

Variation in Spatial Trend of Passengers and Aircrafts Movement in Nigerian International Airports

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Abstract

This paper examines the movement of passengers through air transportation in Nigeria with more emphasis on the rate of arrival and departure in Nigerian International Airports. Although, people move for various reasons. The aim of this paper is to verify the trend of movement of passengers and flights in and out of the country for the period of eleven (12) years, starting from 2000 to 2011. The movement of people from one geographical location to the other varies in relation to season and air transportation capacity within the country differ with respect to the number of patronage from passengers at different international airports. The outward and inward movement in Nigeria is also the function of season. Through trend analysis with the aid of Time Series Analysis, result indicates that arrival and departure always high around festive and pilgrimage periods than any other months of the year. Annual variation between passengers and aircrafts were correlated and statistically significant with the result of 0.987 @ 0.01 level of significant. However, annual trend and pattern of passenger and aircraft movement in term of percentage variation shows high rate of change in passenger than aircraft for observed years. International Airport should be spatially situated according to population distribution and density instead of political consideration.

Keyword: *Arrival, departure, festive, pilgrimage season,*

Introduction

The history of aviation industry is dated back to 1920s in Nigeria and the earliest commercial aviation is credited to Mr. Bud Carpenter, who frequently undertook high-risk flight between Kano and Lagos, using the rail tracks as his guide. (Deba et al., 2005) An enterprising pilot carried a few fare-paying passengers in a sea-plane between Lagos and Warri in 1930. In 1935, the Imperial Airways later known as the British Overseas Airways Corporation (BOAC), commenced operations with flights from London to Nigeria. As a result of development in aviation industry, the need for more aerodrome necessary to handle the aviation enterprises. By the end of 1940, Lagos had been converted into a strategic base from where aircraft were being ferried to Middle East and India as part of the war effort. In 1946, the king of England issued an edict establishing the West African Air Transport Authority (WAATA) as well as the formation of the West Airways Corporation (WAAC). Ghana withdrew from the company in 1957 after her independence and Nigeria government in collaboration with BOAC and Elder Dempster lines formed the West African Airways Corporation (Nigeria) Limited which later changed to Nigeria Airways. Nigeria Aviation Industry is divided into three namely; Nigerian Airspace Management Agency (NAMA), Nigerian Civil Aviation Authority (NCAA), and Federal Airport Authority of Nigeria (FAAN). The development of air transport (Aviation) started in Nigeria at the end of the Second World War in 1946 with the defunct West African Airway Corporation (WAAC) with headquarters in Lagos. (Filani, 1975).

The corporation operated between Nigeria, Gold coast(Ghana), Sierra Leone and the Gambia using Dove Aircraft. Nigeria Civil Aviation Administration was established as a result of increase in the frequent use of air transport under Squadron H.C Brilliant (a Briton) but replaced in 1956 by another Briton in person of Wing Commander E.H Coleman. In 1964, Mr.V.A Roberts(a Nigerian) was appointed as a Deputy Director of Civil Aviation. Air transport development in Nigeria received government special attention in the 1970's more for political and social consideration than economy. Sixteen(16) Airports were developed and expanded. Four(4) of them simultaneously in Lagos, Ibadan, Benin, Enugu, Kaduna, Jos, Calabar, port Harcourt, Abuja, Ilorin, Makurdi, Sokoto, Maiduguri and Kano. Lagos, Kano, and PH have been developed to international standard. The runways aprons and terminal buildings have been completed. At present, Lagos airport alone handles about 80% of the domestic and international passengers, which makes it to be recognized as the most viable and functional airport in the country. As at 2011, total number of international airport in Nigeria were eight(8) and domestic were twenty(20) as well as other landing station for private organization and Nigeria military. Despite the fact that air transport is the fastest and most convenient means of transport system in developing nation of Africa, it is the least patronized due to populace financial status and country economy situation. Most internal transportation is via land, internal land air traffic is low as well owing to economy status of the countries. But affluence people can afford the cost purposely because of their time schedule, distance and space, financial status and public recognition.

Movement of both passengers and aircraft vary with respect to economy situation of the concerned countries(origin and destination) and season. Over years, festive period especially Islamic pilgrimage period and month of December have been noticed to be the season with the highest rate of passengers movement in and out of the country. Vulnerability of flight to climatic anomaly of the involved Nations also regulates the schedule plan of the flight movement especially during the hamattan season.

Objectives of the Study

The main aim of this study is to analyze the trend of passengers and aircrafts movement pattern across the International Airports in Nigeria. This study will particularly: Analyze the trend pattern in passengers and aircrafts movement over years, examine the correlation between the rate of passengers and aircrafts arrival and departure in the country and examine the spatial location in relation to regional situation of International Airports in Nigeria.

Study Area

Nigeria is located in the West Africa sub-region. It is bounded in the north by Niger Republic, south by Atlantic ocean, east by Cameroon and Chad and west by Benin Republic. She is the most populous country in Africa. With respect to NPC,2006,Nigeria accounted for more than 140 million and by August,2011 estimated to be about 167 million. Nigeria is located within the longitude 3⁰E and 15⁰E and latitude 4⁰N and 14⁰N of the equator. As at now, Nigeria has about eight(8) major International and the most functional among them are Murtala Muhammed Airport, Lagos, Nnamdi Azikwe International Airport, Abuja and Mallam Aminu Kano International Airport,Kano. MMA is the busiest international Airports in Nigeria that always account for more than 80% of the international airport service operation in Nigeria follow by MAKIA. Five of the International Airport were located in the northern part of the country while the rest were in the southern. Those in the north mostly perform even not up to the standard during the Islamic pilgrimage. The table below illustrate the spatial and geographical location of International Airports in Nigeria.

Table 1. Location Map of International Airports in Nigeria

Airport	State	Geopolitical Zone
Murtala Muhammed International Airport	Lagos	South West
Nnamidi Azikwe International Airport	Abuja(FCT)	North Central
Ilorin International Airport	Kwara	North Central
Maiduguri International Airport	Bornu	North East
Sadiq Abubakar International Airport	Sokoto	North West
Mallam Aminu Kano International Airport	Kano	North West
Port Harcourt International Airport	River	South South
Margaret Ekpo International Airport	Cross River	South East

Source: Fieldwork,2011

Apart from these international airport, today, Federal Airport Authority, Nigerian Airspace Management Agency and Nigeria Civil Aviation Authority under the ministry of aviation manage not less than twenty(20) local airports. However, some international also function as local airports. Existing local airports are: Akure, Benin, Enugu, Ibadan, Imo, Jos, Kaduna, Kastina, Makurdi, Minna, Yola and Zaria.

Table 2: Geopolitical and International Airports Location In Nigeria.

Geopolitical Zone	Population	Size(km ²)	State	L.G.A	International Airport
North east	18,971,965(13.55%)	272,395(29.49%)	6	112	1
North west	35,376,944(25.56%)	246,375(26.67%)	7	188	2
North central	21,671,458(15.48%)	204,800(22.16%)	7	119	2
South west	27,581,992(19.70%)	79,665(8.62%)	6	137	1
South east	16,381,729(11.70%)	29,095(3.15%)	5	95	1
South south	21,014,655(15.01%)	84,587(9.16%)	6	123	1
Total	140,003,542	923,768	37	774	8

Source: NPC, 2006 and Fieldwork,2011

Information above indicates that the criteria for Nigerian International Airports has socio-political consideration than economic. With respect to geopolitical zone, Northwest and North central have two international Airports each while others have one each. Southwest with 19.70% of Nigerian population and 8.62% of total landmass has a single international airport compare to North central with 14.48% of Nigerian population and 22.16% of landmass has two.

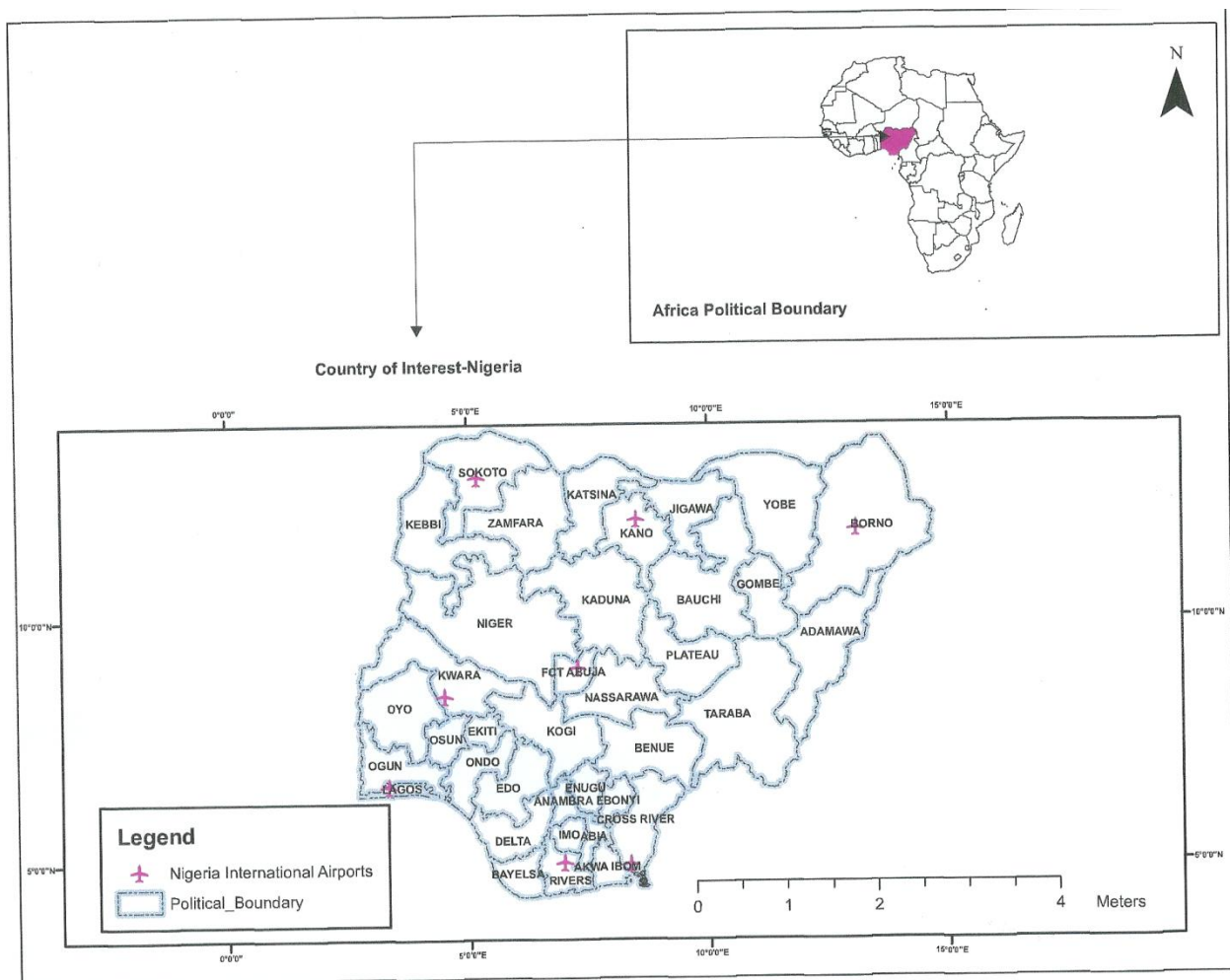


Fig.1 Spatial Location of International Airports in Nigeria

Materials and Methods

Data for this analysis primarily sourced from Nigerian Airspace Management Agency(NAMA) and Federal Airport Authority of Nigeria(FAAN). Collection of data mainly based on information about passengers and aircrafts arrival and departure across the major International Airports in Nigeria . The data covers twelve years(from 2000 to 2011).The descriptive analysis of the data were presented in table while the graphical illustration of the data were subjected to Time Series Analysis to show annual pattern of both movements. Pearson Moment Product Correlation were applied to examine the relationship between the annual aircraft and passengers over years.

Results and Discussion

Table 3 Descriptive Analysis of Passenger Movement

Year	Arrival	Departure	Mean	Range(%)
2000	932,672	949,451	941,062	16,779(1.80)
2001	1,067,152	1,084,390	1,075,771	16,238(1.61)
2002	1,135,910	1,465,420	1,300,665	329,510(29.01)
2003	1,153,206	1,181,287	1,167,246.50	28,081(2.44)
2004	1,201,853	1,256,704	1,229,278.50	54,851(4.56)
2005	4,628,801	4,955,794	4,792,297.50	326,993(7.06)
2006	1,356,653	1,423,603	1,390,128	66,950(4.93)
2007	1,479,709	1,504,483	1,492,096	24,774(1.67)
2008	1,677,154	1,762,475	1,719,814.50	85,321(5.09)
2009	1,508,831	1,666,196	1,591,301	157,365(10.43)
2010	1,854,673	1,891,563	1,871,618	36,890(1.99)
2011	2,035,934	2,025,574	2,030,754	10,360(0.51)
Total	20,032,548	21,166,940	20,599,744	113,492(5.66)

Source: Nigerian Airspace Management Agency,2011

With respect to the above table, It is obvious that arrival rate were less than departure over twelve years of observation. However, variation in percentage range from 1.6 % to 10.43%.Both arrival and departure were high in 2005 than any other years while 2000 recorded the least number of passengers. Over twelve(12) years, arrival of passengers ranged between 932,672 to 4,628,801,departure between 949,451 to 4,955,794 with total range of 113,492(5.66%).

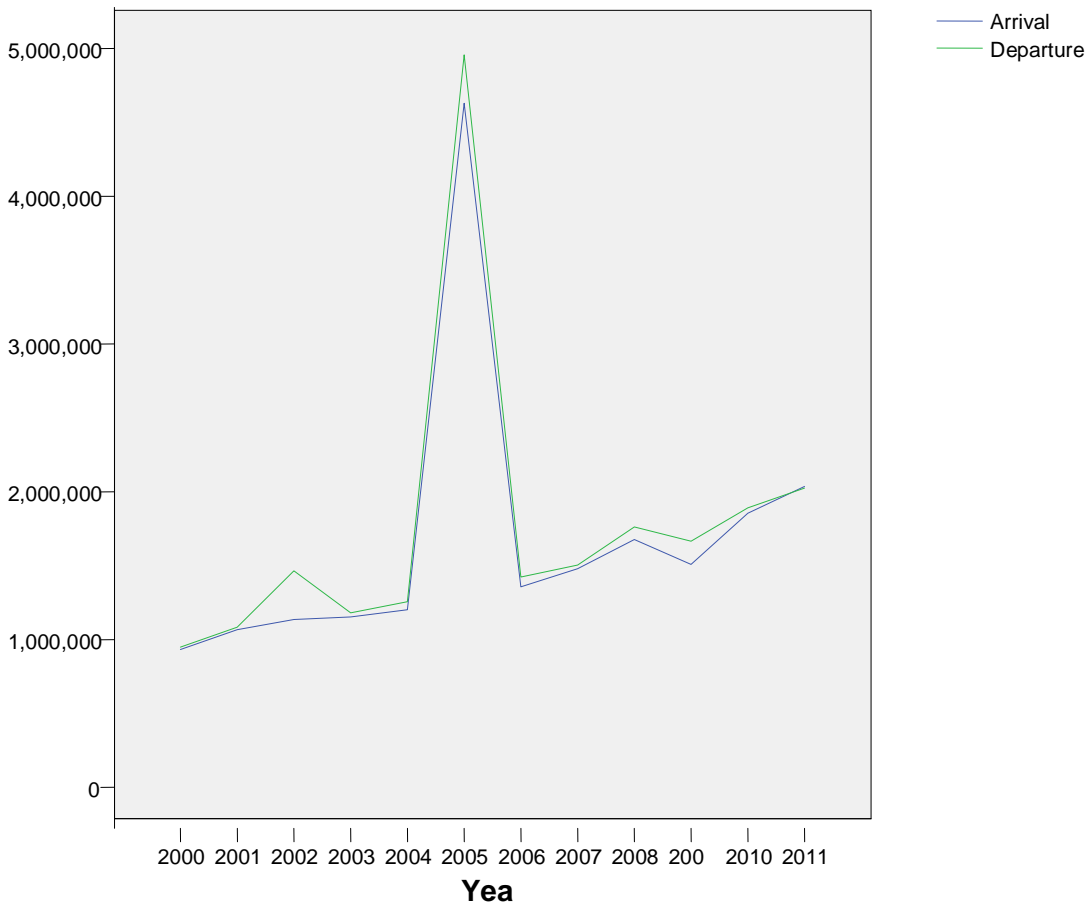


Fig.2 Time Series Analysis of Passenger Movement

As T-Series analysis explain periodical variation and pattern of an observation, the curve above describe annual pattern of passengers movement fluctuation across the specified international airport in Nigeria. The peak of the curve has 2005 as the highest with respect to the volume of the passengers. This sharp rise is followed by 2002. There exist wide gap between the rate of arrival and departure in 2002 than other years. The dimension of changes from 2000 to 2010 were gradual with the exception of 2005. There were correlation between annual passengers and aircraft movement. It was highly correlated (0.987) at 0.01 level of significant. However, this indicate the paripasu flow of p people in relation to the international flight in and out of the country with slight variation of less than ten(10) over eleven(12) years of observation.

Table 4 Descriptive analysis of Aircraft Movement

Year	Arrival	Departure	Mean	Range(%)
2000	11,775	10,765	11,270	1,010(9.38)
2001	10,759	10,930	10,783	14791.37)
2002	12,169	12,397	12,498.50	228(2.0)
2003	11,446	11,551	11,498.50	105(0.92)
2004	11,552	11,633	11,592.50	81(0.70)
2005	93,496	93,383	93,439.50	113(0.02)
2006	13,116	13,679	13,397.50	563(4.29)
2007	13,873	14,103	13,988	230(1.66)
2008	16,002	16,164	16,083	162(1.01)
2009	16,521	17,165	16,843	644(3.90)
2010	18,905	20,276	19,590.50	1,371(7.25)
2011	19,863	19,895	19,879	32(0.16)

Source: Nigerian Airspace Management Agency,2011

Aircraft variation from 2000 to 2011 ranged from 0.12% to 8.58%. It was discovered that 2000 has the greatest variation in the rate of arrival and departure. Generally, departure has been exceeding arrival especially during the festive period and towards the month of December of every year. Also, 2000 has been the only year that arrival outweighs departure with 1010 (8.58%). The total number of 229,614 and 232,039 with a difference of 2,425 which indicates the excess of departure over arrival from 2000 to 2011. It accounts for 1.06% of departure and 1.05% of arrival. Therefore, this explains the greater number of aircraft moving out of the country than coming.

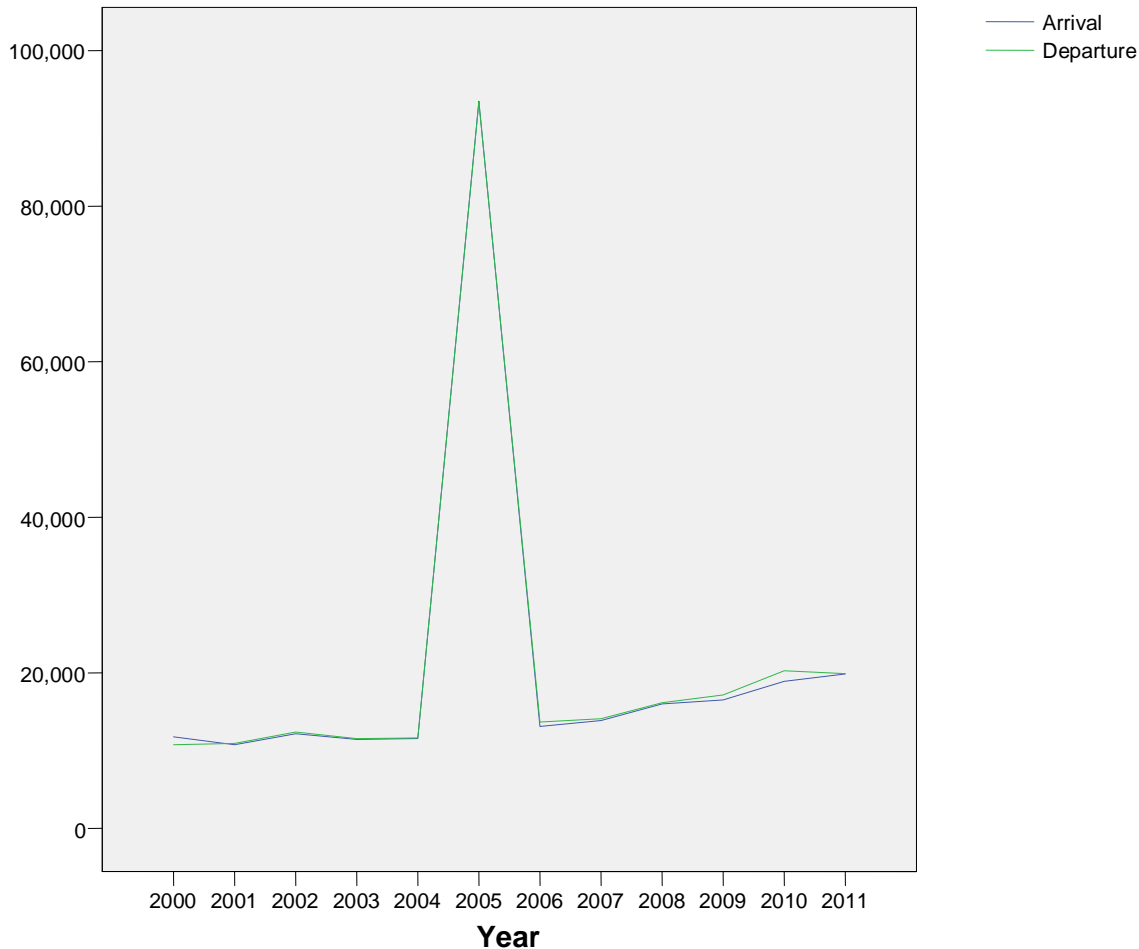


Fig.3 Time Series Analysis of Aircraft Movement

Annual movement of the flight in Nigeria follows the same pattern with the exception of 2000 that shows a sharp increase in the rate of both arrival and departure. Both are in the same trend. That is, the rate of arrival is the function of departure. The higher the number of arrival, the higher the rate of departure in both passenger and aircraft movement in and out of the country international boundaries. Total volume of 17,996,614 and 19,141,366 were recorded for both arrival and departure of passengers over 11 years of observation with the range of 1,144,752 (6.36%) of arrival and 5.98% of departure. This indicates the number of people that stay in their destination. Wider ranges exist between arrival and departure in 2002, 2005, 2008, 2009 compared to the rest of the years. Despite differences in both variables, figure 2 and 3 reveal an increase in patronage of international airports (air transport) since 2006 up to 2011.

Table 5 Annual Variation Rate(%) of Change in Passenger and Aircraft Movement

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Aircraft	9.38	1.37	2.0	0.92	0.70	0.12	4.29	1.66	1.01	3.9	7.25	0.99
Passenger	1.80	1.61	29.01	2.44	4.56	7.06	4.93	1.67	5.09	10.43	1.99	0.51

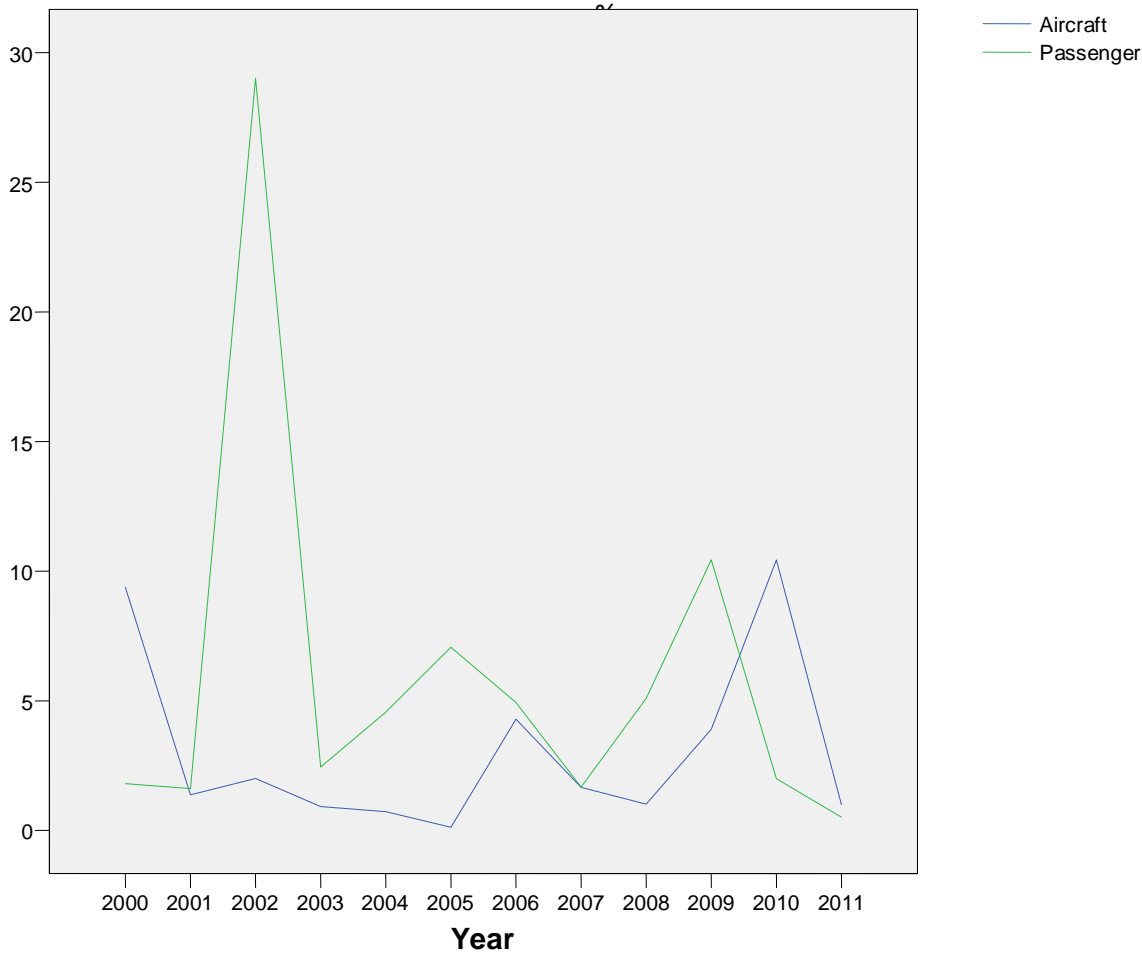


Fig.4

Percentage change in annual passenger and aircraft

Contribution to Knowledge

Without any contradiction, It is obvious that variation exist in aviation industry in Nigeria with respect to festivities, season and economy situation of the country. Movement of both passengers and aircrafts in and out of the country peak-up from the month of September to December, Islamic and Christian Pilgrimages periods (that is impact of religion).Strategic location of international Airports in Nigeria is more of political and religion bias rather than population density and economy (high purchasing power, standard of living, industrial concentration e.t.c) consideration. These are more of some international airport located in the northern part of Nigeria with the exception of Mallam Aminu Kano Airport. Activities peak up there seasonally during political campaign and religion pilgrimage. Commence and trade also play prominent roles in the functioning of international airport. With respect to the most functioning airport ‘MMA’ being situated in the economy and commercial nerve of the country. It accounts for more than 80% of both international and domestic services in Nigeria. The impart of population cannot be underscored in relation to aviation industry owing to the fact that Lagos is the most populous and congested city in Africa.

High rate of departure over arrival has several impacts range from economic to social implication in the country. This may be attributed to brain-drain in Nigeria economy (Industrial Sector) because most of the emigrants are able-bodies people either underemployed or unemployed. This also reduces the country population at the expense of their destination increase. Some people purpose of travelling during the peak months (September to December) may also be of tourism but they are less compare to those that have been staying back.

There is need for creation of employment opportunity with respect to the resources and capability of each regions within the crook and crannies of the country. There is need to decentralize industrial activities in the country to reduce the congestion of Lagos airport and economic activities at large. Establishment of International Airport should be based on commercial and population density rather than political consideration where their situation may not correlate with patronage and annual revenue generation.

References

- Deba U. (2005). A Flight Higher. 80 Years of Aviation in Nigeria 1925-2005. Business Traveling Company, Lagos
- Depriye (1999). Air Transport I Nigeria Development 21st Century. Oyez-Gilgal Company Publisher, Lagos
- Filani M.O .(1975). Air Transport Geography of Nigeria Development. 2nd Edition, Heinemann Publication, Ibadan.
- Federal Airport Authority of Nigeria,(2011)..Service Profile Murtala Muhammed Airport, Headquarter, Ikeja Lagos.
- Nigerian Airspace Management Agency, (2010). Annual Report Murtala Muhammed Airport, Headquarter, Ikeja Lagos.
- Nigerian Civil Aviation Authority,(2010).Annual Report Murtala Muhammed Airport, Headquarter, Ikeja Lagos.
- Federal Airport Authority of Nigeria,(2011).Annual Report Murtala Muhammed Airport, Headquarter, Ikeja Lagos.
- Ogunbodede E.F.,(2008).Urban Road Transportation in Nigeria From 1960 To 2006 : Problems, Prospects and Challenges. *Ethiopia Journal of Environmental Studies and Management*,1,7-18