passengers was increasing, there is a corresponding increase in incoming passenger levels and vice versa. However, the month of December recorded the highest for incoming passengers. It is also the month where incoming passengers far exceeded outgoing passengers, after it has exhibited the same for August, September, October and November. Transit passengers were the least on the graph and recorded an almost steady line from January to December.

Table 3 indicates that 20.9 % passengers were aged ≤ 30 years, 21.8 % were aged between 31 and 36 years, 17.9 % were aged between 37 and 43 years, 21.8 % were aged between 44 and 52 years and 41 (17.5 %) were aged above 53 years.

Table 4 indicates that 69.2 % of the passengers were married, 20.5 % were single, 6 % were divorced and 4.3 % were widowed. This reveals that a large percentage of the respondents were married with 30.8 % being either single, divorced or widowed.

Table 5 indicates that 20.9 % of the passengers were civil servants, 44.0 % were businessmen and women, 14.1 % were students, 1.7 % was unemployed, 4.3 % were artisans, 12.0 % were working with private firms and 3.0 % were retirees. The statistics show that an enormous 95.3 % of the passengers were in the working group and were contributing towards Nigeria's economy against 4.7 % who were dependent. Furthermore, this indicates that the airport serves all categories of people.

Table 3 Age group distribution

Age group	Frequency	Percent
≤30	49	20.9
31–36	51	21.8
37–43	42	17.9
44–52	51	21.8
53+	41	17.5
Total	234	100

Source: Own Field Survey 2010

Table 4 Marital Status

Marital status	Frequency	Percent
Single	48	20.5
Married	162	69.2
Divorced	14	6.0
Widowed	10	4.3
Total	234	100

Source: Own Field Survey 2010

Table 5 Occupational status of passengers

Occupation	Frequency	Percent
Civil servant	49	20.9
Business	103	44.0
Student	33	14.1
Unemployed	4	1.7
Artisan	10	4.3
Private company	28	12.0
Retiree	7	3.0
Total	234	100

Source: Author's Field Survey 2010

The correlation of the educational background and trip purpose indicates that 80.7 % of the passengers who had only secondary education were travelling for educational purpose, 12.3 % for business purpose, 10 % travelled on medical reasons; 40.6 % of the passengers who had tertiary education traveled for educational purpose, 20.4 % for official reason, 10.2 % for leisure, 20.5 % for business purpose, 4.1 % for religious purpose and 4.2 % for medical purpose; and 40.2 % of the passengers that had Masters and PHD traveled for educational purpose, 40.6 % on official assignment and 20.2 % for medical reasons.

Table 6 Independent samples test analysis of 10 year period in the MMIA

Air transport	<i>T</i>	<i>Df</i>	<i>T</i> value
Arrival	0.24	18	0.81
Departure	0.24	18	0.81

Source: Author's Field Survey 2010

Only 12.4 % of the passengers had secondary education, 69.7 % had tertiary education, 6.8 % had Post Graduate Diploma and 11.1 % had Masters and PhD education as their highest level of education. 20.5 % of the passengers travelled for business purpose, 18.4 % travelled for leisure, 34.2 % travelled for educational purpose, 16.2 travelled for official reasons, 5.1 % traveled for religious purpose and 5.6 % traveled for medical reasons.

Table 6 indicates that the passengers' arrival and departure variables were weighted to determine the difference in the volume of incoming and outgoing passengers in the last ten years at MMIA. These two variables were computed to find whether there is significant difference. This statistics is an independent sample test. The *T* value is 0.24. The degree of freedom is 18. At the end of the analysis, the *T*-value is 0.24 which is greater than the 0.05. Hence the null hypothesis H_0 would be rejected. Therefore, there is significant difference in the volume of incoming and outgoing passengers in the 10-year period.

Table 7 indicates that 38 passengers travelled for official purposes. Five passengers out of this were aged 30 and below. One and four passengers were male and female, respectively. Six passengers were aged between 31 and 36 years. Four and two passengers were male and female, respectively. Six passengers were aged between 37 and 43 years, out of which, three passengers were male and female. 15 passengers were aged between 44 and 52 years. Out of which, eleven and four passengers were male and female, respectively. Six passengers were aged 53 years and above, out of which, three passengers were male and female, respectively.

Twelve passengers travelled for religious activities. Out of which, three were aged 30 years and below, one was aged between 31 and 36 years, another one was aged 37–43 years, four were aged between 44 and 52 years and three were aged 53 years and above. All the three passengers aged 30 years and below were women. The only passenger aged 31–36 years was a female. The only passenger aged between 37 and 43 years was a man. Two male and two female passengers were aged 44–52 years. One male and two female passengers were aged 53 years and above.

Only 13 passengers traveled for medical reasons, out of which three were aged between 31- and 36 years. Two were aged between 37 and 43 years and the remaining eight were aged 53 years and above. All the three passengers aged between 31 and 36 were male. Of two passengers aged between 37 and 43 years, there was one each male and female. Five and three passengers aged 53 years and above were male and female, respectively.

The statistics above indicate that passengers from 30 years and below traveled for educational reasons more than the other age groups. Male passengers travelled more than the female for all age groups as illustrated above. The age group between

Table 7 Age-group, gender and purpose of travel cross tabulation

Purpose of travel	Gender		Total
	Male	Female	
Business—Age group			
≤30	2	1	3
31–36	8	6	14
37–43	6	4	10
44–52	8	4	12
53+	4	5	9
Total	28	20	48
Leisure—Age group			
≤30	3	5	8
31–36	5	4	9
37–43	5	4	9
44–52	2	8	10
+53	4	2	6
Educational—Age group			
≤30	13	17	30
31–36	13	7	20
44–52	5	5	10
+53	4	2	6
Total	44	36	80
Official—Age group			
≤30	0	3	3
31–36	1	0	1
37–43	1	0	1
44–52	2	2	4
53+	3	3	6
Religious—Age group			
≤30	0	3	3
31–36	1	0	1
37–43	1	0	1
44–52	2	2	4
53+	1	2	3
Total	5	7	12
Medical—Age group			
31–36	3	0	3
37–43	1	1	2
53+	5	3	8
Total	9	4	13

Source: Author's Field Survey 2010

44 and 52 traveled most for leisure. This represents the most active of all age groups, and all of them are employed in one way or the other. Age group 31–36 years travelled mainly for business. Age group 44–52 traveled mostly for official and religious purpose. Age group 53 years and above travelled mostly on medical grounds. Male passengers were traveling more than the female in all purposes for travel, except those travelling for medical reasons, where the female passengers outnumbered their male counterpart.

5 Summary of Findings and Recommendations

The major findings of this study are summarized in this section, so as to proffer recommendations.

1. Passenger volume increased significantly within the ten year period, from 1,260,851 in 2000 to 2,398,281 in 2008 and 2,333,309 in 2009, thus experiencing 90.2 % increase between 2000 and 2008, and a drop of 2.7 % between 2008 and 2009.
2. 55.1 % of the passengers were male; 87.6 % of the passengers had attained tertiary level of education;
3. 20.5 % of the passengers travelled for business reasons, 18.4 % for leisure, 34.2 % for educational purposes, 16.2 % for official assignments, 5.1 % for religious reasons, and 5.6 % for medical purposes.
4. 50 % of the airlines operated flights to African routes, 31.8 % to European countries; 13.6 % of the airlines operated flights into the Middle East; 4.5 % airlines operated on North America routes and there was no direct airline operating flights to Oceania and Latin America.

The surging passenger traffic is a primary challenge plaguing the airport. This is partly as a result of the early stage of development of the MMIA's services and facilities in Nigeria. But there is still room for improvement. This study should act as the springboard for a more functional and responsive international airport. Hence the available facilities and services might not be able to contain the increasing passengers perpetuating the innumerable challenges, such as high operational costs, a huge foreign exchange component to acquire equipment, absence of maintenance facilities for mandatory checks in the country and the shortage of core aviation professionals, malfunctioning elevators, inadequate seats in the departure lounge. However, the identification of target groups could help the airport management to develop services and innovative sources of revenue for further operational and financial airport expansion.

The following recommendations are in consonance with achieving the Federal Government-planned attainment of vision 20:2020 (<http://www.npc.gov.ng/vault/files/transport%20ntwg%20report.pdf>), particularly in the provision of high quality services to the traveling public and other users in the aviation sector. In this regard,

the following suggestions were made to position the airport as one of the best in Africa, and to achieve and to set a benchmark in the world (Ojo 2011).

Physically, the airport cannot be relocated or abandoned. But since there is still ample land, there is room for a new terminal that will succor the traffic and efficiently cater for the shortfall of the present terminal. An example of this is the domestic wing of the airport. In the future, there should be a functional, efficient and magnificent Murtala Muhammed Airport 2 (MM2) of enviable standard in the sub-region of Africa.

With the upsurge in the number of passengers, there will be shortcomings like cancellations of flights or unscheduled flights. But measures should be put in place to increase the number of daily flights.

Further growth of annual passengers means that the available facilities and services might not be able to absorb the concomitant pressure associated with its intense usage. Hence, the improvement of airport facilities should include an upgrading of some existing facilities and a relocalization of possible new ones according to the Airport Master plan. It is quite important to note that all classes of people use the airport hence levels-of-service should not be discriminatory.

Many of the recommendations made here require a reasonable financial involvement. However, the airport management cannot implement such without subsidy or any form of assistance from the Federal Government of Nigeria. The financial assistance can help the MMIA achieve its prime position in the group of busiest and best airports in Africa in particular, but also in the world at large.

This study has shown that there is an upward increase in the volume of incoming and outgoing passengers. Now there is a gap to assess how the facilities and services are able to accommodate the future increase of passengers, which would invariably affect passengers' perception of service quality of either the airport or the associated airlines using and operating at the terminals.

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