THE IMPACT OF INTERNATIONAL AIR TRANSPORT LIBERALISATION: THE CASE OF NIGERIA

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Abstract

The impact of air transport liberalisation suggested by economic theory and globalisation inspired Nigeria to adopt a more liberal policy towards its international Air Service Agreements (ASA). The policy involves implementing the Yamoussoukro Declaration with some African countries, an Open Skies Agreement with the US, and the easing of some market access regulations with several other countries. This study explores the extent to which international air transport liberalisation has impacted the Nigerian air transport market over the ten years (2001-10) since its commencement. The objectives of the study include, among others: to review the country's ASAs and determine the level of liberalisation in those agreements, to study the performance of the ASA in terms of international air traffic demand in the market, to determine the impacts of liberalisation on passenger welfare in the market, and to evaluate the impact of further liberalising market access and carrier ownership.

The study employed the use of secondary data relating to traffic volumes and socio-economic variables from the market. These were subjected to analytical methods commonly used in the study of liberalisation, including descriptive statistics, entropy and econometric modelling in order to establish relationships among the variables. Also, primary data were collected from a field survey and analysed to complement some of the findings.

The empirical findings were able to fulfil the objectives of the study. It was discovered that most countries' ASAs were not fully liberalised, but have some level of liberalisation. For a country to attain market access liberalisation, the ASA should grant fifth freedom rights, free pricing, multiple designations, and free determination of capacity and frequency. Another salient discovery was that liberalisation of market access and carrier ownership could spur traffic demand in all route markets, which could substantially increase total annual international traffic flows. The impact on traffic could trigger changes in air fares that would enhance consumer welfare. Nigeria's airport infrastructure is found to be capable of accommodating the expected traffic increases as a result of the liberalisation.

Although there were some adverse effects from the policy which include capital flight and the possible liquidation of home carriers, the thesis concludes that liberalisation could stimulate traffic demand in the market significantly, which could enhance revenue to the industry for sustainable development. The study concludes with recommendations and areas of further research.

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List of Abbreviations

AFCAC	African Civil Aviation Commission
AFRAA	African Airline Association
AIB	Accident Investigation Bureau
ALI	Air Liberalisation Index
ASA	Air Service Agreement
BASA	Bilateral Air Service Agreement
CBN	Central Bank of Nigeria
ECOWAS	Economic Commission for West African States
FAA	Federal Aviation Authority
FAAN	Federal Airport Authority of Nigeria
GDP	Gross Domestic Product
HHI	Herfindal Hirschman Index
ICAO	International Civil Aviation Organisation
IATA	International Air Transport Association
NAHCO	Nigerian Aviation Handling Company
NAMA	Nigerian Airspace Management Agency
NBS	National Bureau of Statistics
NCAA	Nigeria Civil Aviation Authority
NCAT	Nigerian College of Aviation Technology
NIMET	Nigerian Meteorological Agency
OSA	Open Skies Agreement
PAX	Passengers
SAHCOL	Skyway Aviation Handling Company
UNECA	United Nations Commission for Africa
WB	World Bank
WTO	World Trade Organisation
YD	Yamoussoukro Declaration

Chapter One: General Introduction

1.1 Background of the research

The air transport industry is an important service sector that supports other key economic sectors such as tourism, manufacturing, international trade and business, as well as contributing to national GDP (Ogunsanya, 2007). Furthermore, Reagan (1982) described it as strategic to the US economy and, as such, the government would bail it out when in crisis and tax it when necessary.

Air transportation has grown tremendously in the last couple of decades due to the expansion of the world economy, technological advancement, globalization and deregulation. The International Air Transport Association (IATA, 2012) forecasted the total global traffic demand in air transport to increase from 2.8 billion passengers in 2011 to 3.8 billion in 2016 at an average annual growth rate of 5.3 percent for both domestic and international services. International markets are expected to grow from 1.11 billion to 1.45 billion passengers. Despite the impressive growth, the business of air transport is described as fragile, characterised by low profit margins, high uncertainty, a sensitivity to economic conditions, and is very competitive and capital intensive (Doganis, 2006).

Because of the significance attached to the air transport system, most countries treat it as a public utility with high socio-economic and political values and regulated to avoid exposing the national interest (Kasarda & Green, 2005). Consequently, many countries govern the system through a host of national and international regulations that place severe limitations and guidelines on key players in the form of operators and service providers. However, for uniformity among regulations, the International Civil Aviation Organization (ICAO) was established as the apex body for global aviation regulation, setting of standards and recommended practice for worldwide application, and protection of member country interests. Accordingly, the economic and safety regulations of international air transport started in 1944 at the Chicago Convention where formal consent of the countries was recognized. The convention established that air transport services should be provided on the basis of equality of opportunity and operated soundly and economically. It recognized the so-called five freedoms of air transport, to which four more have since been added (Vasigh, Tacker, & Fleming, 2008). Although mutual agreement was reached on exchange of the first two freedoms of air traffic, the other freedoms were left to Bilateral Air Service Agreement (BASA) negotiation between governments (ICAO, 2004a). The BASA became the instrument for economic regulation for traffic between countries. Many believe that the key principle of all international bilateral agreement is reciprocity and protection of national carriers, which involves the regulation of carrier ownership and control of market access, competition, consumer interests, and production distribution (Kasper, 1988). The control of market access (regarded as a traffic right) and of price (tariff control) are believed to conflict, however, with a modern free market economy (Barrett, 1994).

The policy of deregulation pioneered by the US in 1978 relaxed some of the strict bilateral conditions of protectionism and allowed competition in domestic markets, which has led to traffic growth, fare reductions, higher profits, higher quality of service, and additional job opportunities, among other benefits, though with some social cost implications (Morrison & Winston, 1990). Moreover, in view of the US experience, the deregulation of domestic air transport gradually spread to almost every part of the world at different times – for example, in Canada (1984), New Zealand (1986), UK (1988), Taiwan (1987) Japan (1988), China (1988), Australia (1990) and Nigeria (1988).

Furthermore, in view of developments in domestic markets, further reform was extended to the liberalisation of international routes. The USA started to pursue open skies agreements (OSA) with other countries in 1992 where carriers of two nations could operate any route between their two countries without significant restrictions on capacity, frequency or price, and have the right to operate the fifth and sixth freedom services, while still regulating carrier ownership (InterVISTAS-EU Consulting, 2009). In a similar manner the European Union adopted comprehensive liberalisation of its air transport market and formed a single market in which remarkable achievements were recorded (Bowen, 2010). In the same way, African countries adopted another form of international liberalisation policy called the Yamoussoukro Declaration which relaxed market access and carrier ownership among African countries including Nigeria.

There is empirical evidence that liberalisation of international transport has imparted considerable incentives for passengers and the economy. For instance, Morrell (1998) claimed that there was a significant increase in traffic demand on most of the routes in Europe after liberalisation. Button (2001) found that the EU single aviation market had greatly increased competition on many routes resulting in more new routes being operated, leading to a 34% decline in average air fare. Furthermore, Piermartini and Rousova (2008a) alleged that restrictions on airline ownership and control has been found to withhold certain benefits from passengers and the economy, with limited access to new and cheaper sources of capital and managerial talent. InterVISTAS-EU (2009) claimed that liberalising airline ownership and control could provide airlines with access to new and cheap capital sources through mergers and consolidation.

In support of this policy, IATA and the World Trade Organization (WTO) canvassed for further liberalisation of international air transport based on the desirable benefits to the aviation industry, passengers and the global economy, although IATA was attentive to some of the possible challenges, including the over-stretching of critical infrastructure, the needs of developing countries, labour interest, fair play, remote island needs, and national pride/sovereignty (InterVISTAS-ga2, 2006). The aviation markets of developing countries can be a source of survival for some countries' airlines with extensive competition. In most developed nations aviation markets are at saturation level while in many developing countries the market is in a growth phase; therefore, foreign investment can be a source of survival for some airlines (Vasigh, Fleming, & Tacker, 2008). Developing countries such as Nigeria, where carrier capacity is grossly inadequate for effectively implementing some of the bilateral agreements, may likely stand to benefit from further liberalisation, especially the ownership of carriers.

Meanwhile, critical observation by Graham (1995) claimed that the absence of market opportunities, heavy indebtedness, competition, and restrictive bilateral agreements all combine to impede the development of Africa's air transport industry, which may well be detrimental to wider concerns of economic development, particularly tourism, trade and other benefits stemming from air transport. This has motivated the need to scrutinise the arguments put forward by conducting an in-depth study of one African country.

For instance, Nigeria, with the highest population in Africa of about 150 million people, and with abundant economic resources (tenth largest oil/gas reserves), per capita income of $1,754 and a vast land area of 923,768 km sq. (32nd largest country), has the potential to make a significant contribution to the world's international air transport industry (AFCAA, 2008). The country has 23 airports of which four operate internationally and Lagos is planned to be a major hub for West African countries. Total passenger traffic in 2008 was around 11 million, that is, an increase of about 34% from the previous year (NCAA, 2009).

According to Akpoghomeh (1999), the first effort to deregulate Nigeria's air transport sector was in 1988 when three private carriers commenced scheduled domestic air services under a form of regulated competition with the then national carrier.

Prior to domestic deregulation, Nigerian air services were depicted as being erratic and ineffective, but soon after deregulation the airline services in the country witnessed a new paradigm of traffic growth and increased investment in the inactive aviation industry (Oluwakoya, 2011). In addition, the number of private carriers increased from three to 14, passenger volumes increased, as well as competition in frequency, fare, and quality of service.

As a matter of concern, the Nigerian aviation sector has numerous challenges, which include a low level of traffic when compared with other peer group countries such as Egypt, Kenya, South Africa and Morocco. This was believed to have caused the underutilization of aviation infrastructure, with only about 2.7 million international passengers in 2010 (NCAA, 2011). Consequently, the revenue generated by the system was negatively affected, posing a threat to the sustainability of the country's air transportation system. Moreover, although the country signed Bilateral Air Service Agreements (BASAs) with over 50 countries, granting international air traffic between them, these agreements are still mostly restricted in nature based on the principle of protectionism (FMOA, 2010). Therefore, going by the empirical evidence of the impact of liberalisation in other countries, it is possible these BASAs are denying the country more economic prospects from foreign investment, consumer welfare and a high quality of competitive services. In addition, the current regulations only protect private carriers that are only currently capable of handling around 20% of the international air service market. As such, the limited number of foreign carriers are benefitting more, while passengers are being deprived of competitive benefits.

The country has adopted some liberalisation reforms with a number of countries, including an Open Skies agreement with the US, and the Yamoussoukro Declaration (YD) with some African countries, but unfortunately, the country was undersupplied with carrier capacity to service most of the routes assigned to Nigerian carriers within these agreements. Despite this, there has been steady growth in traffic demand in the country in recent years, which may be attributed to numerous factors including the liberalisation policy. Also, it is observed that in Nigeria, after the demise of the then national carrier Nigerian Airways in 2003 due to heavy debt and poor management, different start-up airlines came on board and attempted to fill the vacuum (Bowen, 2010). Consequently, foreign carriers dominated international traffic. There have been tremendous developments in the country's international connectivity owing to the entrance of new foreign network carriers such as Emirates, Qatar and Kenya Airways.

There were several studies carried out on the impact of air transport liberalisation in some countries, but mostly developed nations, and a few developing countries. Nevertheless, the Nigeria air transport market seems to be distinctive in character from these countries in terms of the dominance of business travellers, low traffic demand, abundant infrastructure, the absence of a strong home carrier, and huge market potential (from the country's economy, teeming population and political stability).

In view of the above observations and empirical evidence, the question was raised whether liberalisation can solve the underutilization of the country's airport infrastructure. Although various studies have been undertaken in evaluating domestic deregulation, little is known about the impact of international liberalisation on the market. Therefore, this research project seeks to examine the impact of the liberalisation of some aspects of international air transport services in Nigeria and, also, to determine the potential impacts of further liberalisation.

The research will study the implications of an increase in market access and a removal of foreign carrier ownership/control (limited to air service agreements) of the country's aviation industry to determine its impact on traffic levels and consumer welfare as exhibited in other markets.

The research project will also be mindful of some consequences of a liberal policy as observed by Graham and Guyer (1999), including capacity limitations of infrastructure, fuel hikes/scarcity, the global warming effect, and noise and pollution effects. Also, Vasigh, et al., 2008 added the issue of capacity dumping by large carriers which can strangle small indigenous carriers.

1.2 Statement of the Research Problems

This research examines the impact of air transport liberalisation on passenger traffic and other effects. Hence, it involves active challenges emanating from the argument of viability based on empirical evidence and theoretical foundation. For that reason, the research addresses some of the current and envisaged drawbacks observed by deregulation practice in the Nigerian international air transport industry or by theoretical assumptions. Although the drawbacks may be numerous, the research will focus on the following: -

First, it is generally believed that the issue of economic regulation of international air transport between countries governed by a restricted BASA is meant to protect national carrier interests, while overlooking the interest of consumers. Despite the protection effort and government support, the airline industry is still fragile and financially unstable which has led to the collapse of a number of carriers (Doganis, 2002). In this regard, Nigeria's case is no different from other country experiences, which implies that the regulatory policy of protecting the then national carrier's interest to the detriment of the travelling public did not help home carriers survive the financial turbulence that led to their collapse. Consequently, the financial support offered by the taxpayer was wasted.

Moreover, many small private carriers attempted to fill the gap created by the collapse of the national carriers, which combined only handled 17% of the international passengers in the market. Thus, the regulation principle in this case was only trying to protect home based private carriers to the detriment of passengers, deprived of competitive benefits from more foreign carriers that may have entered the market after liberalisation. It is against this background that this research will establish the impact of deregulation policy with a view to finding a feasible solution.

Secondly, a few studies have discovered the advantages which Nigeria derived from domestic deregulation. For instance, Akpoghomeh (1999) acknowledges the gains of deregulation, such as traffic growth, private airline competition, foreign investment, quality of service, and greater accessibility to services. However, little or no investigation has been carried out on the issue of the impact of international liberalisation.

Another issue is that government has made significant investments in air transport infrastructure, which includes 23 airports and other navigational aids, with four of these airports operating international services to different parts of the world. More over these facilities remain vastly under-utilised; passenger traffic volume was about 9 million and 3 million passengers per annum for domestic and international flights respectively (NCAA, 2011). Meanwhile, empirical evidence from other countries suggests that liberalisation could inspire traffic growth. Therefore, there is a need to evaluate the impact of the current liberalisation so as to ascertain its impact on traffic growth, and determine whether further liberalisation could address the problem of underutilization of the infrastructure.

Most of the country's active bilateral agreements signed with over 50 other countries required a designated indigenous carrier from Nigeria but this has not occurred on most routes owing to the inadequate capacity of the carriers. In a similar manner, Nigeria recently attained US FAA certification for category 1 status in terms of safety standards giving its airlines direct access to the US market (NCAA, 2011). This was achieved after massive investment in modern navigational aid facilities that enhance the safety of Nigeria's air space. However, without robust carriers the opportunity will be wasted. Therefore, a policy of further liberalisation could lead to investment in the carriers by foreign investors, capable of fully utilizing the opportunity. Another issue affecting the industry is the shortage of manpower skill development in both managerial and technical skills. Ore (2009) attributed some of the aviation accidents and incidents to indifference to manpower development and training by the private carriers, unlike the former Nigeria Airways. This is confirmed by the Accident Investigation Bureau in one of its reports involving Bellview Airline's "flight 210" accident in 2005 where inadequate training on a B737 Aircraft was among the reasons for the accident (The Accident Investigation Bureau). Full liberalisation of carrier ownership can attract investment from foreign operators where the country can benefit from the sharing of best practice and the improvement of manpower skills in the industry. In addition, more jobs could be created therefore reducing unemployment problems.

Another interesting development is the link between air transport development and growth in other sectors of the economy such as tourism and trade. O'Connell and Warnock-Smith (2012) argued that incoming tourism expenditure can be stimulated due to a change in aviation policy that influences the supply of services. Therefore, there is a strong indication that air liberalisation policy can affect the supply of airlines which in turn can stimulate investment in the tourism industry. In fact, tourism now is becoming a major contributor to GDP in many developing countries (World Tourism Organization, 2005) , but in Nigeria, despite its advantages of good terrain for tourism, the opportunity is yet be exploited due to an over-dependence on the oil sector, which is limited in the long term. Therefore, a sustainable industry such as tourism can be more reliable and guarantee future development, as practised in the UAE and Singapore.

However, some empirical studies discuss the consequences of a liberalisation policy such as Graham and Guyer (1999), which highlighted the risk of exposing small carriers to international competition without any protection and consequently ruin the carriers' business. This may be a challenge to policy makers to try to balance the positive prospects of a liberalisation policy against its side effects on the industry and the country.

Also, there is the issue of critical infrastructure. The much anticipated traffic increase resulting from liberalisation could lead to overstretching the use of airports. This could cause congestion and delays as evidenced in some developed countries. Therefore, this research should quantify the anticipated benefits against the likely cost effects and possible drawbacks, especially regarding critical airport infrastructure that is not sufficiently flexible to the growing demand.

This poses some questions, the answers to which will be detailed in the research findings. The research questions are as follows:

What is the nature of international air service agreements between Nigeria and other countries?
Which airlines benefited most from the Nigeria ASAs in providing international air services in last ten years?
How will future passenger air traffic demand develop in the country after full liberalisation of international air services?
What will be the impact of full liberalisation on passenger welfare and airport capacity in the Nigerian air transport industry?

1.3 Research Hypothesis

The following hypothesis will be tested;

Hi: The liberalisation of international air service agreements in areas of market access and carrier ownership and control is a driver for the substantial growth of passenger traffic in Nigeria, with potential consumer benefits.

Ho: The liberalisation of market access and carrier ownership/control may not bring any meaningful increase in passenger traffic in Nigerian international air transport markets.

1.4 Aim and objectives of the research

1.4.1 Aim:

The aim of the research is to study the impact of liberalisation of some aspects of international air transport services, specifically the issue of market access and carrier ownership/control on traffic demand in the Nigerian market.

Accordingly, the research formulated the following key objectives as a strategy for achieving the research aim.

- To review the country's ASAs and to determine the level of liberalisation based on the World Trade Organization's index of liberalisation.
- To study how ASA changes affected international air traffic demand in the Nigerian market.

- To determine the socio-economic characteristics of international travellers in the market with a view to understanding the market implications of changing the liberalisation level.
- To determine the impact of liberalisation on traffic demand, passenger welfare, and airport capacity in the market.
- To evaluate the impact of fully liberalising market access and carrier ownership.

1.5 Rationale of the Research

1.5.1 Economic Justifications

Statistics have shown that the turnover of the aviation industry globally per annum is into trillions of dollars, providing jobs for millions of people, with annual passenger volumes of 2.3 billion and a revenue of US$564 billion from passenger traffic in 2009 (ATAG, 2010, Boeing 2010). Definitely, such an industry cannot be overlooked and needs to be properly monitored for development through research and development which can lead to improvements in efficiency. Even though the industry is only contributing less than 1% of Nigeria's GDP, according to a CBN (2010) report, empirical evidence has shown that air transport is one of the key drivers for the development of other economic sectors such as tourism, trade and industry, which make a substantial contribution to the nation's GDP. It is therefore pertinent to nurture its growth for the development of other sectors, which can be achieved through innovation and sustainable research development, as is being practised in other industries such as IT.

Similarly, the airline industry is believed to be very fragile with a very low profit margins when compared to other business industries in many countries (Doganis, 2010). Also, industry business policy is becoming more dynamic, from regulation to deregulation and so on. As a result, many airlines are collapsing, including the Nigerian national carrier in 2002. However, only sound and efficient management of the sector can sustain its growth and development, which is achievable through research that can project future market accurately.

The issue of deregulation and liberalisation is an innovative idea introduced in the sector for the purpose of improving the business of air transport throughout the world. The policy was started by the US in 1978 and later spread to Europe and other countries of the world, and almost all these countries are now counting the gains from this policy (Doganis, 2010). Even in Nigeria, the deregulation of domestic services brought about some reasonable gains (Daramola & Jaja, 2011). Therefore, in consolidation of the gains of domestic deregulation, some countries' ASAs were liberalised with mixed outcomes, while some believe it is contributing to capital flight losses to the tune of about one billion US dollars annually. Therefore, research on the matter should be able to ascertain the actual benefits against the cost of the policy to the development of the sector and the nation in general. Also, research may be able to discover an antidote for the identified shortcomings of the policy and possibly mitigate some of the industry's numerous challenges.

Furthermore, the issue of liberalisation has become a global phenomenon where some international bodies such as IATA and WTO are the vanguard of its promotion worldwide (InterVISTAS-EU Consulting, 2009). Already these organizations are making commitments in terms of studies about the impact of the policy in some countries, by enhancing awareness of the policy benefits. Therefore, this research study will complement these other studies and inform the general public about the Nigerian experience. The research will confirm or otherwise some of the general findings of various empirical studies, since the Nigerian market is assumed to be unique in terms of its market attributes and consumer behaviour.

Providing forecasts and recommendations about liberalisation policy in the country could provide the basis for future decision making by industry stakeholders such as business investors, airline operators, airport organizations and policy makers.

Finally, the research will make an academic contribution by providing additional knowledge of a existing concept in a relatively unknown market, which could add to the pool of knowledge on liberalisation for reference by academics and professionals.

1.5.2 Who Benefits from the research

The thesis' findings may be of interest and benefit to the following categories of user:

Policy makers: The research findings could provide assistance with information that could guide Nigerian policy makers on the issue of air service agreement with other countries or considering further air liberalisation policy. It may not be necessary to say the research findings should inform the decision but they could be of help to instigate further study or comparison with an existing research outcome on a similar issue.

Air transport industry: the research findings may benefit to major players in the industry such as airlines, airports, airspace agencies and handling companies. Both national and international carriers should be concerned about possible or predicted market situations in the country as this will guide them in future investment decisions and prepare them for a more liberal market. It will also let them better understand the concept of liberalisation policy and its impacts.

Also, potential entrants to international air services may benefit from having access to an in-depth study of the Nigerian market. The airport authorities, airspace agencies and handling companies can use the travel demand forecast (in case the market is fully liberalised) in determining the supply of their services for the purpose of investment planning.

Academics; this research may be useful to the academic community in these areas:

- Reinforcing the worldwide pool of knowledge on air transport liberalisation.
- Providing an argument for a specific market experience.
- New concept of using international trade as an exogenous variable in determining the Nigerian international traffic demand.
- Contributing towards the health of the academic discipline in terms of reference material and citations.

1.5.3 Originality

The research conceives and identifies an emerging issue in a new environment, where such research by either academics or professionals is limited, while the policy impacts as revealed by empirical studies such as this are very extensive and worthy of investigation for public awareness.

Therefore, a conventional research instrument will be applied on air transport liberalisation to study its impact in Nigeria where such an impact has not been established scientifically, especially given the fact that the Nigerian air transport market exhibited unique attributes from the countries where research on liberalisation has been carried out. For instance, Nigeria has a large potential market from a teeming population (about one hundred and fifty million people) and a modest economy, but with a very low volume of international passenger traffic and no national carrier. Also, a significant proportion of the passengers are business travellers, while very few are leisure travellers. Therefore, what will be the impact in such a country's market when international air transport is liberalised?

Another original aspect of the study is the creation of new understanding for the use of international trade volumes between Nigeria and other countries as the exogenous variable in determining the traffic demand for the country.

1.6 Scope and limitations

A research thesis on the issue of liberalisation impacts on air transport in Nigeria has a very wide scope, and the limited resources and time constraints will make it impossible to achieve everything. In view of the constraints, the research will focus specifically on passenger traffic demand so as to achieve the research objectives.

The research will focus on air passenger traffic demand which excludes international freight and mail traffic. The data on traffic demand is mainly for passengers measured annually as passenger volume. Also, the research would further limit the scope to international traffic, thus excluding domestic traffic from the analysis. However, the issue of domestic and freight traffic will be discussed in the literature review.

Additionally, the research will focus mainly on scheduled traffic services in the market, and as such, any charter and ad hoc traffic is ruled out in the data analysis and findings. This constitutes more than 80% of international passengers in the Nigerian market based on NCAA figures in 2004. Also, it was difficult for the research to access comprehensive data on unscheduled traffic.

Even though Nigeria has signed many bilateral air service agreements with over 50 different countries, the study's focus is only on countries with scheduled traffic and countries with significant traffic demand as shown by the in-depth country traffic analysis. Though, in the development of the research model, all international traffic demand by country is used.

1.7 Organisation of the thesis

The thesis is structured into seven chapters and will be reinforced with diagrams, tabulations, graphs, charts and appendices so as to enhance readers' understanding.

Chapter 1: General Introduction:

This chapter provides an introduction to the research by highlighting the background of the study, with a statement of the research problems/questions, as well as the research aim and objectives. It also explains the economic justification, research originality, scope and limitations, and the organization of the thesis. Finally, the chapter provides a summary of the research methodology.

Chapter 2: Literature Review – Liberalisation Concept, and Impacts;

This chapter discusses some relevant theories behind liberalisation from a conceptual context to applications which include; deregulation of air transport, international air transport agreements, competition between airlines, elasticity theory, consumer welfare and airport capacity. The chapter also explores the impact of the policy based on empirical studies covering traffic growth, competition, prices, cost/efficiency, and some undesirable effects of the policy. Also, the literature reviewed African liberalisation policy implementation and empirical evidence of its impact in Nigeria.

Chapter 3: Research Methodology

The chapter develops the methodology and methods underpinning the study, which covers philosophical assumptions guiding research design (epistemology, ontology and methodology). The chapter explains the research approach of the study covering data required, data collection and its sources, and the various analysis techniques employed.

Chapter 4: Market traffic Data Presentation and Discussion

The chapter presents the data collected, runs an appropriate analysis and discusses the findings. The NCAA provides the data on annual passenger traffic by route for ten years. The chapter also classifies the data in tables/figures with logical categories for proper analysis using an Excel package. The presentation, analysis and discussion of the data in this chapter covered; a review of ASAs of all active country-pairs; level of liberalisation in the ASA; traffic trends in the market; origin and destination traffic analysis and airline competition. This chapter's content is used to achieve objectives 1 and 2 of the research.

Chapter 5: Analysis of the Primary Data Obtained from Field Survey

This chapter analyses the data collected from the field survey, where the socio-economic characteristics of the passenger market are found. The questionnaires contained 16 questions to the passengers covering their demographic profiles and journey profiles. The chapter provides a summary of the responses from a sample of 502 responses on the 16 variables in tabular form with most of them in nominal scale and some in ordinal and continuous scale. Further, the data is analysed using descriptive and bivariate statistics such as cross-tabulation, central tendency and a one-way Chi-squared test. This chapter is able to provide a basis for achieving objective number 3 of the study.

Chapter 6: Analysis of Liberalisation Impacts

This chapter analyses the secondary data of all countries' traffic demand and estimates the impacts of liberalisation in the countries' international traffic by developing a cross-sectional model using a multiple regression technique. Furthermore, the chapter applies the model in forecasting the future traffic demand when the current regulations in the top 20 country destinations are liberalised. The estimated traffic demand is used in forecasting change in average air fare as well as consumer welfare. The expected traffic increase is finally contrasted against the designed capacity of the country's airport. The chapter accomplishes objectives 4 and 5 of the research study.

Chapter 7: Conclusions and Recommendations

This chapter summarizes the findings of the research from the analysis and discussion of the data that shape the findings of the research, based on empirical evidence. Also, the chapter reviews the extent to which the research objectives have been achieved, and provides answers to the research questions from the findings.

Furthermore, the chapter highlights some useful contributions to policy, theory and practice in the form of recommendations. Also, the chapter discusses some of the research limitations and finally identifies opportunities for further research on liberalisation in Nigeria.

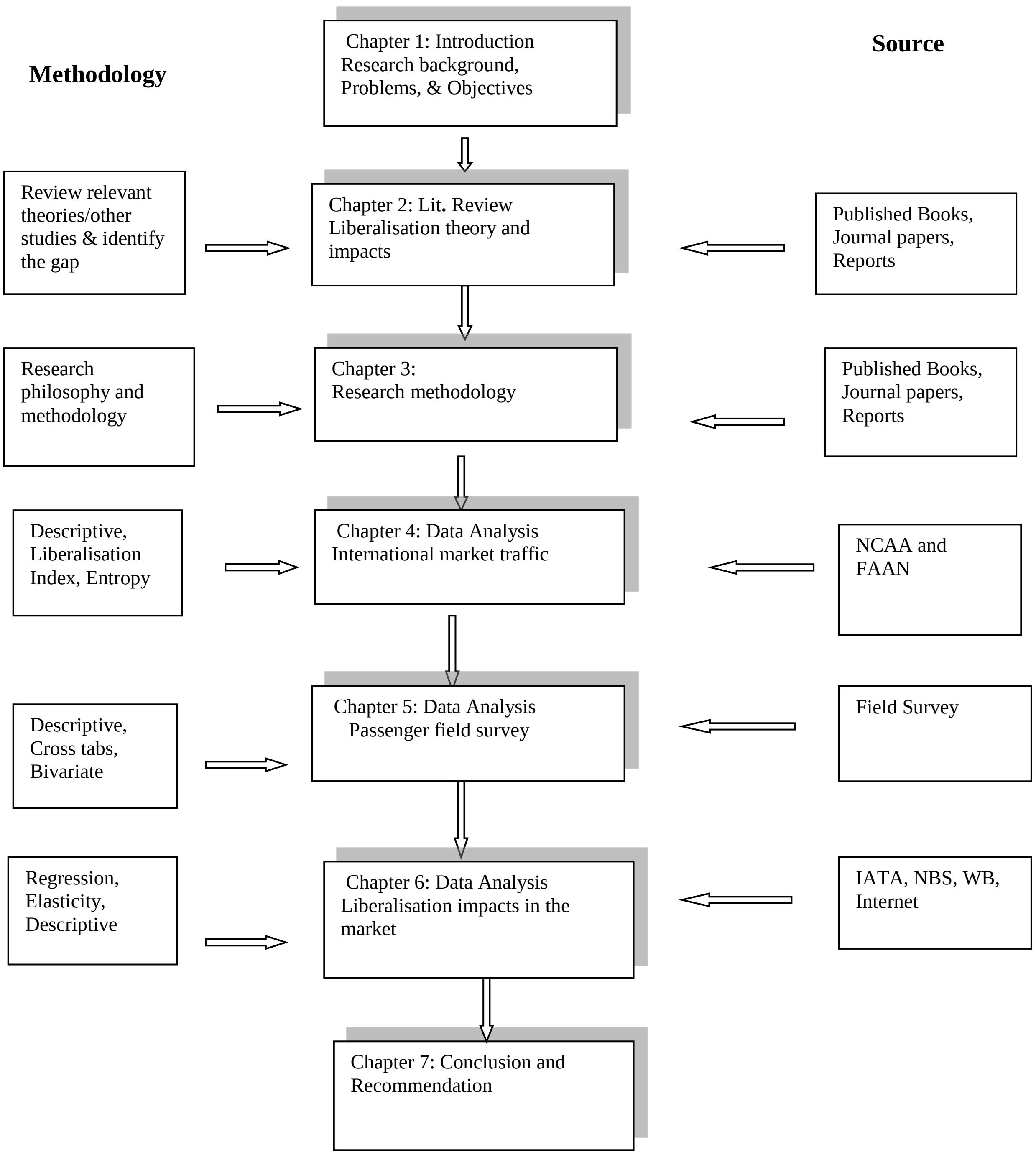

Figure 1.1 Thesis Structure Flow Chart

Chapter Two: Literature review: Liberalisation Theory and Impacts

2.1 Introduction

According to Bryman and Bell (2007), a literature review provides a basis for justifying research questions and research design, as well as informing the data required and the strategy for the research analysis. In this regard, a wide and systematic consultation of published books and journal articles guiding the research has been undertaken.

This chapter discusses some of the relevant theories behind liberalisation from the conceptual context to applications such as the economics of air transport regulation, deregulation in air transport, international air transport agreements, elasticity theory, consumer welfare and airport capacity. The chapter also explores the impact of liberalisation policy based on empirical studies covering traffic growth, competition, prices and, cost/efficiency, as well as any undesirable effects of such a policy.

2.2 Economic Regulation in Air Transport

In response to the development of air transport in areas of technology, economics and politics in the early twentieth century, an institutional framework for regulation was developed and globally applied. In a similar fashion, countries also established regulation policies to curtail domestic air transport competition. For instance, economic regulation in the US domestic market started when the Civil Aviation Act of 1938 was passed. The aim was to promote public interest by enabling people to enjoy a safe and adequate transport service provided by financially sound and reliable carriers. In a similar manner, the regulatory policy established by European governments was aimed at protecting mostly publicly owned flag-carrier airlines from competition. By tightly controlling market entry on both domestic and international routes, the countries were able to provide their carriers with a virtual monopoly (Williams, 1993).

According to the ICAO (2004b) air transport regulation insinuates the process of giving authoritative direction to bring about and maintain a desired degree of order for an expected result. This involves the regulatory structure and a legal framework in the form of licences, regulations and agreements. Also, all regulations contain some content of the particular subjects being regulated such as market access, pricing and capacity. The document adds that the process and structure of international air transport regulation has three distinct venues – national, bilateral and multilateral.

It is widely believed that the major instrument of international air transport regulation is the bilateral air service agreement (BASA) which Vasigh, Tacker, and Fleming (2008) believed was designed to protect national interests and provide support for national carriers. In general, the proponents of regulation believe that the rationale for regulation may not be more than national pride, trade and tourism promotion, foreign exchange earnings, and national security for the country (O'Connor, 2001).

The development of international air transport was guided by the ICAO Conventions of 1919 and 1944 where member countries accepted sovereign rights over their territory and established international air transport agreements on three critical issues that shaped the commercial aspects of the industry, namely: the exchange of traffic rights or freedoms of the air (see Appendix1); control of fares and freight tariffs; and flight frequency and capacity (Doganis, 2002). These three issues determined the degree of pricing freedom and market access. Also, Doganis (2002) added that the convention established the international air service transit agreement (1st and 2nd freedom rights) and that commercial agreements (3rd and 4th traffic rights exchange) be resolved on mutual agreement between the countries concerned. Therefore, the exchange of traffic rights became a matter for air service negotiations in the form of a Bilateral Air Service Agreements (BASAs), or in some cases, multilateral agreements among countries.

2.2.1 Air Service Agreements (ASAs) as instruments for air traffic regulation

In general, before an airline operates international services to another country, the government must first negotiate a treaty level agreement with the destination country's government in the form of a Bilaterl Air Service Agreement (BASA). A BASA is concluded between two contracting countries which permits commercial civil aviation services between the countries. The agreements allow the designated airlines of those countries to operate commercial flights that cover the transport of passengers and cargoes between the two countries. Also, they normally regulate the frequency and capacity of air services between the countries, pricing and other commercial aspects (ICAO, 2004b).

This agreement sets the legal framework for the bilateral air transport relationship between both countries. As a result of ICAO resolutions on commercial international traffic among member countries, the US and UK signed a mutual agreement called the Bermuda (I) agreement. This agreement, according to Doganis (2002), became a model for other countries including the agreements signed by Nigeria.

A BASA involves only two countries, but an agreement comprising more than two countries or a group of countries is referred to as a multilateral air service agreement. The most common form of agreement is divided into four parts, which ICAO (2004b) outlines as;

i) Preamble of the agreement
ii) Main body of the agreement
iii) Annexes to the agreement (Exchange of routes and some matters)
iv) Sometimes exchange of letters or memorandums of understanding.

Based on some Nigerian agreements revealed by FMOA, the body of the agreement and the annexes are the most significant parts of the agreement. For instance, the body of the agreement contains mainly the clauses/articles on grants of rights, preconditions on the exercise of the rights such as carrier airline designation, and ownership/control. However, Doganis (2002) highlighted other clauses/article contents of the agreement to include: tariffs, dispute settlement, effective date, termination, modification, statistics, security/safety, observing national laws and regulations, capacity, timetable and transfer of surplus receipts. Annexes of the agreement mainly deal with air service routes to be operated by the designated airlines.

This research explores some of the key regulatory features identified by WTO (2007) as relevant indicators of openness for any scheduled air passenger services, namely granting of rights, designation, capacity, tariffs, withholding, and cooperative arrangements.

Designation refers to the number and identity of carriers named by each country that could serve a route in the arrangement, which could range from being very restrictive (permitting a single designation of airline) to a fully liberal agreement, which allows multiple carriers (Kasper, 1988). But in between these extreme cases, ASAs can be found that call for multiple, but nevertheless limited, designations (Doganis, 2002).

Closely related with airline designation is the withholding regulation in the agreement that sets a limit for substantial ownership and control of the designated airlines, and a majority stake has to be owned by the country or its nation. Therefore, the regulation is limiting for foreign investment.

The granting of rights or market access suggests an exchange of traffic rights as well as specifying access points. However, in respect of the nature of ASAs, most of the agreements permitted third and fourth freedom rights of international traffic (Doganis, 2002). Therefore, this suggests that the strength of deregulation is assessed from the granting of fifth to the ninth freedom rights, and the number of entry airports. A reasonable, less restrictive ASA allows fifth freedom rights and/or multiple landing points in one or both respective countries, as in the case of the USA open skies agreement with other countries including Nigeria. The most liberal ASAs give airlines open access to all airports in both countries and do not only refrain from restricting fifth freedom traffic, but also grant the right of unrestricted cabotage to the airlines.

Capacity/frequency control refers to the quantity of services that airlines can provide. Possible arrangements, according to WTO (2007), may include predetermination of capacity and frequency as the most restrictive agreement, or free determination of capacity and frequency (absence of any control). In between the two cases, there is a Bermuda type option which allows for an increase of capacity/frequency subject to regulatory approval; sometimes a country of origin rule is implemented, which restricts a government's disapproval to traffic originating in its own country (Doganis, 2002).

Before deregulation, tariff regulation in most ASAs delegated the task to the designated airlines, which used the International Air Transport Association (IATA) as a platform to negotiate air fares. The countries usually approve the resulting airlines agreements on air fares. However, the level of strictness depends on the type of state approval required – moderate ASAs require double disapproval of the governments. This means that an airfare proposal will be automatically accepted as long as both countries to not disapprove of it, while a very restrictive ASA ensure strict agreement on airfares by all carriers serving the routes. A liberal agreement does not require any government approval of fares. Sometimes airlines are also obliged to pool revenue (Doganis, 1994).

According to Doganis (2002), reciprocity is the basis for the complex process of negotiating the air freedoms in bilateral agreements. Each partner in such negotiations tries its best to affect a reasonable balance between the rights to be exchanged by the parties in order to safeguard their own interests and those of their national airlines.

Nevertheless, reciprocity here does not mean that the rights granted by both parties should necessarily be identical. Furthermore, Doganis (2002) stressed that the results achieved by applying reciprocity differ from one agreement to another, and from one case to another, depending on the circumstances prevailing in each case. This research attested this heterogeneous arrangement from the various BASAs in Nigeria with other countries. For instance, some countries' agreements are strict BASAs while others such as the USA have an open skies agreement (OSA). In general, the scope of rights and privileges exchanged is influenced by the bargaining power of each country, the air transport policy of each party (whether liberal, protectionist or in-between), the level of demand in each country's market, and the strength of the national carrier of each country (Doganis, 2002).

As a result of these regulations, international airlines face restrictions on their operation and efficiency which sometimes affect their effectiveness. This, according to many economists and practitioners, negates the principle of a free market economy, and works against the growth of the industry, discouraging competition. For instance, Morrison and Winston (1986) argued that the absence of competition leads to inefficiency, high fares, low load factors, poor profit, and poor service quality. In this regard, they acknowledged that restrictive BASAs inhibit a market-based solution to international air travel and replaces it with government regulation, which raises costs to both operators and customers and thus creates inefficiency in the market. Meanwhile, the drive to relax economic regulation for a competitive environment in air transport as a catalyst for its growth and expansion has increasingly witnessed heightened momentum worldwide (Graham, 1995). This is based on some scientific theories developed by various scholars and evidently justified by observations in practice.

2.2.2 Bilateral Air Transport Policy in Africa

The formulation and scope of African country regulation policies depends upon the objectives of the country concerned. However, according to the specialized African

Union in charge of aviation, the African Civil Aviation Commission (AFCAC), African countries, like other countries of the world, seek the realization of one or more objectives, which include: protection of national carrier interest, promotion of trade/tourism, providing affordable adequate air transport to the public, and avoidance of excessive capacity for wastage.

These objectives do not necessarily coincide, and the relative degree of importance attached to each objective varies from one country to another and from one time frame to another. The policy of a given country reflects its national goals and objectives in international air transport. In fact, bilateral agreements, like other international agreements, show how far each party has succeeded in achieving its goals and objectives – in the end they should serve the interests of both negotiating parties to varying degrees.

AFCAC (1999) further suggested that policy must be geared to overcoming the difficulties encountered in achieving a proper and healthy development of African air transport by improving the adverse conditions prevailing in the continent, which include:

- The concern for protection of national airlines which may be at a competitive disadvantage in the absence of restrictions.
- Most African country BASAs between themselves or with other non-African countries exchange only the third and fourth freedom rights whereas the exchange of the fifth freedom rights is very limited.
- An inadequate air transport market, as traffic volumes are limited and thus the potential progress of tourism is limited too.
- Insufficiency of direct air services within Africa, and an inadequacy of frequency of existing services.

Many analysts believe that these regulations have not succeeded in helping African countries achieve their air transport objectives, but have rather contributed to the underdevelopment of the continent. According to Bofinger (2009), the consequence of the bilateral regulatory system as practised is a bottleneck in the overall development of the air transport network in Africa in which the quantity and quality of air services have not increased or improved. In practical terms, the system has not served the interests of the consumer or that of the airlines or helped strengthen the operations of most African airlines, in particular for a continent of more than 53 independent countries including Nigeria. It has restrained the potential for growth. The current weakness of some African airlines is perhaps the result of this overtly protectionist policy.

As the airlines have become weaker owing to the shift in national policies, the limitations of such restrictive bilateral air service agreements have become more and more apparent; it is becoming increasingly clear that they can no longer meet the rapidly changing needs of the African market and the globalization of the economy. The development of appropriate regulatory policies for African air transport is a key component for an efficient and competitive air transport network in Africa, which ensure the participation of the continent in economic globalization (AFRAA, 2000). In light of the limitations and shortcomings of the African bilateral system, compounded by the growing trend towards globalization, the United Nations Economic Commission –UNECA (2001) – believed that there is a general need for African countries to review the current bilateral framework and launch initiatives towards genuine liberalisation of air services.

As a result of this, AFCAC and UNECA spearheaded the formulation of a new policy for African country air transport liberalisation, termed the Yamoussoukro Declaration, which is similar to European liberalisation.

Nigeria, like other countries in Africa, has signed bilateral air service agreements with many countries of the world. This research discovered that agreements with some countries are liberal in nature. The liberal agreements differ from country to country – they may be partially liberal or moderately liberal. But the majority of such agreements do not contain liberal policies.

2.3 Arguments for Regulatory Reform

As stated earlier, after the establishment of ICAO in 1944 and the subsequent air transport development in to a commercial venture, the civil aviation system was systematically regulated to control competition so as to avoid chaotic economic conditions and to provide more security for investors. As Williams (1993) claimed, the objective of economic regulation is to promote public interest by enabling people to enjoy a safe and adequate air transport service provided by financially viable and reliable carriers.

However, in the late 1970s, according to Gillen and Hinsch (2001), the traditional system of regulating international air transport by means of a restrictive bilateral ASA came under growing pressure from a number of sources. These included new developments in domestic air transport policy in the US which spilled over to other countries, new competitive pressures by some Asian Airlines, and the formation of the European Single Market extending its free trade regime to air services.

Also, in the same period many economists and industry professionals began to doubt the benefits of regulation and argued for more competition in the system based on economic theories and empirical analyses. For instance, Jordan (1970) argued that regulation in practice did not promote public interest but rather helped the producers in forming cartels that enjoyed monopoly profits, while entry and exit were effectively restricted and price levels were higher than they would have been if unregulated. In addition, Breyer (1982) argued that certain features of the airline industry make regulation inappropriate, such as individual markets and an industry that can support more airlines of an efficient size. Also, the demand for air transport is highly cyclical, where load factors drop and costs per passenger rises during recession, hence profits suffer; as such there is a need for airlines to reduce fares to attract more passengers during recession which can increase load factors (Breyer, 1982). Also, Graham (1995) further added that load factors tended to be low, profitability and service quality was poor and competition was almost eliminated by the regulatory failure to secure efficient economic performance.

2.3.1 Economic Theory of Liberalisation

Another possible rationale for reform in air transport regulation policy is the theoretical explanation of the deregulation concept that shows how restrictive bilateral ASAs dictate the institutional structure of international airline markets. Therefore, the thesis examines some of the theories that attempt to explain the concept scientifically.

Button and Drexler (2006) offered a general representation of the issue graphically as shown in Figure 2.1. It highlights the potential fare and output implications of the various types of regulatory regimes. The theory postulates that international traffic between countries A and B under a BASA regulatory regime is assumed to have a linear demand D1. As a result of international regulation, fares and capacity are restricted in the market to P1 and N1 respectively.

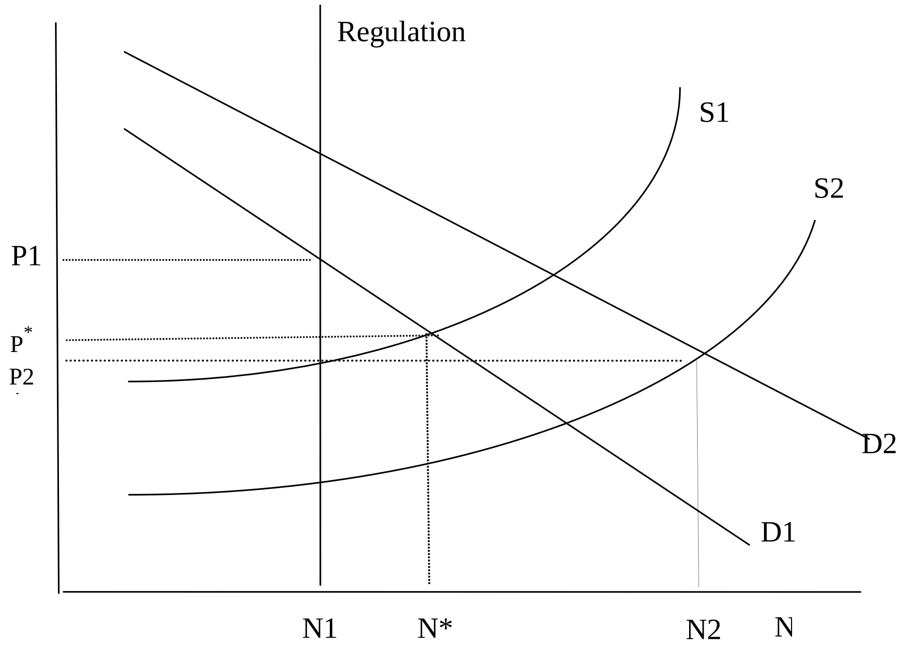

Figure 2.1 Theory of liberalisation extracted from Button and Drexler (2006)

However, Button and Drexler (2006) further added that removal of regulation due to a liberalisation policy such as an open skies agreement or an African type Yamoussoukro Declaration results in competition and a drop in price to P*. This affects both the demand and supply curves for international air travel between A and B due to downward pressure on costs from the privatized carriers that mitigate inefficiency in the industry and route expansion. The policy implementation provokes a more integrated quality of service such as hubbing, code sharing, interchangeable frequent flyer programmes, common lounges and baggage check-in, consequently pushing the demand for international service to D2. The drop in costs and the outward shift in demand leads to an increase in volume of travelling passengers to N2 and liberalisation allows price to fall to P2, as illustrated in Figure 2.1.

The diagram suggests that, by applying the *ceteris paribus* rule, liberalisation leads to lower costs of operation and a higher number of passengers. The relationship between the degree of liberalisation and traffic volumes appears to be robust, while the impacts on air fares are debatable, in which the direction of the change depends on the shapes of elasticity of supply and demand curves (Grancay, 2009).

The theory seems to justify the liberal air transport system for the purpose of market growth, efficiency and possible low fares or consumer surplus, but it fails to provide remedies for protecting national carriers that have been previously protected by a regulatory regime; nor does the theory predict how smaller carriers from developing countries can compete effectively with bigger carriers from developed countries in a liberal arrangement. There are also other challenging issues that the theory needs to address in order to satisfy proponents of regulation.

In addition to the above theory, there are numerous scientific hypotheses that advance the cause for reform in air transport from regulation to liberalisation policy in various countries. The reform as cited by many studies was pioneered in the USA in 1978 and gradually spread to many countries at different times over the last 35 years ago. Consequently, the air transport market witnessed a significant change in some of its parameters such as levels of competition, traffic demand, price, cost and frequency.

According to InterVISTAS-EU (2009), there is considerable evidence that liberalisation of international markets has provided substantial benefits for air passengers and the wider economy. One study of the EU single aviation market found that it had greatly increased competition on many routes, had resulted in many new routes operating, and led to a 34 per cent decline in fares (UK CAA, 1998). Another study found that liberalisation of the EU market had doubled the rate of growth in air traffic in the EU (Graham, 1998). Furthermore, other studies have demonstrated a link between increased air traffic and growth in employment and Gross Domestic Product (GDP). For example, a recent study estimated that each 10 per cent increase in international air services led to a 0.07 per cent increase in GDP, which can translate into millions (or even billions) of dollars of incremental GDP (Kincaid & Tretheway, 2013).

2.4 Deregulation and Liberalisation – Concept and development

As stated earlier, economic theory, technological development, globalisation and airline business concerns formed the basis for regulatory reform in air transport with the expectation that the sector would be transformed into a highly efficient, competitive and consumer-oriented market, where entry barriers would be relaxed while incumbents would be forced to be efficient; consequently and air fares would come down. As a result, two general policy models were established: a deregulation and liberalisation policy.

According to Graham (1995), globalisation in general is partly explainable by economic paradigms that promote free trade and international competition, achieved through world-wide processes of deregulation and the removal of trade barriers. In this present context, deregulation involves the exposure of air transport to laissez-faire or free-market forces, achieved through the removal of most regulatory controls over pricing, while permitting carriers to enter and leave markets at will.

However, the research study observed that deregulation and liberalisation mostly refer to the same issue and some literature used them interchangeably. Graham (1995), however, claims that deregulation refers to the exposure of air transport to competitive laissez-fare or free-market forces achieved through the removal of most regulatory controls over pricing, entry and exit barriers; while liberalisation recognizes that the structure of the transport industry may necessitate the retention of some form of regulatory protection, if consumers are to gain long-term benefits from the competition promoted by deregulation measures.

Meanwhile, Grancay (2009), described air transport liberalisation as a process of the gradual abolition of regulation on designation, capacity, frequency and tariff setting within ASAs. It aims at creating an efficient air transport system based on free market mechanisms where market factors are determined by a demand and supply curve at the point of equilibrium, and the government would only be concerned with safety and security.

Furthermore, regulatory reforms and privatisation policies are expected to be held concurrently. Proponents contend that privatisation without reforming economic regulation would lead to private monopolies, and deregulation without privatisation merely promotes inefficient public monopolies (Button, 1991).

Wang (2004), however, identified the air transport reform process to comprise five different stages: regulated market; process of deregulation; deregulated market; process of liberalisation and fully liberalised market.

It is observed that there is generally a time lag between the implementation of domestic and international deregulation, the former being much easier to implement, either at the scale of the individual country or of a trading bloc such as the EU, where the Single Aviation Market was completed in 1997. By then, deregulation was creating a world air transport market in which fully or partially privatised major airlines sought, if not to eradicate, at least to control competition and capacities through consolidation into regional and ultimately global alliances. Their strategies were increasingly driven by the pursuit of high-yield traffic and lower costs rather than chasing market share (Graham, 1998).

2.4.1 Deregulation in US and the Global Spread

The regulation of the US government through the Civil Aeronautics Board (CAB) in the 1970s covered routes, fares and schedules. The CAB's main functions then included: allocation of routes to airlines; limiting the entry of airlines into new markets; and the regulation of fares for passengers (Morrison & Winston, 1986).

The Airline Deregulation Act of 1978 removed many of these controls, thus changing the face of civil aviation in the US. Airlines required permission to serve any given route and incumbents could raise many obstacles to the granting of that permission. It also dismantled the notion of a flag carrier (Morrison & Winston, 1986).

Furthermore, Moore (1986) added that the new air transport policy of the US rested on two closely related events. The first was the implementation of the US airline deregulation policy which led to productivity gains of US air carriers and fare reductions for travellers. The second event was the 1978 CAB order that proposed the withdrawal of antitrust immunity for the IATA air fare conference, which initially prevented all airlines from participating in air fare co-ordination meetings for routes to and from the US. Subsequently, this was limited to only US air carriers in return for approval for some liberalisation on air fare setting for other countries.

The implementation of reform in the US market, which lessened some stringent bilateral conditions on protectionism and allowed competition in the domestic market, led to growth in traffic, fare reductions, higher profits, good quality of service and more job opportunities, among other benefits, though with some social cost implications (Morrison & Winston, 1995).

In another testimony, Goetz & Vowles (2009) observed that from 1978 to 2000, there was, in general, a greater quantity of services, more people flying, and lower average fares, although widespread differences occurred across places based largely on the level of single carrier domination, size of market demand, and the presence or absence of LCCs such as Southwest Airlines.

In addition, it was found that airline ticket prices were almost 40 per cent lower (inflation adjusted) than they were in 1978 when the airlines were deregulated. Alongside growth in populations and workforce-mobility increases, these trends provided some of the stimuli for rapid expansion in domestic passenger traffic volumes which rose from 250 million passenger miles in 1978 to 750 million passenger miles in 2005 (Moore, 1986).

Meanwhile, after the success of domestic deregulation, the US pursued deregulation on the international front by adopting liberal 'Open Skies' bilateral air service agreements with other countries around the world. The agreements opened the aviation market to foreign access and removed barriers to competition which gave airlines the right to operate air services from any point in the US to any point in the other country, including the fifth freedom agreement (Button & Taylor, 2000).

Another remarkable market that become a benchmark was the success of European country deregulation. The economic liberalisation of air travel was part of a series of deregulation moves based on the growing realization that a politically controlled economy served no continuing public interest. The effects of liberalisation in Europe are undoubtedly quite different in scope and magnitude than in the US (Button, 1991).

Meanwhile, Wang (2004) compared the liberalisation effects in different markets and found that Europe and the USA had a slower growth rate of 4 to 6 per cent per year, while the Asia and Pacific region witnessed the most dynamic growth rate of about 9 per cent per year. This may be due to fast growing trade and investment coupled with rising domestic prosperity, and the region's air traffic is forecasted to grow continuously (Wang, 2004).

As a result of the US experience, deregulation gradually spread to almost every part of the world at different times, examples include: Canada (1984), New Zealand (1986), UK (1988), Taiwan (1987) Japan (1988), China (1988) and Australia (1990). In most of these countries, the early proliferation of competitors gave way to a sharp increase in market concentration (Graham, 1995).

2.5 Economic Impacts of Liberalisation: Empirical evidence

After several years of reform in air transport involving the implemented of deregulation and liberalisation policies in a number of markets, there have been some significant changes, which have had glaring economic and social impacts on the aviation market namely the stimulation of airline and airport services. Also, all other aviation service related industries such as tourism, and the economy in general have been stimulated. Even though there are some negative outcomes from such policies, the consensus in general is evident from the empirical analysis that the policies are generally beneficial to most aviation stakeholders. This section will examine the empirical evidence from previous studies of the impact on some key market variables such as traffic, competition, cost, and profit/consumer welfare. Also, the development of business models like hub & spoke networks, and Low cost carriers (LCC) are some of the benefits of liberalisation. In addition, it is acknowledged that liberalisation has had an effect on labour movements and cross-border cash flows due mainly to airline acquisitions and mergers.

2.5.1 Impact on market competition

One of the primary purposes of liberalisation according to some of the theories is to make air transport services competitive with regards to efficiency and quality of service. Therefore, the first expectation from liberalisation is to have an increase in the competition levels depending on market regulation, whether it is free entry, free capacity, free pricing or all the three.

As stated earlier, the US market was the pacesetter in the reforms that triggered fare-setting freedom and endorsed free market entry to prospective airlines, subject to safety requirements. The impact was immediate, with discount fares emerging, significant numbers of new carriers entering the market, and many more services being offered.

According to the US Government Accountability Office (GAO, 2006), the effects of deregulation on airline competition in the US domestic market included the fact that the average number of competitors had increased to 3.5 per market in 2005 from 2.2 in 1980. During the same period, fares declined almost 40 per cent. Similarly, Button (2001) found from a UKCAA analysis in 1994 that the reforms of the 1990s produced greater competition both on EU domestic routes and on international routes within the Union. Specifically, 30 per cent of EU routes were served by two operators and 6 per cent by three operators or more. Further analysis for 1997 showed that since 1992 the number of international city-pair routes within the EU with multiple carriers rose from 500 to 566, many having three or more competitors. On the denser routes, the number of cities served by multiple carriers with three or more competitors doubled. Similarly, the number of domestic city-pair routes served by multiple carriers rose even more, with 20 per cent now served by three or more airlines. Consequently, fares fell on routes where there were at least three operators (Button, 2001).

InterVISTAS-ga2 (2006) summarised the impact on competition as, between 1992 (the year before the EU air market was fully liberalised) and 2000, the number of intra-EU routes served by more than two carriers increased by 256 per cent while the number of domestic (within member country) routes with more than one carrier increased by 88 per cent.

Similarly, Warnock-Smith and Morrell (2008) examined whether liberalisation of air transport in Caribbean Island countries had affected levels of competition and enhanced traffic levels. The findings buttress the previous presumption that there is a positive correlation between liberal policy reform and entry as well as traffic/capacity growth, which enhances tourism in the region. The analysis focused on three busy city-pairs that link to the US, and discovered that carrier designation relaxation and granting of the fifth freedoms permitted additional airlines from the USA and third countries (Argentina and Chile) to enter routes in 2000 and compete. This facilitated traffic growth of up to 130 per cent in these particular routes in three years, while capacity was observed to increase by about 110 per cent. However, one of the routes (US–Dominican Republic) was discovered to have low traffic growth that differed significantly from the others, which may not be unconnected with the Dominican Republic's strict regulations on designation of carriers making entry difficult (Warnock-Smith & Morrell, 2008). The regression and time series analysis study concluded with evidence from three US–Caribbean markets that there is a significant statistical relationship between air policy reform and traffic/capacity growth, leading to greater output and competition levels.

This research envisaged that cases of EU and Caribbean liberalisation differ significantly from the Nigerian situation: while the former markets were dominated by leisure travellers and believed to be foreign nationals, the Nigerian market is substantially dominated by business travellers and mostly Nigerian passengers. Therefore, it is likely the two markets will respond to liberalisation differently.

In a related development, it is generally understood that competition begins to be effective once there are three carriers present, thereby avoiding situations of monopoly or duopoly (Graham, 1998). Although the claim agreed that, a duopoly of a network carrier and a low-cost airline leading to a wider price gap is inevitably a competitive situation. Also, competition between two network carriers leading to duopoly does not necessarily mean the absence of competition (Graham, 1998).

However, the assessment of competition between airlines seems to differ between various studies. Some researchers study competition from the perspective of the number of carriers, or airports, or traffic, or market share (market concentration). But an evaluation of competition based on city-pairs turns out to be more appropriate, though the issue of stop-overs when passing through another country somewhat complicates it as a measure. Dobruszkes (2009) designed two methods of evaluating competition: using the number of competitors and entropy. The latter is a capacity share index that provides a good measure of effective competition, calculated by summing the squares of the shares (fractions or percentages) of seats provided by each airline on the route.

Therefore, since competition can only be effective with more than two carriers competing in a market, in some developing countries like Nigeria, effective competition may not be possible on some of the routes due to the absence of a Nigerian carrier on many of the routes, leaving the route with a monopoly or duopoly service. Therefore, the impact of liberalisation in such a situation may be different from the evidence found in US and European markets.

2.5.2 Impact on passenger traffic

Traffic increases are another anticipated impact in terms passenger of freight demand. Hypothetically, it can be assumed that an increase in competition can lower prices which can stimulate more traffic demand (Button & Drexler, 2006). As a matter of fact, Xiaowen, Oum and Anming (2010) elaborated how liberalisation efforts have brought significant traffic growth, which according to them was mainly driven by two factors: first, liberalisation removes constraints on pricing, route entry, service capacity, and co-operative arrangements among alliance members. Removal of these constraints allows airlines to compete more effectively and operate more efficiently, which reduces prices and increases service quality in terms of flight frequency and frequent flier programmes, for example. As a result, passenger traffic can be stimulated substantially. Second, liberalisation allows airlines to optimize their network configuration. The implementation of hub-and-spoke networks has enabled carriers to link small markets with their hub airports, thus expanding air services to new destinations.

Meanwhile, there is much empirical evidence to support the above argument from all parts of world, both in developed and developing country markets. Some even develop a model for global applications, and most of the evidence from studies agrees that liberalisation enhances traffic growth for both passengers and freight.

One of the significant demonstrative effects of liberalisation on traffic is the US market. For a period of 12 years encompassing the policy change (1976–87), passenger traffic had risen by 88 per cent, employment in the industry had risen from 340,000 to

450,000, scheduled passenger miles were up by 62 per cent and seat availability had grown by 65 per cent (Button, 1998).

Another research study by UKCAA (2006) discovered that two years after liberalisation the number of direct services between the UK and India had increased from 34 to 112 services per week (an increase of 229 per cent). While most of these new services were operated between the two countries' main airports (Heathrow in the UK, Delhi and Mumbai in India), services connecting secondary points in the UK and India also rose. In addition, the number of carriers operating between the two countries increased from three to five.

Despite the fact that many analysts believe the stimulus impact of liberalisation can take several years to fully mature and bring a significant change, InterVISTAS-EU (2009) provided evidence, from some exceptional cases, where there was an instant impact on traffic changes as shown in Table 2.1 below.

Table 2.1 Traffic growth rates on a selection of routes due to liberalisation

Canada – USA bilateral in 1995, one year after traffic increased by 146.4%.
Costa Rica – USA bilateral in 1995, one year after traffic increased by 118.5%
Hong Kong – USA bilateral in 1996, one year after traffic grew by 21.1%.
China – USA bilateral in 1996, one year after traffic increased by 174.3%.
Brazil - USA bilateral in 1997, one year after traffic increased by 120.0.4%.
Japan – USA bilateral in 1998, one year after traffic increased by 116.6%.
Mexico – USA bilateral in 1999, one year after traffic increased by 169.6%.
India - UK bilateral in 2004, two years after traffic increased by 229%.

Source: InterVISTAS-EU (2009)

Although it is proven that liberalisation stimulates traffic growth, there is no universal fixed ratio for the change. However, the level of traffic growth depends on each country-pair factors which include socio-economic links, the nature of liberalisation, distance and the age of the ASA. Accordingly, Permartini and Rousova (2008b) developed a universal empirical model with the aid of gravitational theory using a standard Air Liberalisation Index (ALI). The model estimated the impact of a change in the degree of air service liberalisation on the volume of international passengers with a database of 2,300 air service agreements between 180 countries using the following regression:

$$\ln(\text{Passenger Traffic}) = \alpha + \beta 1 \ln(\text{distance}) + \beta 2 \text{ border} + \beta 3 \text{ colony} + \beta 4 \text{ language} + \beta 5 \text{ low-income} + \beta 6 \text{ ASA\_age} + \beta 7 \text{ air liberalisation} + \Sigma k\, \gamma\, k\, Dk + \varepsilon \text{ -------------- } (2.1)$$

Where ln(Passenger *Traffic)* is the total number of passengers travelling between two countries in log form, ε is the Error term, the symbol ln denotes logarithms, Dk denotes country k fixed effect in dummy. *Air liberalisation* denotes the degree of liberalisation of air service between the two countries.

From the model, Permartini and Rousova (2008b) found robust evidence of a positive and significant relationship between passenger traffic and the degree of liberalisation of the aviation market. It estimated that increasing the degree of liberalisation from the 25th to 75th percentile increases traffic by approximately 30 per cent. Overall, the gravity-type model explains an important proportion of the variance in the data, with an adjusted R^2 of over 75 per cent. However, during the analysis of the role of specific provisions of agreements in liberalising the aviation market, they found that the removal of restrictions on price, capacity, cabotage rights and the possibility for airlines other than the flag carrier of the foreign country to operate a service are the most traffic-enhancing provisions of air service agreements. In addition, the most liberal type of ASA is found to increase traffic by 78 per cent relative to the most restrictive type. These results are robust to the use of different estimation techniques. The most remarkable significance about Permartini and Rousova’s (2008b) study that make it different from other studies, was the use of indices of the degree of liberalisation developed by experts and widely used by WTO. This addresses the issue of multicollinearity among the dummy variables discovered in some previous studies such as that of the Intervista study in 2006–09. In addition, the research takes into consideration the differences in country pairs in terms of low income countries and high income countries. The research finally addressed the issue of the mismatch between data on bilateral passenger flow and the regulatory regime.

However, the major weakness of the model includes the use of a maximum of only 3 per cent of its sample from developing countries, which may not adequately represent the market performance of developing countries such as Nigeria. Another shortcoming of the model is that it is a global model relationship which may not be as precise as market specific studies. Also, the use of 2005 data when liberalisation in many developing countries had just started without any noticeable effects may affect the generalisations of the study.

From the available empirical evidence, the study is convinced that liberalisation and network competition in international markets lead to shifts in the spatial pattern of traffic flows as well as air fare reductions, which in turn substantially stimulates traffic. However, traffic increases for any given market also depends on underlying socio-economic variables and levels of liberalisation.

2.5.3 Impact on Flight Frequency

Another impact associated with traffic increases is the increase in frequency of flights. This is one of the attributes of airline service quality that implies the number of aircraft departures, the total number of miles flown and the timeliness of service. The importance of frequency is compounded by evidence that it is high-yield business-class passengers who are most sensitive to this factor.

According to Graham and Guyer (1999), the need to optimise frequency of service in a competitive market demands a smaller aircraft type. This leads to airlines having a mix of aircraft in their fleet. Furthermore, they claim that competitive market entry demands a matching of frequency with that of the incumbent carrier(s). Consequently, most carriers have linked frequency and status products, further reducing the capacity of their aircraft to install separate business class cabins and/or seating for those paying for premium tickets that maximise frequency benefits, including the ability to switch flights. It is readily apparent that the hypothetical use of larger aircraft conflicts with the evidence that airlines will continue to pursue strategies that accommodate growth primarily through additional frequencies.

In this regard, the demand by airlines for smaller capacity aircraft of about 110–180 passenger seats are on the increase. Boeing estimated that 70 per cent of aircraft deliveries over the next decade will be single aisle models (mostly less than 200 seats), which will account for 69.1 per cent of aircraft in 2016. Such projections underline the fragility of any argument that growth can be partly accommodated in larger aircraft (Boeing, 2007).

Liberalisation has also led to an increase in frequency as evident in Morrell's (1998) analysis where the average frequencies offered on all intra-EU routes increased from 13.9 departures per week in 1989 to 15.5 in 1992, subsequently declining to 14.5 in 1995. This indicates some frequency competition in the first period, with the decline since 1992 explained by the addition of new non-stop regional services (and some charters switching to scheduled) with below average frequencies, rather than by any reduction in frequency on the denser routes. This is evident from the sharp increase in the number of routes served by only one carrier between June 1992 and 1995. Also, it was observed that the average load factor changed slightly between 1989 and 1992, but changed more between 1992 and 1995 on routes with competition from up to three carriers. Those routes with over three carriers competing were already served by larger aircraft, in part because of some fifth freedom operators with very large B747s. It was proven that airline competition at the route level can only be effective if the number of actual competitors is greater than two.

In addition, Morrell (1998) agreed that competition is best described by the number of effective competitors, rather than just the number of carriers serving the route. This takes into account the limited ability to compete on low frequency leisure or fifth freedom flights. As predicted by contestability, a relatively large number of new firms entered the market in the first phase, but many did not survive the rise of competition, giving rise to the emergence of oligopolies (Morrell, 1998).

Also, Schipper et al. (2002) found from the analysis of a sample of 34 routes in Europe with varying liberalisation statuses from 1988 to 1992 that fares on fully liberalised routes had fallen by 34 per cent, while the departure frequency had risen by 36 per cent. They argued that, as a result of multiple services, many routes were not economically sustainable, while institutional impediments limited entry on some routes, which remained monopolies.

2.5.4 Impact on Air fare/Consumer welfare

The general economic principle from the Button and Drexler (2006) liberalisation graph (see Figure 2.1) is that deregulation removes barriers on entry and price, which stimulates additional supply from competitors; as a result the air fare declines, which creates some consumer welfare from the air fare saving. There is much empirical evidence that corroborates this theory. For instance, Forsyth (1998) simulated different scenarios of the deregulated market in the US by manipulating some of the regulation variables and discovered that substantial fare reduction would be possible through an increase in load factor. But due to inefficient competition with fixed fares and deregulated capacity, the load factor had fallen to a level that added substantially to cost but little to service quality. Therefore, it is suggested that additional load factor would lower fares at little extra cost.

Evidence from a UK CAA (1998) study also examined changes in fares between 1992 and 1997 for four markets (Amsterdam/London, Brussels/Rome, Madrid/Rome and Madrid/Milan) and found a mixed outcome. Fares had not fallen dramatically and, for some classes, especially business class, there had been a rise. The analysis did not reflect changes of patronage between classes or the effects of frequent flyers and other benefits.

Morrison and Winston (2000) investigated the effects of deregulation on fares and service levels and found that deregulation led to significant reductions in fares; 80 per cent of passengers, accounting for 85 per cent of passenger miles, paid fares that were lower than the estimate of regulated fares in the US market. They believed the emergence of low-cost carriers played a significant role in this phenomenon, such as Southwest Airlines that accounted for nearly 40 per cent of the fare savings in the United States (based on a statistical analysis that compares fares in city-pair markets where Southwest offers service).

Furthermore, Moselle et al. (2002) found that business class air fares from Heathrow to the US were more than 200 per cent higher than those from Frankfurt, Amsterdam and other leading European airports where open skies policies were agreed. As a result, UK business class passengers alone paid in excess of £2 billion a year more than their European counterparts for transatlantic fares. This is one of the impacts of the Bermuda

II agreement signed by the UK–US governments, which is more restrictive than open skies agreements.

Another study by the European Union in 2003 found that the liberalisation of the EU airline market instigated a fall by 34 per cent in discounted air fares (in real terms – after inflation adjustment) between 1992 and 2000, while full economy fares declined 5 per cent in real terms in the same period. Furthermore, fares fell on routes where there were at least three operators overall, after allowance is made for charter operations, 90–95 per cent of passengers on intra-EU routes were travelling on reduced fares. However, there are variations in the patterns of fares charged across routes. Mandel (1998) found that on routes with three or more airlines (about a third of the total in terms of passengers carried) fares fell, but that there had been little change in fares in monopoly or duopoly markets.

Gillen, Harris, & Oum (2002) developed a model to assess the effects of changes in ASA on the distribution of benefits and costs to airlines, consumers and foreign carriers. This study estimates a model that integrates all possible routes in the O-D market and applied simulation experiments on Canada–Japan routes to predict the likely outcome of liberalisation under different scenarios. The model describes a Price Index function P; and a Consumer equilibrium E;

$$P = (\left\lfloor \sum_{1}^{R} \delta_r p_r^{-\sigma} \right\rfloor)^{-1/\sigma} \text{ ------------------- (2.2)}$$
$$E = \sum_{r=1}^{R} P_r q_r \text{ -------------------------- (2.3)}$$

Where qr is the individual route demand measured in passenger unit terms and pr is the route price, r is individual routes, σ is elasticity substitution between any pair and route δ is the weight of individual routes.

Gillen, et al., (2002) discovered the effects of removing frequency regulation while regulating price and entry. In this scenario, the two carriers involved maintained profitability and the total route demand increased by only 1 per cent. However, relative to the base case this market outcome was less profitable for the Canadian carrier and slightly more profitable for the Japanese airline, making a combined net welfare loss of $4 million.

Furthermore, the study adds that the equilibrium results for the case of removing both frequency and entry regulations while maintaining price regulation attracted a new carrier from Canada with additional flights. The findings suggest an increase in traffic volumes on the route of 37 per cent over the previous case of frequency competition without entry. This scenario also produces positive welfare impacts relative to the no entry case. The gain in aggregate profits for carriers was about $31 million, while the gain in consumer benefit was approximately $30 million.

Similarly, the study simulated the effects of removing price regulation with and without entry regulation, but with frequency regulation. The results with entry regulation show that the two airlines reduced fares by an average of 23 per cent, and attracted an almost equal number of passengers. The net welfare effect is positive, with the gain in consumer benefit slightly outweighing the reduction in carrier profits. But when both price and entry regulations are removed while maintaining frequency regulation, the study findings show that the entry of a new carrier stimulates the market demand, and offers consumers a wider range of choices. Consumer benefit here was far in excess of the scenario where frequency competition takes place in the absence of price competition (Gillen, et al., 2002).

Further analysis by Gillen et al., (2002) simulated the effects of removing regulations on price, frequency and entry; it suggests the entry of a new carrier (Air Canada) makes the market much more competitive, and as a result, the equilibrium prices are significantly lower than the case with entry regulation and this stimulates a traffic volume increase of about 50 per cent. Additionally, there would be a fivefold increase in welfare gain to Canada because of the entry of Air Canada while Japan's welfare gain is limited to an increase from $23 million to $38 million.

In addition, the study discovered that liberalisation achieves not only a competitive increase on direct routes, but changes the relative attractiveness among alternative routings – that liberalisation of the Canada–Japan route would likely induce additional passengers travelling between the countries via the US to use the direct route, and some US passengers travelling to Japan, to use the route via Canada. The additional passengers increase traffic density and reduce per passenger cost, which could lower fares on the route (Gillen, et al., 2002).

Therefore, this study found that liberalisation is negatively correlated with air fare, but the ratio of the relationship varies from one route to another. However, it is observed that the fare changes were considerable where a low cost carrier exists in the market as observed by Morrison and Watson (2000).

Most of the study areas where evidence of liberalisations impact is found occurred in developed countries. Therefore, extrapolation from their experience is potentially misleading because of the difference in the market structure and the nature of the rules that exist in different countries. In addition, experiences of the impact of liberalisation on various markets are not homogenous. Therefore, it would be deceptive to assume Nigeria's air transport market would follow a similar pattern.

2.5.5 Impact on cost efficiency

Assessing the impact of liberalisation on airline efficiency is difficult as it involves classified information from the airlines. But, generally, there are quite marked differences in levels of productivity among airlines. Despite the challenges from airlines, some studies discovered the impact of liberalisation on cost efficiency by comparing the efficiency of airlines under periods of regulation and liberalisation, using different approaches.

One of the traditional approaches to evaluate cost efficiency is to use the stochastic frontier method. For instance, Good, Röller and Sickles (1995) conducted a data envelopment and stochastic frontier analysis on eight European and eight US airlines which compared their productivity from 1976 to 1986.

The study found that the EU carriers would save about $4 billion a year (in 1986 dollars) if they became as efficient as US airlines.

Similarly, Oum and Yu (1995), compared 23 international airlines from 1986 to 1993 and, using a total factor productivity framework, found variations in the performance of carriers across regions. With the exception of the Japanese airlines, Asian carriers were found to have lower costs than European or US airlines. The post-liberalisation period assisted productivity improvements in European carriers compared with their US counterparts, probably due to catching-up consequences (Oum & Yu, 1995).

Another contribution from Moselle et al. (2002), found from the study of US–EU liberalisation that variations in costs across airlines reflect the existence of possible inefficiency that could be reduced by transatlantic international liberalisation. The analysis suggests that the potential for increased efficiency is possible if airlines whose costs are higher than the estimated best practice benchmark were able to reduce their costs to levels where total savings of about €2.9 billion annually is estimated. The study believes that a proportion of these cost savings would be passed to consumers in the form of lower fares. Also, an additional annual increase in consumer welfare of about €370 million arising from increased passenger traffic in response to the lower prices could be realized (Moselle, et al., 2002).

Furthermore, Inglada et al. (2006) applied an efficiency frontier in the assessment of the economic and technical efficiency of various airline companies involved in liberal air services. They developed an efficiency frontier cost model as functions of capital, energy used, and work force. The model was applied to a sample of 20 international airlines from different continents and found that liberalisation has a tendency to reduce cost and improve efficiencies but this is not always the case in some airlines. It means there may be other contributing factors that cause various cost efficiencies. Their arguments could not ascertain the efficiency of these airlines before the liberalisation era.

Another contribution is that the waves of alliance formations help airlines to rationalise services, consolidate traffic and reduce costs, as well as play a role in dictating the competitive strength of major alliances such as Star Alliance, One World, and Sky Team. Wang (2004) uses a theoretical model and shows an increase of this type of alliance is significantly related to market-specific variables in which deregulation influences the development of code sharing and marketing agreements. He concludes that increased traffic volumes will enhance operational efficiency by using larger planes that reduce costs for the long-haul market operating multiple connections through joint operations.

This also proves the hypothesis that deregulation leads to the development of strategic alliances which in general increases the average number of flights and the number of passengers carried per flight on routes; that is to say, an increase in the levels of cooperation between partners contributes to an increase in network share, passenger market share, number of direct flights/city-pairs, and the number of routes.

2.5.6 Impact on Contemporary Development in Aviation

Liberalisation brought about some contemporary developments in air transport, which have shaped the business models of the industry, such developments include hub & spoke operations and Low cost carriers.

The development of hub and spoke networks (HS) after low cost carriers (LCC) entry are believed to be a survival strategy for incumbent airlines after being exposed to competition (Dennis, 2007). Graham and Guyer (1999) claimed that in response to liberalisation, where new airlines have entered and compete with the incumbents in the market, the major carriers have a survival strategy of domination over new entrants, through the development of new business strategies like, hub and spoke networks, code sharing and alliances, frequency of service, and the setting up of low-cost carriers.

This network pattern, which is repeated several times during the day, is essentially a supplier-driven strategy, maximising the online and interline connections available to a particular airline at their hub airport. A hub operation when combined with airport congestion and linked to an alliance strategy offers the real possibility of controlling competition at a particular airport. The objective of hub networks by airlines, according to Oum, Taylor and Zhang (1993) is to achieve cost efficiency by exploiting "economies of traffic density". They further argued that relaxing foreign ownership and control restrictions will consolidate the market via mergers and acquisitions, allowing airlines to strengthen their networks and market position.

The HS model survives among the legacy carriers, but the LCCs now handle a significant intra-continental market share, typically flying point to point. The network hub model offers consumers more convenience for routes, but point-to-point routes have proven less costly for airlines to implement. Over time, the legacy carriers and the LCCs will likely use some combination of point to point and hub networks to capture both economies of scale and pricing advantages.

The LCC model is the competitive strategy mostly adopted by new entrants in to the market with much lower fares to attract customers that are highly elastic and typically fly point to point. Doganis (2006) alleged that the model grows substantially and makes a significant impact in most developed country markets. The rapid growth of LCCs demonstrates that price can significantly affect markets. However, in order to provide much cheaper and more accessible services, the LCC operators use secondary and third level airports close to major cities as is the case with Ryanair that uses Liverpool airport instead of Manchester airport, or EasyJet, which uses Gatwick in place of Heathrow Airport, for example (Dennis, 2007).

In liberalised markets like the EU single aviation market, LCCs have benefited most from the deregulation of beyond traffic rights, which give them freedom to establish airport bases in foreign countries (Doganis, 2010). In addition, development of LCCs in domestic markets can promote liberalisation policy by increasing the competitiveness of a nation's airline industry as a whole. On the other hand, existing regulations on route entry, foreign ownership, and effective citizen control have constrained the expansion of LCCs.

However, the development of LCCs has not impacted much on the Nigerian aviation market due to the absence of LCCs in the market either indigenous or foreign owned.

2.6 Adverse Impact of Liberalisation

With regards to liberalisation, previous discussions have been focussed on the affirmative input of liberalisation from theories and empirical analyses; however, the policy is believed to have some issues of concern for the industry.

2.6.1 Protection of National Carriers

Most countries' main reasons for regulating air transport are to protect the national carrier, which is often regarded as a public asset; in this regard the carrier is given protection against competitive threats with monopoly power and, as such, the carrier becomes indifferent to market and customer concerns. For instance, the United Nations Economic Commission for Africa (UNECA, 2001) observed that an overriding motivation of the history of the economic regulation of air transport in Africa has been the desire to ensure the protection of the national flag carriers. Consequently, African aviation policies are based on the concern of protection of the interests of national airlines rather than the interests of consumers (passengers and shippers). The desire to protect flag carriers explains much of the attitudes of African countries towards air transport liberalisation.

Furthermore, Abate (2007) added that most African countries are interested in having a national airline that is shielded by restrictive bilateral agreements in order to generate hard currency. Subsequently, airlines become strong interest groups that dictate policy for their own ends.

In this regard, most country airlines enjoyed some form of monopoly and protection from competition under traditional BASAs. However, liberalisation allowed competition on price and frequency of service from other airlines. Consequently, many country airlines that enjoyed some form of monopoly and protection during the regulation era collapsed after being exposed to deregulated markets as was the case with Nigeria Airways in 2002. Even some European airlines were adversely affected by liberalisation policies, such as the Greek carrier (Olympic Airways) and SAS (Bowen, 2010).

2.6.2 Labour Issues

The economic benefits of liberalisation have been substantial for the travelling public and the airline industry in general. Certain fundamental predicaments brought on by deregulation continue to afflict industry workers. Labour substitution has a negative impact in some countries where labour costs are high, as in developed countries. Gittell, Von Nordenflycht, Kochan, McKersie, and Bamber (2009) claimed that, due to the drop in air fares by 40 per cent following deregulation in 1978, airline employees have seen up to 40 per cent cuts in income, which involves about 545,000 employees in the US market. This claim reasons that, under regulation, airlines received returns on capital, giving profits to executives and employees, but these high returns had disappeared due to a higher consumer surplus a competitive market. Corporate interests considered the labour costs to be incompatible with what they interpreted as inefficient work rules, when compared with what they would theoretically have expected in a competitive market.

In developing countries like Nigeria, labour could be affected by the liberalisation of carrier ownership; for example, foreign partner airlines employing pilots and technical crews from abroad, which may result in job losses to some Nigerian pilots. However, the Nigerian carriers that dominate other West African countries may benefit from this policy too within the West African region.

2.6.3 Environmental Concerns

It is widely accepted that liberalisation of air transport promotes growth of the air transportation system as claimed by theories and empirical studies. However, the issue of sustainability and environmental impact is a matter of concern, most especially in developed countries where environmental impacts have reached an alarming stage.

It is against this background that Graham and Guyer (1999) alleged that air transport constitutes one of the negative environmental externalities of the single European market, creating noise, atmospheric pollution and consuming large areas of land, while being dependent on non-renewable energy resources. According to them, air transport accounts for around 10 per cent of all transport energy consumption in the EU and is responsible for approximately 15 per cent of all transport CO_2 emissions. Even though technological developments are reducing the negative environmental effects, such as low sound aircraft and fuel efficiency, the sector's growth precipitates the effects much faster than technology returns on the negative impact. This raises the issue of the sustainability and capacity of the infrastructure.

In another contribution, Goetz and Graham (2004) argued that globalisation and liberalisation have resulted in excessive air traffic growth and wasteful competition, thereby exacerbating negative social and environmental externalities incompatible with long-term sustainability.

Traffic growth, however, is eroding attempts to move towards a more sustainable system, air transport having a higher growth rate than any other transport mode. Therefore, if the goal is environmental sustainability rather than global development, then it is apparent that a transport policy must be designed to reduce demand for mobility, a demand that is derived and can therefore be altered (Goetz & Graham, 2004). The liberalisation policy for air transport arguably has an inverse relation with a commitment to sustainable mobility, and in apparent confirmation of the argument that policies for the mitigation of environmental impacts of transport are frustrated by market developments. According to Dennis (2009) air transport accounts for about 3 per cent of annual man made contribution to climate change mainly anthropogenic emissions of CO_2 which was about 705 million tonnes per annum. Although the proportion seems to be inconsequential, there are some concerns such as the prevailing growth rate of aviation precipitated by contemporary issue like liberalisation, high per capita emission levels of aviation and the green house emission cap by international bodies (Dennis, 2009). In general, air transport has the potential to contribute to unsustainable development, while liberalisation is not only not mitigating the problems but rather precipitating it.

2.6.4 Airport capacity constraints

As stated earlier, liberalisation led to growth in air traffic (more passengers and cargo volumes, new airlines, and more airline frequencies), which increases the pressure on some infrastructure capacity such as airports. In some countries, capacity is overstretched and expansion is not easily implemented, as is evident in the UK at Heathrow airport, for example.

Some developed country airports have been perceived as having overstretched capacity, although innovations in air traffic management and control have mitigated the problem for a while. According to Graham and Guyer (1999), the situation is portrayed as more complex by three crucial factors that create the geography of airport capacity restrictions. These are the different structures of airport infrastructure, the growth in demand for air transport, and the distribution of the demand for air transport. They cited the instance that runway capacity is a function of an airport's layout in EU airports where only marginal increases in runway capacity can now be achieved without the construction of additional supporting infrastructure.

Secondly, they added that aggregate demand for air transport remains driven by GDP growth, with some significant contribution from changes in industrial logistics (just in time) and lifestyle (increases in income). Lastly, European air transport liberalisation has helped grow the air transport market through price competition (Graham & Guyer, 1999).

Meanwhile, Airbus and Boeing (2007) estimated a global average annual growth rate in air traffic of 5 per cent over some years to come and the growth is equivalent to a doubling of demand every 12 years. However, Graham and Guyer (1999) noted that the construction of runways, or even their lengthening, creates even more strenuous opposition in many European airports, which compounds the capacity challenges.

Therefore, this suggests that there is likely to be conflict between demand or the projected growth in traffic and existing infrastructure at some European airports. Simply, the projected growth rates cannot be sustained within current infrastructure capacity. This is evident from the current slot scarcity in some airports such as London Heathrow, where the demand is very high and the slots are scarce. As a result, some airlines such as Nigeria's Arik Air had to hire slots from BMI (British Midland Airways), even though it has the traffic rights to operate to the UK courtesy of the Nigeria-UK BASA. Therefore, this suggests that even if the UK and Nigeria liberalised their agreement, there is the possibility that the Nigerian carriers could face the challenge of slot allocation at UK airports.

Meanwhile, the level of growth in most developing countries including Nigeria has not reached the optimum level of airport capacity. In fact, some airports in Nigeria are suffering from capacity underutilisation. As Ozoka (2009) pointed out, only Lagos airport has a reasonable traffic level that can be self-sustaining while the other four international airports are desperately in need of additional traffic to boost their revenue. The only anticipated constraints from traffic growth will be additional terminal capacity, most especially during the peak period at Lagos airport, although there may be a scarcity of resources to finance such projects.

Although consumers benefit more from frequent services, the negative environmental effects of the widespread use of relatively small aircraft are compounded by unimpressive load factor statistics. As Goetz and Graham (2004) pointed out, the combination of frequency as a competitive weapon with relatively modest load factors means that the "slot productivity" of many key European airports rarely exceeds 100 passengers per commercial aircraft movement. Airlines, moreover, are forced to try to sell surplus capacity through special fares and promotions. Such tactics, of course, simply encourage increased mobility, further pressurising already scarce resources and increasing environmental impacts.

2.6.5 Capital Flight Issue

Capital flight is an economic consequence that occurs when money or assets flow out of a country to another destination by an investor as a result of taxes on capital or the actions of equity holders. This has adverse effects on a country's balance of payments.

There is concern in the air transport industry that opening a market to be accessible to leading international foreign carriers, and competing with indigenous carriers without protection is like strangulating the latter, most especially the niches among them. Liberalisation allows market competition with little market guarantee or protection for indigenous carriers allowing leading international carriers to capitalise on the weaknesses of competitors and offer a high quality of service at a reasonable price. Because of their economies of scale advantages from their higher capacity and larger network, they tend to dominate the market. The situation is even worse if the agreement is between a developing country and a more advanced country. Therefore, the proceeds of the international market will end up going to other countries, causing capital flight that can create balance of payments imbalances.

This is evident from the Nigerian market where foreign carriers dominate the international passenger market by over 85 per cent (Ismaila & Warnock-Smith, 2012). Also, Usim (2011) alleged that liberal bilateral has resulted in multiple frequencies and entry points to foreign registered airlines in which Nigeria loses $1.41 billion yearly to capital flight, while indigenous airlines operating internationally gross a paltry $28.37 million out of that figure.

Even the multiple entry points deprive local carriers of the market for distributing international passengers to their final destinations by using domestic operations. This may have contributed to the financial woes of indigenous carriers.

2.7 Deregulation in Africa

According to AFCAC (1999), African aviation policies have been based more on concern for protection of the interests of national airlines rather than the interests of the consumers (passengers and shippers). The desire for the protection of flag carriers explains much of the attitude of African countries towards air transport policy, which is characterised by state control over traffic rights and the curtailment of fifth freedom rights, restrictions on frequencies and capacity, double approval of tariffs, single designation of a carrier on a route, and prohibitive demand for royalties. Consequently, the bilateral regulatory system has remained a bottleneck in the overall development of the air transport network in Africa, while the quantity and quality of air services have not improved (Bofinger, 2009). Therefore, the system has failed to serve the interests of the consumer or that of the airlines in fact and has restrained the continent’s potential for growth (Economic Commission for Africa, 2000).

2.7.1 Development of Yamoussoukro Declaration

In light of the limitations and shortcomings of the African bilateral system compounded by the growing trend towards globalisation, there has been a growing recognition by the 55 African countries of the limitations of the current bilateral framework and the need to launch initiatives towards a genuine liberalisation of air services. These initiatives for regional liberalisation, while perceived with the broadest consensus within the continent, somehow remained elusive until 1988.

The need for a continent wide consensus and solution was discussed at length under the auspices of the Economic Commission for Africa (ECA) by African ministers responsible for civil aviation which led to the adoption, in October 1988, of the Yamoussoukro Declaration on a new African civil aviation policy that included comprehensive proposals for a general framework for air transport reform in Africa and the unification of the fragmented African air transport market. The objective was to create a beneficial environment for the development of intra-African and international air services.

A further important step in the move towards intra-African air transport liberalisation was taken in November 1999 at a conference of African Ministers responsible for Civil Aviation held under the auspices of the United Nations Economic Commission for Africa in Yamoussoukro, Côte d'Ivoire.

After intensive discussions, the Ministers adopted a decision relating to the implementation of the Yamoussoukro Declaration concerning the liberalisation of access to air transport markets in Africa. The decision was subsequently endorsed by the Assembly of Heads of State and Governments of the African Economic Community in July 2000 under Article 10 of the Abuja treaty. The decision was published in the Official Journal of the African Economic Community on 12 July 2000. The decision entered into force on 12 August 2000 among the 44 African countries who had ratified the Abuja treaty.

The framework provided for a continent-wide aviation agreement to liberalise the African skies with the aim of reaching full liberalisation by the year 2002. It removed all restrictions on traffic rights including the fifth freedom, capacity between city pairs, non-regulation of tariffs by government, multiple designations, and the complete liberalisation of cargo and non-scheduled air services. A monitoring body was established to oversee the implementation process. The decision gradually replaced the current fragmented regulatory regime by a unified system that gave airlines commercial opportunities on an equal basis and ensured that their activities were be governed by a common body of aviation rules.

2.7.2 Liberalisation in Yamoussoukro Declaration

In view of the YD development, a number of African countries have signed or amended bilateral agreements to introduce a more open and liberalised regime, lifting restrictions on traffic rights, capacity, frequency, tariffs and designation.

In this regard, Nigeria has signed liberal bilateral agreements with many African countries to the level of YD, including all West African countries, Egypt, Ethiopia, Kenya, Cameroon, Morocco and Libya. However, some of these liberal bilateral agreements are not effective due to the absence or limitation of carriers in the member country or inadequate air transport markets between the two countries.

Table 2.2 Comparisons of YD provisions relative to other forms of ASA

Provisions	**Traditional Bilateral**	**Liberalised Bilateral**	**YD Provisions**
Airline Designation	Single from contracting Countries	Multiple	At least one
Traffic Right (Routes)	Limited 3rd , 4th and 5th (Only Specified routes in the BASA)	Full fifth freedom (Open market access, flying on any route between two Countries)	Full fifth freedom in Africa, as from 2002
Fares	Double Approval	Double Disapproval	Double Disapproval
Capacity	Equally shared among both designated airlines	Free choice of A/C type and frequency	Unlimited number of frequency
Ownership	Substantially and effectively owned by nationals or government of the contracting Countries	More Liberal provision on foreign ownership	Substantially and effectively owned by nationals/gov't of the contracting Countries, or Country Parties to the YD

Source: Doganis 2004 and ECA 2007

2.7.3 Implementation and Sub regional Arrangements

The Yamoussoukro Declaration has exerted pressure on the African sub regions for implementation on regional basis. As a result, a number of sub regional consultations and arrangements for the economic regulation of African air transport at the wider sub regional community level or among countries with a community of interest have been or are being developed (Bofinger, 2009). Some of these initiatives include the Banjul Accord, COMESA (Common Market for Eastern & Southern Africa), EMCA (Economic Monetary of Central Africa), EAC (Eastern African Community), SADC (Southern African Development Cooperation) and WAEMU (West African Economic & Monetary Union).

The operational implementation has forged ahead with greater freedom to negotiate bilateral agreements, as evident in all areas of the continent. As a result, routes and aircraft sizes are better adapted to the market, and viable indigenous carriers have expanded.

Implementation has been uneven across sub regions, however, with the greatest progress made in West Africa, particularly among the Banjul Accord Group of countries (see Table 2.3). In southern Africa, particularly, many domestic and intercontinental markets remain protected, often in an effort to bolster unviable national carriers. Recent modelling suggests that full liberalisation in the Southern African Development Community (SADC) would reduce air fares by 18 to 40 per cent. With multiplier effects, such a reduction could add half a percentage point to economic growth in the region (Bofinger, 2009).

Table 2.3 YD in the sub regional organisations

Community	**Members**	**Status of YD implementations**	**Status of ASA liberalisation**	**5/7th freedom**
Banjul Accord Group	Cape-Verde, Gambia, Guinea, Liberia, Nigeria , S/Leone	YD policy agreed on Multilateral ASA	5th freedom granted. Tariff, capacity and frequency are set to free	43%
Economic Monetary of Central Africa (EMCA)	Cameron, Chad, C/Africa, Gabon, Congo, DRC, E/Guinea	YD principles is agreed, but some minor restrictions remain	5th freedom. Free tariff, capacity and frequency. But max of 2 carriers per country.	28%
Common Market for Eastern & Southern Africa	Most east African countries except Botswana, SA, Lesotho, Tanzania	YD accepted but implementation is pending until a joint competition commission is formed.	Liberalisation is pending. But when applied, 5th freedom, capacity, fare, destination will be free.	14%
Eastern African Community (EAC)	Kenya, Uganda, Tanzania	EAC issued a directive to amend ASAs to YD policy	Air service is not liberalised. Because amendments remain pending	16%
Southern African Development (SADC)	Countries south of Tanzania	No steps were taken toward YD implementation.	No liberalisation within SADC has been initiated	6%
West African Economic and Monetary Union (WAEMU)	Benin, B/Faso, Cote D'Ivoire, G/Bissau, Mali, Niger, Senegal, Togo	Within members, YD is fully implemented	All freedoms including cabotage are granted. Tariff and capacity liberalised	44%

Source: Bofinger (2009)

The Banjul Accord: The accord was for an accelerated implementation of the Declaration among the West African Countries (Cape Verde, Ghana, Guinea Bissau, Sierra Leone, Nigeria and the Gambia) and was concluded in April 1997. The purpose was to foster co-operation in the areas of provision and management of air traffic services, establishment and exercise of Safety Oversight Procedures, and the establishment of a coordinated multilateral approach to the negotiation of agreements with respect to the granting of traffic rights, among others.

Jallow (2001) added that in order to simplify the exchange of traffic rights, and market access, the Banjul Accord encouraged airlines of member countries to enter into commercial arrangements, so as to achieve efficiency and cost effectiveness; harmonisation of air transport regulations and air services agreements, joint capacity building, pooling of expert skills and services, and effectiveness in safety oversight practices.

Some of the sub-regional initiatives described above aim at greater flexibility of rules that go beyond the existing bilateral regulatory framework.

The countries involved adopted regional regulation of air traffic, either complementing or superseding the bilateral structure. These initiatives seem to indicate a trend towards sub regionalisation of air transport in Africa, mostly undertaken as part of the construction of common markets or economic integration processes that imply close economic integration between the member countries of a sub-region.

2.7.4 Potential benefits/impacts of YD

While the benefits of liberalisation are not perhaps any different from those in other parts of the world, in respect to Africa the benefits of regional liberalisation will have the added economic importance of strengthening the African market and ultimately enhancing the participation of African airlines in international air transport and the integration of the continent (Richman & Lyle, 2005). However, some of the specific potential benefits and impacts include the following:

2.7.4.1 Efficiency

The efficiency of air transport would be enhanced by allowing more open markets for suppliers. Freer markets in air transport would also allow sectors that make use of its services to become more efficient (Graham, 1995).

2.7.4.2 Increased frequency

Liberalisation enables airlines to offer a wider range of destinations and more frequent services, thus improving the African network. In 2000, there was a maximum of 14 flights per week from the UK to Nigeria, and by 2010, the agreement allowed up to 42 flights per week on this country-pair (NCAA, 2010).

Furthermore, the Ghanaian Minister of Transport Doreen Owusu-Fianko (2011) asserted that Ghana's aviation industry has been noted as one of the fastest growing and perhaps most competitive in the West African sub region with a growth rate of about 20 per cent, with the number of airlines plying their trade in the country having doubled from 15 at the beginning of the millennium to about 36 in 2011 and with increasing interest being shown by more foreign carriers.

2.7.4.3 Stimulation of Traffic

In most cases, liberalisation tends to encourage traffic development (Richman & Lyle, 2005). This is what has happened with countries that have adopted liberalisation. For example, frequencies between Kenya and Uganda have increased to 20 flights per week from 11 flights per week. It appears that with this substantial increase in frequency, the load factors have not declined, indicating an overall increase of traffic.

In addition, traffic growth of about 6 per cent in Africa (IATA, 2008) in recent years, which is above that of many other continents, is an encouragement and can be attributed to the liberal YD. Such a traffic increase may stimulate private sector participation in the development of the air transport industry.

2.7.4.4 Improvement of Quality of Service

Liberalisation offers significant benefits to the consumer in Africa. It can serve to increase the range of options and choices available to the travelling public, as well as improve the standards and quality of services (Richman & Lyle, 2005).

2.7.4.5 Increases in investment

Liberalisation has resulted in the emergence of new private airlines operating largely in the domestic and regional markets as found in many countries including Nigeria, when in 2003 Virgin Nigeria was established by its UK parent airline. There is a growing trend towards the privatisation of national carriers on the continent. This is a positive development as privatisation tends to improve the performance of the airline industry.

A growing number of major international airlines are acquiring equity in some African airlines. For instance, Kenya Airways and Ethiopian Airlines attracted investment from Lufthansa and KLM respectively and, as a result, their larger operating networks have a greater chance of survival and benefit from the competitive operating environment in Africa.

IT development is also attracting investment and increasing at a rapid rate. This should enable airlines to reduce costs and exploit opportunities for e-commerce (Chingosho, 2005).

2.7.4.6 Enhancement of Competitive Position

Liberalisation may also improve the competitive position of African airlines by positioning them to be more competitive. Liberalisation has the potential to enable them to create new services and increase efficiency for the benefit of the travelling public. Consolidation in the African airline industry is progressing; with an increasing number of airlines joining the major worldwide alliance groups, for example Egypt Air being a member of Star Alliance and Ethiopian Airlines in Sky Team.

2.7.4.7 Tariffs and Costs

As a result of a freer market and reduction of costs, more fares that are competitive will be offered to the consumer. Already there are some indications that where a more liberal approach has been adopted, fares have gone down by more than 30 per cent in Eastern Africa as well as between East and Western Africa. In addition, average fares between Nairobi and Addis Ababa have gone down from US$630 to US$350 (Chingosho, 2005).

2.7.4.8 Benefits to Governments/Private Sector

The expected increase in traffic will result in increased revenue to governments since more airlines will be operating, thus optimising the utilisation of the facilities in the areas of airport landing charges and air route navigational charges (Doganis, 2002).

Such incremental revenue could be ploughed back to further improve infrastructure and aviation safety and security.

2.7.4.9 Encouragement of Tourist Traffic

According to InterVISTAS-ga (2006) and Warnock-Smith (2008), liberalisation has the potential to encourage the development of tourist and cargo traffic. This encouragement will come through better access to the country, opening new markets as more airlines will be operating and offering more competitive pricing, creating the opportunity to attract more business into the country. For example, a tourist destination country that is relying exclusively on charter operations could attract higher income tourists seeking quality products and price combinations. In fact, many African countries are noted for being tourist destinations such as Egypt, Ethiopia, Kenya, Morocco and South Africa.

The derived effect on tourism and trade, with all the multiplier effects, could bring up to an additional USD1.5 billion to the SADC region, including 70,000 new jobs (OAG, 2010). Therefore, by restricting traffic to protect home airlines, a significant economic opportunity is being forfeited.

2.7.5 Challenges for African Liberalisation

Despite the potential benefits of the YD in African air transport markets and African development, there are still a number of outstanding issues that militate against the effective implementation of the liberalisation process:

- A lack of commitment from the parties concerned is a major impediment. The Yamoussoukro Decision is yet to be fully implemented by most countries. As a result, Africans cannot speak with one voice when negotiating with the much stronger regional entities such as the European Union. The Cape Town Convention, which is meant to establish an international legal framework for financing aircraft, is yet to come into force because insufficient numbers of countries have ratified the agreement (Chingosho, 2005).
- Airline directors are still distrustful of each other and hesitate to commit themselves to cooperation and integration arrangements. African airlines continue to operate individual services to Europe and Asia while better coordination and co-operation on these routes could lead to the creation of African hubs which would make it

possible to operate daily flights to Europe and Asia and also provide better air services to African capitals. Furthermore, the airlines fear that the implementation of the Declaration might place them at a disadvantage in commercial terms.

- The absence of a level playing field for effective implementation of the liberalisation process, such as visa restrictions, work permits, government travel, exchange control, and other such hurdles do not exist in the EU single market.
- Many African countries do not regulate competition or have institutions that specialise in competition matters, which definitely allows room for fare collusion (Doganis, 2010). This may be the case in Nigeria, where the Nigerian government claims that British Airways and Virgin Atlantic colluded and charged discriminatory air fares, giving evidence that air fares on the London route from Nigeria were almost twice those of Ghana to London, which are in the same region and almost the same distance.
- Resources at the national level are often insufficient to establish organisational structure, especially with respect to civil aviation and airport authorities, and to ensure a constant upgrading of the regulatory regime. The development of appropriate regulations and a harmonised sub-regional civil aviation code requires a concrete programme of co-operation at the continental and sub-regional basis (Chingosho, 2005).
- Currently, many civil aviation and airport authorities do not have appropriate skilled manpower due to a lack of financial resources and the fact that qualified trained people seek employment in other parts of the world. Staff productivity is below the world average – there is over-manning, but not enough trained personnel (Chingosho, 2009).
- The absence or limitation of carrier capacity in most of the countries is a serious challenge for effective competition; otherwise, the emergence of monopolies on intraregional routes would defeat the objective of YD, which seeks to promote fair competition practices. Chingosho (2009) argued that many African carriers are undercapitalised and face tight liquidity. In short, most airlines have too much debt and very little equity. Equity financing may be the best option for airlines, but in its absence, the availability of debt funding at affordable interest rates is a key factor inhibiting expansion.

- In addition, ageing fleets result in low aircraft utilisation and generally unreliable services (AFRAA, 2005). Inadequate infrastructure, IT, safety and security facilities are a threat to the anticipated traffic growth from liberalisation in Africa. Indetie (2002) alleged that IT penetration among African airlines is about the lowest globally. Although African labour is comparatively cheap, recent developments in IT are proving more cost-effective and reliable than dependence on manual operations.
- As a result of the traffic boom, airlines from Europe and the Middle East are aggressively penetrating the African market and securing larger market shares, taking advantage of ill-prepared African operators. African airlines are therefore operating in a highly competitive environment and many carriers are unable to stand the competition and the high operating costs and thus fold up. In fact, the uneven playing field is putting a lot of strain on African airlines in their own markets and threatening their survival. Indetie (2002) sums up the ill preparedness of these African airlines as having limited capital, limited frequencies and networks (point-to-point operations), low application of IT, use of ageing fleets, poorly motivated staff, a lack of training, inadequate operating capital, a lack of commercial agreements with partners, an inability to plan for the long-term (overwhelmed by day-to-day operational challenges) and management instability.
- Furthermore, the cost of running airlines in Africa is also believed to be affected by rising fuel prices, interest rate charges, and high airport charges.
- Fuel prices globally are going up but, unlike elsewhere, few African airlines have hedged part of their fuel requirements. According to Indetie (2011), the result is that fuel costs in Africa represent about 30 per cent of total airline operating costs compared to 15–16 per cent some four years ago.
- High airport taxes and charges are inhibiting the growth and development of the African air transport industry. Taxes, particularly for intra-African flights are sometimes higher than the actual fare for the flight. Airport and ATC charges represent about 10 per cent and this cost is continuing to grow in spite of declining yields and growing competition (Indeitie, 2011**)**.
- It is common business practice that the cost of debt and equity capital is paid out of operating profit. To do this, airlines need to realise an operating margin of 9–10 per cent on average. Unfortunately, African airlines have not been able to generate a

sufficient return on the capital invested. African airlines in recent years generated an average return of 6 per cent as opposed to an estimated cost of capital of 7.5 per cent (IATA, 2007).

Finally, The Yamoussoukro Decision, signed by African civil aviation ministers in 1999, set the framework for the intra-African liberalisation of the air transport industry. Liberalisation is progressing, even though slowly (Chingosho, 2005). However, consolidation of the African airline industry is expected to accelerate, especially with the full implementation of the Yamoussoukro Decision. Increased opening up of African skies should see the growth of low-cost carriers. Competition from these new players should be a strong incentive for legacy carriers to simplify their business models and to become more efficient operating entities. Another encouragement is that the operating environment is becoming more conducive to the growth of the industry, arising from the reduction of conflicts and a commitment to Africa's renaissance by politicians.

2.8 Economic Regulation in Nigerian Civil Aviation

The primary legislation regulating aviation in Nigeria is the Civil Aviation Act (CAA), first enacted in 1965, and now Cap. C. 13 Laws of the Federation of Nigeria (LFN) 2004, together with the regulations made thereunder, the most prominent ones being the Civil Aviation (Air Transport) Licensing Regulations and the Air Navigation Regulations (FGN, 2004).

The Air Navigation Regulations (ANRs) made pursuant to the CAA Cap C. 13 LFN 2004 and the Air Navigation Regulations made by the NCAA and approved by the Minister in 2003 basically regulate air transport in Nigeria in terms of safety and economics. Although the ANR of 2003 made by the NCAA is stated to prevail and supersede, the matters not covered by it are still regulated by the ANRs, pursuant to the CAA Cap C. 13 LFN 2004.

The ANRs of 2004 are modelled after ICAO Annexes and thus are in substantial conformity with ICAO’s international standards and recommended practices (NCAA, 2011). They are additionally supplemented where necessary with sections from the

European Joint Aviation Requirements and/or the United States Federal Aviation Regulations.

2.8.1 Market Access Regulation

Air transport services are regulated by the issuance of licences and permits to operators who satisfy the stipulated requirements for the issuance of the licences and permits. According to NCAA (2011), a person seeking to provide air transport services in Nigeria must obtain an Air Transport Licence in respect of scheduled journeys, an Air Operating Permit for non-scheduled journeys and an Airline Tour Organiser's Licence for tour organisers.

However, there are regulations that apply in areas of financial fitness and nationality of ownership and control of air carriers. According to the act, any companies seeking to provide air transport services must have the following minimum paid-up share capital:

• Five hundred million Naira for domestic operators ($3.2 million)

• One billion Naira for regional operators ($6.4 million)

• Two billion Naira for international operators ($12.8 million)

The acts further stipulate other financial conditions to include details of insurance policy for hull, passenger/cargo and third party insurance in accordance with the relevant aviation regulation, bank reference in respect of the company, cash flow analysis and evidence of tax payments by the company and its directors. The NCAA monitors the financial position of an air carrier by regular screening of up-to-date monthly management accounts, quarterly balance sheets, and annual profit and loss accounts and cash flow projections.

By virtue of Section 17 of the Nigerian Investment Promotion Commission Act No. 16, 1995, restrictions on ownership and control of air transport businesses that existed before have been removed. However, under the ANRs the NCAA may issue an AOC only if, among other things, the applicant for the AOC is a citizen of Nigeria. The said provision does not draw a distinction between natural persons and companies. Consequently, a company incorporated under the Laws of Nigeria regardless of the nationality of its shareholders would qualify as a citizen of Nigeria under the provisions of the ANR aforesaid. A company having 100 per cent foreign ownership can therefore operate an air transport business in Nigeria. However, for purposes of designating operators to fly any regional or international route under the terms of bilateral or multilateral air services agreement, the policy of the Federal Government is to designate only airlines in respect of which Nigerians own at least 51 per cent of the equity of such airlines and are in effective control of it.

Therefore, this sets the restrictions on carrier ownership and control, which is one of the provisions in most Nigerian ASAs.

2.8.2 Traffic Rights and Route Entry Regulation

According to the CAA Act (2004), domestic routes in Nigeria are liberalised and operators are free to fly any route without a special licence provided that they give notice of their flight schedules to the NCAA, the FAAN and the NAMA. However, with regard to rights by Nigerian carriers to operate international routes, an application is made to the Minister of Aviation for designation of an air carrier as a flag carrier to operate an international route that is the subject of an air services agreement between Nigeria and another country. The applicant must comply with guidelines set for designation. The application is sent by the Minister to the NCAA for technical evaluation. If a favourable report is issued by the NCAA, the minister may at his discretion designate such an air carrier as a flag carrier to operate the said route.

For foreign airlines, seeking to operate in Nigeria, after designation of such airline by the relevant contracting country under the air service agreement, the notice of designation is forwarded to the Nigerian Ministry of Foreign Affairs which transmits the same to the Minister of Aviation. The Minister of Aviation sends the said documents to the NCAA for assessment on the suitability of the airline to operate in Nigeria under the terms of the bilateral air services. The process of assessment involves the evaluation of the documents issued by the home country and all other relevant documents that may be demanded by the NCAA from the airline. If the NCAA is satisfied with, the documents and other materials provided by such foreign carrier, it would give a favourable report to the Minister who may then issue the air traffic licence. Usually the air traffic rights specify the amount of frequencies given to such an air carrier and the airports of entry. These are usually in accordance with the relevant air service agreements. Additional frequencies can be negotiated under the relevant air service agreement via commercial agreements between the Federal Government and the air carrier.

This is also an important stage for international traffic, which forms a significant part of any country's ASA. This covers the issue of airline designation and capacity control, especially frequency of flight and airport of entry.

2.8.3 Airline Access/Competition Regulation

According to the CAA Act of 2004, the policy on the aviation industry as it relates to domestic airlines is secured on free enterprise, and airlines may operate any routes in the country. But, foreign airlines operating in Nigeria are limited to the airport of entry specified in the relevant air traffic licence and are not allowed to operate domestic routes.

This therefore rules out any cabotage flights, which is regarded as one of the significant liberal traffic rights granted to foreign carriers in ASAs.

2.8.4 Air Fare Regulation

The CAA Act (2004) did not regulate any air fares; as such, air operators may charge such fares as they deem appropriate for their services. To prevent predatory pricing, the NCAA, under its general power to regulate, conducts economic audits on airlines offering such low prices for air services as appear inadequate to cover their costs and may impose relevant sanctions or issue directives where such an audit discloses predatory pricing (NCAA, 2006).

This therefore suggests an important provision of ASAs, which indicates that the country could grant free pricing provision in the ASA unless the other country refuses.

2.8.5 Foreign Airline Operations Regulation in Nigeria

According to the CAA Act's provision 18.5, for a foreign designated carrier to operate a scheduled international air service in the country, the carrier shall meet the following requirements:

(i) To be designated under an existing Bilateral Air Services Agreement (BASA) between its government and Nigeria.

(ii) Submit necessary supporting documents through diplomatic channels to the NCAA. Details of such designation must be in accordance with the provisions of the existing BASA, upon which such designation is being made.

(iii) Obtain a foreign carrier operating permit (FCOP) issued by the NCAA. The authority's safety inspectors shall carry out a safety assessment audit of the airline's base prior to the issuance of a FCOP and commencement of operations.

However, after obtaining the FCOP certificate, NCAA (2006) expects airlines to abide by other regulations that guide their operations in the country, which include:

- Shall not have sales offices or outlets in cities other than the point(s) of entry specified in the subsisting bilateral air services agreement under which the foreign carrier is designated, and this shall be limited to the airports.
- Shall not distribute tickets through banks and other financial institutions.
- Shall not engage in self-handling, but shall use the services of duly registered Nigerian handling companies.
- Shall not conduct non-scheduled (charter) operations into and out of Nigeria without a flight clearance issued by the Authority.
- Shall not engage in non-scheduled (charter) passenger or cargo operations into and out of Nigeria except in conjunction with a Nigerian ATOL holder.
- Foreign airlines engaged in non-scheduled cargo operations in Nigeria shall obtain flight clearance from the Authority and also pay royalties to the Authority as may be determined by the Authority from time to time (CAA Acts, 2004).

However, if any carrier violates any provisions of the CAA Act, regulations, rules and order made thereunder, the NCAA may suspend or revoke the FCOP (NCAA, 2006). Some of these regulations such as sales offices and self-handling are created to encourage foreign carriers to outsource some of their auxiliary services to Nigerian nationals, such as travel agents and handling companies.

Meanwhile, according to the Act, the overriding principle of the country's civil aviation sector with respect to international agreements (BASA, MASA, YD, Protocols and others), and the monitoring of carriers under such agreements, is the promotion of the overall national interest, which is guided by the following principles:

(*i*) Encourage competition and the development of new and expanded international air services to benefit travellers, airlines, and tourism and business sectors.
(*ii*) Create opportunities for Nigerian airlines to grow and compete successfully in a more liberalised global environment;
(*iii*) Enable Nigerian airports to market themselves in a manner that is unhindered by bilateral constraints to the greatest extent possible; supporting and facilitating Nigeria's international trade objectives;
(*iv*) Support a safe, secure, efficient, economically healthy and viable Nigerian air transportation industry and;
(*v*) Protect consumers from unreasonably discriminatory practices and the application of all subsisting consumer protection regulations (CAA Acts, 2004).

2.8.6 ASA Monitoring Mechanism in Nigeria

The Act also provides mechanisms for the monitoring and compliance with international regulations. Accordingly, NCAA monitors the operations of all foreign airlines operating in Nigeria so to as ensure that their operations are in accordance with the provisions of the existing BASAs, MASAs, Commercial Agreements and approvals guiding their operations. The authority ensures that the frequencies being operated by foreign airlines are in accordance with the seasonal schedules approved by the Minister. This shall include the collection of flight data, billing and maintenance of accounts and accounts for the payment of royalties accruing to the country from commercial agreements with foreign airlines.

The Act also requires all foreign airlines having commercial agreements with Nigeria to pay all royalties accruing to the country into a designated account(s) with the Central Bank of Nigeria (CBN).

In addition, the airlines should forward to the NCAA, passenger and cargo manifests, load sheets, air waybills and any other information necessary for accurate billing, not later than 24 hours after each flight.

The Act further asserts that a reconciliation committee shall be instituted for resolution of disputes and discrepancies arising from bills forwarded to the foreign airlines by the authority. Non-compliance with the terms of payment in the commercial agreement by any airline will lead to the suspension or withdrawal of such services in addition to up to 9 per cent compound interest rate on the unsettled amount to be reflected in subsequent commercial agreements.

The Act reiterates that the government shall continue to promote the interests of Nigeria in the monitoring and implementation of the Yamoussoukro Decision, the Banjul Accord Group (BAG) Agreements, and other multilateral agreements and protocols to which Nigeria is a signatory's state.

In addition, the government shall continue to support and facilitate the implementation of the resolution of the Banjul Accord Group Council of Ministers to turn airline operations of the BAG countries into domestic operations.

2.9 International Operations in Nigeria

A new paradigm of international competition among airlines emerged due to liberalisation policy and airline alliances (Doganis, 2006). This guided the Nigerian government's negotiation of BASAs and Multilateral Air Services Agreements (MASAs) with other countries with the aim of achieving economic consideration and the principle of reciprocity. According to the Ministry of Aviation's policy of 2001, the objectives towards international operations include among others:

- Designation of foreign carriers and tariffs based on the provision of an ASA; while Nigeria's designated carriers shall operate based on these conditions.
- Foreign Airlines operating in Nigeria shall submit their seasonal schedule for ministry's approval.
- Commercial agreements, code share arrangements and alliances by the designated carrier with other airlines shall be filed with the ministry.
- The ministry shall issue approval for flight clearance under the ASA, while non-scheduled commercial flights shall be issued by NCAA.
- The National Airspace Management Agency is to issue clearance for over-flights and technical landings.

- All route rights continue to belong to the government, and there shall be no route transfers between airlines. However, mergers and acquisitions should be encouraged among the airlines.
- NCAA is to monitor ASA compliance. The government shall ensure the realisation of the goals of the Yamoussoukro Declaration, Banjul Accord, Open Skies agreement and MASA without compromising the national interest and growth of the industry.

As a result, Nigeria has signed bilateral air service agreements with 70 countries, including an open skies agreement with the USA and a multilateral service agreement with African countries under the Yamoussoukro Declaration of 1998, as well as the Banjul Accord for West Africa countries. Some of these BASAs were signed as early as the 1960s although many of them have undergone review.

As a fall-out from these agreements, many international traffic routes opened in the country. Table 2.4 below shows the leading international routes from Nigeria with the number of operators providing services.

Table 2.4 Major International Routes and Operators in the Nigeria Market

S/N	Route	Airports	No of Operators	Nigeria Operators	Foreign Carriers	Frequency (flights/wk)
1	Nig-UK	LOS, ABV	3	ARIK	BA, Virgin	33
2	Nig-USA	LOS, ABV	3	ARIK	Delta, United	13
3	Nig-SA	LOS	3	ARIK, Air Nig	SAA	19
4	Nig-Ghana	LOS	3	Air Nig, ARIK, Aero	-	49
5	Nig-UAE	LOS	1	-	Emirate	14
6	Nig-Qatar	LOS	1	-	QATAR	7
7	Nig-Ethiopia	LOS, ABV	1	-	Ethiopia	21
8	Nig-Egypt	LOS, ABV, KNO	1	-	Egypt Air	12
9	Nig-Kenya	LOS	1	-	Kenya air	7
10	Nig-France	LOS, PHC	1	-	Air France	10
11	Nig-Germany	LOS, ABV	1	-	Lufthansa	12
12	Nig-Neth'land	LOS, ABV, KNO	1	-	KLM	13
13	Nig-Italy	LOS	1	-	Alitalia	3
14	Nig-Turkey	LOS	1	-	Turkish	4
15	Nig-Spain	LOS	1	-	Iberia	3
16	Nig-Morocco	LOS	1	-	Royal Air Morocco	4
17	Nig-Libya	LOS	1	-	Afriqiyah	8

Source: FAAN (2010) [Key: LOS-Lagos; ABV-Abuja; KNO-Kano; PHC-Port Harcourt]

Contributing to the growth of international traffic may have been a stable aim of the national policy (stable civilian administration), accompanied by growth of the country's

GDP as a result of the rise in the price of crude oil (the major source of the country's income), economic reform such as deregulation of the aviation sector, the privatisation of government industries, and minimum wage upgrades, among others. All these led to growth in market demand for international air services, which attracted foreign carriers to enter the market, such as Emirates airline (2004), Qatar Airways (2007), Turkish Airlines (2007) and China Southern Airways (2007).

From Table 2.5, international traffic grew astronomically from 1998 to 2008 by about 200 per cent over the period. The traffic is the total from the five international airports, namely, Lagos, Abuja, Port Harcourt, Kano and Calabar as show in the Figure 2.2. The distribution of passengers from the airports is uneven as shown in Table 2.5.

Table 2.5 International Passenger Distribution

Year	Abuja	Calabar	Kano	Lagos	PH	Total
1995	-	-	123,464	1,664,485	13,171	1,801,120
1996	-	-	82,958	1,693,567	14,239	1,790,764
1997	-	-	141,820	1,158,792	28,927	1,329,539
1998	-	-	153,545	1,000,414	43,819	1,197,778
1999	13,923	-	208,103	1,205,487	38,612	1,466,134
2000	43,971	-	154,082	1,421,909	40,937	1,660,899
2001	86,893	223	225,632	1,791,485	45,801	2,150,034
2002	112,350	6,427	216,854	1,906,385	53,807	2,295,823
2003	133,350	5,219	222,228	1,840,037	65,756	2,266,590
2004	145,074	1,226	216,537	1,943,686	94,859	2,381,382
2005	182,639	383	240,702	2,102,601	149,294	2,124,677
2006	184,163	3,932	246,444	2,152,315	106,218	2,693,072
2007	231,607	2,361	219,666	2,430,224	-	2,884,155
2008	329,177	683	217,235	2,688,595	11,756	3,247,446
2009	395,974	362	134,760	2,324,469	13,209	2,868,774

Source: FAAN & NCAA, 2010

From Table 2.5, total international passenger traffic from Nigeria grew from 1,466,134 passengers in 1999 to 2,868,774 passengers in 2009. This is quite remarkable, and may be connected with these factors: the growth in GDP, the stable political system, and reform in the aviation sector.

Figure 2.2 Map of Nigeria showing the international airports

Also, Table 2.5 shows that Lagos was the major international airport with about 80–90 per cent of total international passengers, while Abuja grew rapidly from 13,923 passengers in 1999 to 395,974 passengers in 2009, which is about 250 per cent growth in ten years. However, the other airports at Kano, Port Harcourt and Calabar recorded a gradual decline in passenger traffic from 1995 to 2009.

2.10 Deregulation/Liberalisation Progress and Assessments

Anyanwu (1996), Akpoghomeh (1999) and Idrisu (2004) claimed that the first attempt at deregulation in Nigerian air transport was in 1988, when entry restrictions were lifted, allowing three private airlines to commence scheduled domestic air services. This initiated two airline policies that limited the main routes to Nigeria Airways and one independent airline. Competition on the basis of air fares and routes was ruled out, and the airlines competed only on the level of services provided (Akpoghomeh, 1999).

This was similar to the Australian policy in the 1970s and early 1980s (Forsyth, 1982). The basic objective of this move was to increase competition between the airlines and also allow airline management to respond quickly to changing market conditions. In addition, the African Union responded to global liberalisation efforts and formulated the Yamoussoukro Declaration – a new African Civil Aviation policy adopted in October 1988. The declaration called for the liberalisation and integration of air services, so as to pave the way for the continent to participate actively in the globalisation process and regional development. In line with this declaration, government policy was directed towards liberalisation and limited or guided deregulation of the air transport market (Akpoghomeh, 1999; Idrisu, 2004).

This led to the reorganisation of the government agencies as well as the commercialisation and privatisation of some of them. The period also witnessed extremely difficult circumstances in Nigeria's aviation history where passenger traffic and other activities at the airport dwindled tremendously mainly due to growing costs, poor management, incompatible policy with structure, and an unfriendly investment environment with high risk caused by political instability (Akpoghomeh, 1999).

Oluwakoya (2011) further adds that the restoration of democratic government in 1999 was the beginning of genuine deregulation of the whole economy and growing investor confidence in the nation. The government set up institutions that would oversee the privatisation of a number of public sectors of the Nigerian economy, including aviation agencies such as airports, airlines, handling companies and others. In addition, the sector agencies and institutions were restructured in 1999 so as to achieve the goal of a the new aviation policy that included deregulation of the sector. The sector was restructured to have 6 organisations namely; NCAA, NAMA, FAAN, NIMET, NCAT and AIB, while the national carrier was liquidated due to excessive debts over its value; however, both handling companies NAHCO and SAHCOL were privatised. The restructuring according to the then Minister of Aviation was based on ICAO SARPs (Chukwe, 2003).

Idrisu (2004) summed up the deregulation and liberalisation policy in Nigeria as involving:

- The institution of a New Civil Aviation Policy of 2001 in line with the liberalisation trend, especially the Yamoussoukro Decision, backed by law.
- Commencement of the review of existing Bilateral Air Services Agreements with African countries, in line with the provisions of the Yamoussoukro Decision.
- Deregulation of the domestic aviation market, where several private airlines were granted a licence to undertake local, regional and international operations.
- Privatisation of public companies such as Nigeria Airways (liquidated), handling companies and terminal building concessionaires (Bi Courtney).
- Implementation of a multiple designation with the U.K. government;
- Signing of an open skies agreement with the United States of America;
- Granting commercial agreements with a number of countries' airlines such as Germany, France, the Netherlands and UAE. This arrangement permits the airlines of the second party to provide additional frequencies from the agreed BASAs.

2.11 Assessment of Impacts in Nigeria

According to Akpoghomeh (1999), more than 104 different airlines rushed to register with the defunct Federal Civil Aviation Authority and FAAN after the commencement of deregulation in 1988, which relaxed entry regulation but as at 1999 only about 40 per cent were operational. There was also deregulation of the military administration, which was done without adequate institutional structure and privatisation, and was criticised as promoting public enterprises (Graham, 2005). However, the study of Akpoghomeh (1999) was not able to assess the traffic situation after registration of additional carriers in the country, even though it was claimed that many of the carriers failed due to managerial incompetency .

In another study, Oluwakoya (2011) carried out research from the published and unpublished documents database, where the impact of deregulation and liberalisation in the Nigerian air transport industry was examined. The results of this study reveal that an unprecedented growth in traffic was recorded from 2000 to 2004. The policy brought about market expansion and investment opportunities. There was a significant increase of freight tonnage and passenger traffic of 54 per cent and 9.4 per cent per annum, respectively, during the period. In this way, it significantly contributed to the enhancement of Nigerian economic development, such as healthy competition needed for growth and development, increased participation in the industry by the private sector and foreign airlines, and increased international route traffic or connectivity to more international hubs such as Dubai, Cairo, Qatar, Atlanta and Ankara. There was significant private investment worth about US$5 billion, which covered among others initial equity financing from Virgin Nigeria and Arik Air for orders of aircrafts and other set-up costs (Oluwakoya, 2011).

Oluwakoya (2011) further claimed that the increase in the number of points of entry from two to four made international traffic easily accessible to all parts of the country, while private participation in airport infrastructure development was encouraging. The study also concluded that the institutional framework and operational capacity were enhanced. However, the policy formulation framework was strengthened towards innovations and competitive advantage, thereby inducing effectiveness, efficiency and reliability in the operations and management of the industry.

The findings are in conformity with the traditional impact of deregulation as obtained in other countries. However, the study's arguments are weak owing to using only descriptive statistics to compare data for different periods, without the use of any statistical tools to prove or disprove that the rise in traffic levels during this period was a result of deregulation and liberalisation policy only, instead of other exogenous factors such as changes in GDP (proxy for income level). During the period of this study, traffic rose by about 100 per cent while GDP grew by about 150 per cent as shown in Table 5.4. Therefore, the study should have isolated the impact of deregulation and other exogenous factors from traffic growth.

Furthermore, the study did not elaborate the impact of international traffic liberalisation on the country, but rather focused more on domestic deregulation impacts; and the negative impacts were not discussed. A huge amount of private investment in the sector was discovered, but the return from the investment was not revealed, even though it may be of equal interest, in order to make a comprehensive assessment of the situation.

Another shortcoming is that the period of analysis was from 2000–04; probably six years later many other things would have changed and new developments may have occurred. Therefore, there is a likelihood his argument may not be the same when recent developments are taken into account.

A study by Idrisu (2004) examined progress made in the area of air transport liberalisation and “open skies” in Africa in the face of the poor economic situation and the stage of development in the continent. The study used questionnaires (administered to a group of stakeholders) and traffic data from Nigeria. The study also applied the chi-squared technique to test the hypothesis of the samples’ opinion on the issues. The findings revealed that:

- The economic situation and stage of development in the African continent was ripe for full liberalisation of air transport, which can improve the African business environment.
- The Yamoussoukro Decision had not achieved much because African countries lacked the political will to implement the provisions.
- African airlines were undercapitalised and so would need to pull resources together through mergers and acquisitions before going into alliances with the mega-carriers of developed countries; while a country like Nigeria without a national carrier could only be an onlooker in the liberalised aviation market.

However, it is noticed that the approach did not use any market data or industry data to prove the claim, but rather relied on people’s opinions on certain questions. Therefore, it is extremely difficult to convince many readers of the findings.

In addition, a sample of 136 opinions may not adequately represent the entire African passenger market. Therefore, this created a gap in knowledge in the literature and empirical analysis. Hence, this research is attempting to fill the gap by applying an appropriate research instruments for assessing the impacts of liberalisation as obtained in other countries. This is performed by developing an econometric model with the use of macroeconomic variables and air traffic data to establish the relationship.

Another issue that is raising concern for policy makers and the financial sector in the country is capital flight, which this research believes may have been precipitated by the international liberalisation policy in the country. Capital flight is an economic consequence that occurs when money or assets flow out of a country to another destination by an investor as a result of taxes on capital or equity holders. In this case, many international carriers that enter the Nigerian market as a result of the liberal policy succeed in getting huge patronage from Nigerian passengers, and money realised by the airlines in the business is being repatriated to shareholders abroad. This, according to economics, has adverse effects on the country's balance of payments. This is evident from the submissions to the Senate Committee on Aviation in Nigeria by CBN and NCAA, published in The Punch newspaper of 20 September 2012. CBN claims that total remittance by foreign airlines between 2000 and 2011 reached $4.3 billion, while NCAA put the figure of ticket sales by airlines between 2006 and 2011 at about $5.4 billion (Punch, 2012). This shows that a huge amount of revenue accrued to the market goes to international airlines, but they argue that the policy fails to inform the benefits accrued to the industry and the consumer. In addition, the consequences of foreign airlines' absence would be more disastrous since there is currently no alternative in the market.

Therefore, there is gap in knowledge in identifying the impact of liberalisation of international air transport in Nigeria as done by many developed countries. Even the attempt by three studies carried out by Akpoghomeh (1999), Idrisu (2004), and Oluwakoya (2011) did not really focus on international services. Therefore, this research is going to build upon work done in other countries and fill the gap in knowledge on the impact of liberalisation of international air transport in Nigeria using a similar approach to that taken for some other countries. The methodological approach accordingly differed significantly with other localised studies as discussed in the next chapter.

2.12 Summary of the Chapter

This chapter has explained deregulation and liberalisation from the theoretical point of view where the economic policy theory of regulation justifies deregulation; and the integration of political consideration into utility maximisation where the government uses the mechanism to control excessive competition in the market in the interest of the public. The policy mechanisms include price, product quality, frequency, distribution and information.

Meanwhile, in response to the development of air transport in areas of technology, economics and politics, an institutional framework for regulation was developed by the ICAO and applied globally. This involves a regulatory structure and a legal framework in the form of licences, regulations and agreements. In addition, the chapter reveals that the major instrument for international economic regulation is the ASA. Furthermore, the chapter explores the key features of ASAs that indicate the liberalisation level guiding scheduled air passenger services, namely, the granting of traffic rights, designation, capacity, tariffs, withholding, and cooperative arrangements.

The chapter also discusses deregulation and liberalisation concepts and developments from a global perspective along with their impact on traffic, competition, frequencies, air fares, costs and efficiency. In summary, the chapter discovered from various international markets in Europe, America and Asia that liberalisation has multiple economic benefits for both the operators and the passengers. Specifically, liberalisation is found to stimulate traffic growth significantly for both passengers and freight services. This has a multiplier effect on other market variables, for instance passenger increases lead to more frequencies and increases in traffic density. This reduces cost per passenger which could lower air fares on the route. In addition, the chapter identifies the impacts on other contemporary developments in the aviation market such as hubbing and airline alliances. The adverse effects of liberalisation policy to the industry and economy in general are highlighted.

Finally, the chapter examined the liberalisation policy practice among African countries (YD) where it is found to have potential benefits to countries' carriers and the development of air traffic in the continent if implemented. However, the chapter highlights the challenges faced by African countries in YD implementation.

Chapter Three: Methodology of the Research

3.1 Introduction

Research methodology is the backbone of any research study, which designs how research should be undertaken to the conclusion (Saunders, Lewis, & Thornhill, 2009). This involves the design of a research plan from research conception to research methods, from the development of interrelationships between variables using appropriate scientific tools, to the research findings. This chapter provides an appropriate framework for the research methodology used, which entails the development of an appropriate research paradigm and philosophy for the research, the identification of a suitable approach and strategy, as well as suitable research methods necessary for the analysis techniques and procedures used to obtain the data. The chapter also discusses the justification for the selection of data based on theory and empirical studies.

This research aims to examine the impact of the liberalisation of international air transport services in developing countries. The main objective is to evaluate the economic implications of liberalising market access of international air services in Nigeria. As air traffic demand is the pivotal variable for assessment of the impact, the methodology develops a model to express the relationship between traffic demand, liberalisation and other variables. The techniques for analysing consumer welfare, competition and airport capacity are also examined.

3.2 Research Paradigm

According to Easterby-Smith, Thorpe, Jackson, and Lowe (2008), philosophical thinking is fundamental to the conception of a research design and can influence the quality of the research process and the outcome. The research philosophy contains an assumption that supports the research strategy and the methods. However, the two most common strategies of research philosophy are ontology and epistemology (Bryman & Bell, 2007; Saunders, et al., 2009). The former is about the nature of reality and existence, while the latter concerns the best way of enquiring into the nature of the world. Traditionally, most research is extracted from different ontological and epistemological assumptions in the designing of methodologies for the research work. Hence, Easterby-Smith et al. (2008) established the connection between the philosophical strategies in the conduct of research. They depict the relationship as similar to the trunk of a tree that has four layers of rings as shown in Figure 3.1.

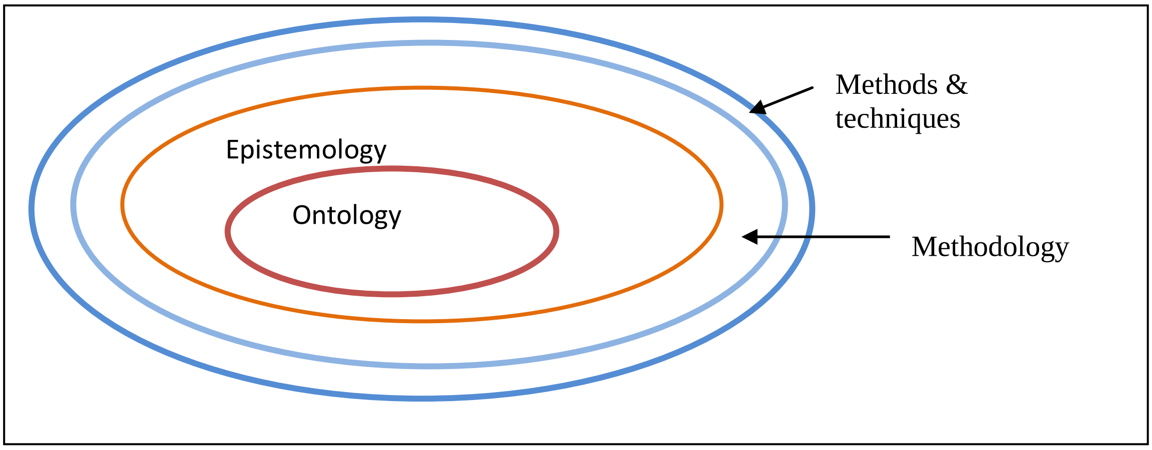

Figure 3.1 Research paradigms; Source: Easterby-Smith et al. (2008)

The outer ring or bark of the tree symbolizes the methods and techniques adopted in the research that aid data collection, such as interviews and questionnaires. These are clear visible features of the research to the general public. The methodology is the combination of techniques used to enquire about a specific situation. Epistemology is the general assumptions about ways of enquiring about the nature of the world, while ontology is the philosophical assumptions on the nature of reality.

The ontology philosophy represented by the inner-most core of the tree believes in reality, while epistemology is the link between reality and the researcher, and the methodology is the procedure used to discover the reality (Sobh & Berry, 2005). The methods and techniques rely on decisions and assumptions from methodology, epistemology and ontology that are not visible (Easterby-Smith, et al., 2008).

Therefore, these four elements form the research paradigm, which is essentially the overall system concept that guides any research.

However, there are various choices of research paradigm that can guide research work. According to Saunders, Lewis, and Thornhill (2011) there is no ‘best option’, but the choice depends on the research questions that the researcher seeks to answer, which are possible to answer using various philosophical strategies outlined in the "research onion" – Figure 3.2.

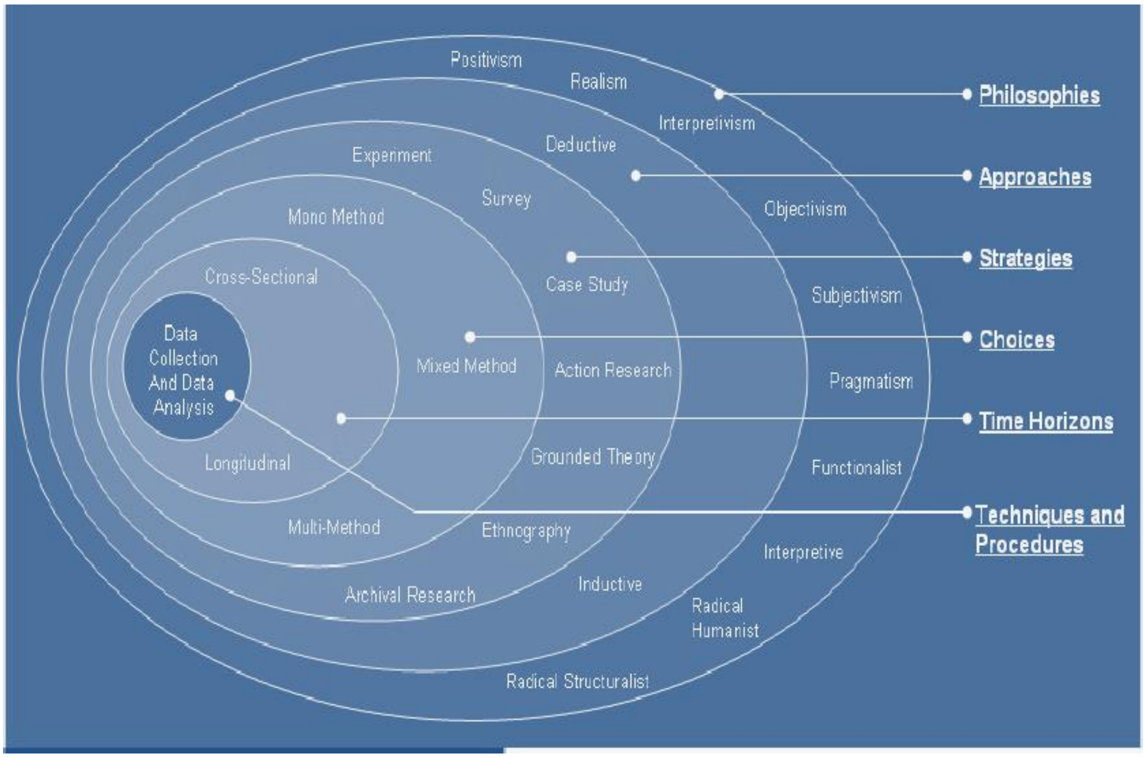

Figure 3.2 Research Onion; Source: Saunders, et al. (2011)

3.3 Research Philosophy Assumption

There are numerous schools of thought concerning the available options for research philosophies by different philosophers. However, the most common belief consists of four philosophies, namely positivism, realism, constructivism (or interpretivism), and pragmatism or critical theory (Bryman & Bell, 2007; Saunders, et al., 2009). Often these four options can be further subdivided into other subcategories.

3.3.1 Positivism

The main concern of the positivism philosophy is that the "social world exists externally and that its properties should be measured through objective reflection or intuition" (Easterby-Smith, et al., 2008). They also maintained that positivism is the best way of examining human and social conduct due to the effect of metaphysical conjecture. The highlights of the main philosophical assumptions of positivism given by Easterby-Smith et al. (2008) include:

- The researcher should be independently minded
- Social science should identify the causal explanations and fundamental laws that explain regularities in social conduct
- There should be hypothesis and deduction which enable science to progress
- Operational concepts need to be defined, such that they can be quantifiable
- Problems are summarised into the simplest possible element for clear understanding
- To be able to generalise the outcome to the wider population, an adequate sample size must be selected
- In cross-sectional analysis, regularities should be recognised from the contrast of variation across samples
- The strategy of the research depends on the objectives of the study.

The common methods of data collection under positivism involve highly structured, large samples that are measurable and quantitative, but can also be qualitative (Saunders, et al., 2009). Since the assumptions of positivism are observed to be highly correlated with this research's objectives and questions, it is therefore appropriate to associate this research with a positivist approach.

3.3.2 Constructivism or Interpretivism

Another paradigm of philosophy is constructivism or interpretivism which believes that reality is not objective and exterior, but socially constructed by people (Easterby-Smith et al., 2008). It is added that the focus should be on what people believe and sense. Therefore, this philosophy believes in appreciating the different experiences of people rather than probing for outside causes and fundamental laws to explain the behaviours. This clearly deviates from these research objectives; and as such, this research cannot be regarded as interpretivism.

3.3.3 Realism Paradigm

Realism refers to external reality as consisting of structures that are themselves sets of interrelated objects and mechanisms (Sobh & Berry, 2005). The realism philosophy understands the difference between the real world and a particular view of it and constructs various views of this reality in terms of time and place (Riege, 2003). It is believed that social phenomena by their nature are fragile and causal impacts are not fixed but are contingent on their environment. Hence, the desire of realism research is to develop a family of answers that covers several contingent contexts and different reflective participants.

3.3.4 Pragmatism (Critical Theory)

This is a compromise between realism and positivism, which rejects the idea of predetermined theories that shape knowledge and facts, or that people can construct their own facts out of nothing (Easterby-Smith, et al., 2008). The key idea is that any meaningful structure should emanate from the practical experience of individuals.

Pragmatism has a significant value in social science research, because it focuses on a process that is particularly relevant to social knowledge and learning, in which its impact on methods can be seen in the tradition and methods of grounded theory (Easter-Smith et al., 2008). Furthermore, Easterby-Smith et al. (2008) suggested the various methodologies commonly associated with different epistemologies as shown in the Table 3.1.

Table 3.1 Methodology Associated with Different Research Philosophies

Ontology	**Realism**	**Positivism**	**Interpretivism**	**Pragmatism**
Epistemology Methodology	Strong Positivism	Positivism	Constructiveness	Strong Constructiveness
Aims	Discovery	Exposure	Convergence	Invention
Starting point	Hypothesis	Propositions	Questions	Critique
Designs	Experiment	Large survey; multi class	Cases and Survey	Engagement and reflexivity
Data type	Numbers & Facts	Numbers & words	Words & Numbers	Discourse & experiences
Analysis/ interpretation	Verification/ falsification	Correlation & regression	Triangulation and comparison	Sense-making; understanding
Outcomes	Confirmation of theories	Theory testing & generation	Theory generation	New insights and actions

Source: Easterby-Smith et al. (2008)

Table 3.1 shows how positivism and constructiveness epistemology are linked to realism and interpretivism ontology. It suggests that positivism and interpretivism have weaker epistemology and have some overlap in their methodology, while realism and pragmatism have stronger epistemology with a diverging view in methodology.

Easterby-Smith et al. (2008) further explained that realism research aims to discover the laws and theories that rationalise reality, which is achieved via experiment. This removes unconventional reason and allows major factors to be evaluated precisely, so that the hypotheses is verified or falsified. However, positivism that is less strong in epistemology believes that reality can be accessed easily; hence, the need to infer the nature of the reality indirectly through surveys of large samples of people, activities or organizations. In this case, quantitative data, sometimes supplemented by qualitative data are required for some statistical analyses such as regression and correlation. The analysis identifies regularities in behaviour, which allows propositions to be tested and new ideas to be developed.

The constructiveness position assumed the existence of different realities; hence, the need for several methods, both qualitative and quantitative, that can generate views and experience of diverse opinions of observers using triangulation (Easterby-Smith et al., 2008). However, a stronger constructiveness (pragmatism) assumes the absence of pre-existing reality, and the aim is to understand how the structures are invented.

3.4 Research Approaches

From the layers of the "research onion" in Figure 3.2, this research examines the various research philosophical paradigms and identifies positivism as the appropriate research philosophy of this study. However, the research considers the options for research approaches. The approach could be deductive or inductive. A deductive approach means that the study develops a theory and hypothesis, and a research design to test the hypothesis. Alternatively, an inductive approach involves collection of data and the development of theory from the analysis. Saunders et al. (2009) outline the major difference between the two approaches as shown in Table 3.2 below.

Table 3.2 Difference between Two Research Approaches

Deduction Approach Emphasis	Inductive Approach Emphasis
Scientific principles	Gaining and understanding of the meanings humans attach to events
The need to explain causal relationships between variables	A close understanding of the research context
Collection of quantitative data	Collection of qualitative data
Application of controls to ensure clarity of definition	A more flexible structure to permit changes of research emphasis
Highly structured approach and independence of the researcher	Realisation that the researcher is part of the research process
Necessity to select samples of sufficient size to generalise conclusions	Less concern of the need to generalise

Source: Saunders et al. (2009)

It has become clear from the two options that this research on the impact of liberalisation of international air transport is best suited to a deductive approach, since the research needs to explain a causal relationship between traffic demand and other independent variables including liberalisation, which involves a lot of quantitative data collected from a sufficient sample size to enable a valid generalisation to be made for the whole country's international air traffic.

3.5 Research Purpose and Strategy

Unlike the research approach, which clearly distinguished between two options, the research purpose can be for an exploratory, descriptive or explanatory purpose (Saunders, et al., 2009). The selection of the purpose is determined by the research questions. Exploratory research is a methodological approach that is primarily concerned with discovery and with generating theory. Exploratory research is conducted either through a literature search or interviewing experts or focus group interviews (Saunders et al., 2009); while descriptive studies are meant to provide an accurate profile of persons, events or phenomena – a prelude or extension of exploratory or explanatory research. Saunders et al. (2009) asserted that an explanatory study is meant to establish causal relations between the variables, which more precisely define the purpose of this research.

Meanwhile, the selection of an appropriate research strategy depends also on the research questions and objectives, current knowledge, the available of resources (time and funds) and philosophical support (Saunders et al., 2009). The common strategies employed in research outlined in the research onion comprise: experiment, survey, case study, action research, grounded theory, ethnography and archival research.

Experimental research is very common in natural sciences' research but rare in social science. The aim of this research is to study the fundamental association between variables; experimental research mostly requires a laboratory, and accordingly appears to be exploratory and explanatory research that answers the "how" and "why" question of a research (Saunders et al., 2009). The researcher has greater control over the research process. Hence, this type of strategy may not be suitable for a study on the impact of liberalisation.

According to Saunders et al. (2009), the survey is another type of strategy that is associated with a deductive approach, commonly applied in social science research that seeks to answer questions on "whom", "where", "what and how". They further allege that survey appears to be exploratory and descriptive, which requires the collection of a lot of quantitative data by administering questionnaires to samples of a population. The data analysis under survey includes descriptive and inferential statistics in which the outcome can suggest possible reasons for a relationship between variables and even development of a model for the relationship. Moreover, Saunders et al. (2009) added that the findings of the survey, if data are sufficient to represent the population, can be generalised. But the major drawback of the survey strategy is that it is not wide ranging compared to some other strategies (Saunders et al., 2009). Hence, this strategy seems likely to be suitable for this particular research project in achieving some of its objectives.

A case study strategy of conducting research involves practical examination of a particular observable fact in real life using several proofs. It is very useful in getting a rich understanding of the research context for exploratory and explanatory analysis, and has the ability to provide answers to research questions on "why", "what" and "how" (Saunders et al., 2009). The commonly used techniques for data collection under case study are interviews, observation, documentary analysis and questionnaires. However, in most cases triangulation is advised in comparing multiple sources so as to ensure reliability of the data. Also, Saunders et al. (2009) contend that a case study may feature several cases, so as to establish whether findings for one case could be the same in other cases.

Another research strategy is action research, which Kemmis and McTaggart (1998) claimed entails conducting a systematic investigation of a group of people so as to resolve their organisational issues that are causing discord. The aim of action research is to bring about a collaboration of understanding in the participants that emphasises changes in their social circumstances. It is a democratic problem-solving approach achieved through a cyclical process that moves between initial problem identification and reflection to planning, taking action, evaluation, then further reflection and planning. Therefore, this type of research that involves the researcher in the project is not in conformity with the dictate of the positivist philosophy which guides this research.

Grounded theory is another strategy commonly applied to qualitative research; its main thrust according to Glaser and Strauss (1967, cited in Saunders et al., 2009) is to generate theories regarding social phenomena, which is to develop a higher-level understanding that is "grounded" in, or derived from, a systematic analysis of data. Grounded theory is appropriate when the study of social interactions or experiences aims to explain a process, not to test or verify an existing theory. Researchers approach the question with disciplinary interest, background assumptions and an acquaintance with the literature in the domain, but they neither develop nor test hypotheses. Rather, the theory emerges through a close and careful analysis of the data.

It is therefore clearly evident from the various strategy options outlined in the research onion, that as this research is based on the purpose of establishing a causal relationship between liberalisation and air transport demand, specifically the case of the Nigerian market, and a case study and survey are the most suitable – in this case, the use of a survey strategy as part of a case study.

3.6 Choice of Research Methods

The next stage in the research onion is the choice of methods, which Saunders et al. (2009) claimed to involve a combination of data collection techniques and analysis procedures that have three choices – mono method, mixed method, and multi method.

Mono method refers to the use of a single data collection technique and corresponding analysis procedure, while multi method suggests the use of more than one data collection technique and analysis procedure to answer research questions. But the mixed method study combines quantitative and qualitative collection techniques and analysis procedures, as well as combining qualitative and quantitative approaches at other phases of the research through converting qualitative information into quantitative data (Saunders et al., 2009).

Therefore, it is fairly convincing that this research lends itself to a mixed method approach. This is because the research requires different types of data from various sources. For instance, information on liberalisation policy is in qualitative form, which has to be converted to quantitative data for analysis.

3.7 Time Horizons

The time horizons of a research study are independent of research strategy or choice of methods, but the objective and scope of the research will dictate the appropriate time horizons, which could be cross-sectional or longitudinal (Saunders et al., 2009). According to Saunders et al. (2009), a cross-sectional study is an event at a particular point in time, usually due to time constraints or an absence of long-term data, whereas a longitudinal study is an event over a longer period of time, capable of isolating change and development, and associated with constructionist research (Easterby-Smith et al., 2012).

Also, Bryman and Bell (2007) alleged that a cross-sectional analysis requires data on several observations or events at a particular period in connection with two or more variables, which are examined to detect the pattern of relationship. The highlights of the main features of cross-sectional studies include: multiple cases or observations, a fixed period of time, quantifiable data, and a focus on relationships (causation). It is also a very common approach with surveys and questionnaires, and belongs to the positivism research philosophy (Easterby-Smith et al., 2012).

In this regard, this research has adopted the use of a cross-sectional study in determining the causal relation between variables. The advantages of cross-sectional analysis include the ability to isolate the effects of changes in air transport policy on local development (InterVISTAS-ga2, 2006). Cross-sectional analysis assumes that every country route will display unique traffic volumes, socio-economic variables, and degrees of liberalisation in the air service agreements. Accordingly, the study is capable of making use of many countries' traffic as multiple cases over a one-year period of time.

3.8 Research Design

After carefully examining the various options in the research paradigm as outlined in the research onion, this research recognises an appropriate research philosophy, research approach, research purpose, research strategy, research methods and time horizons of the research as depicted in Figure 3.3.

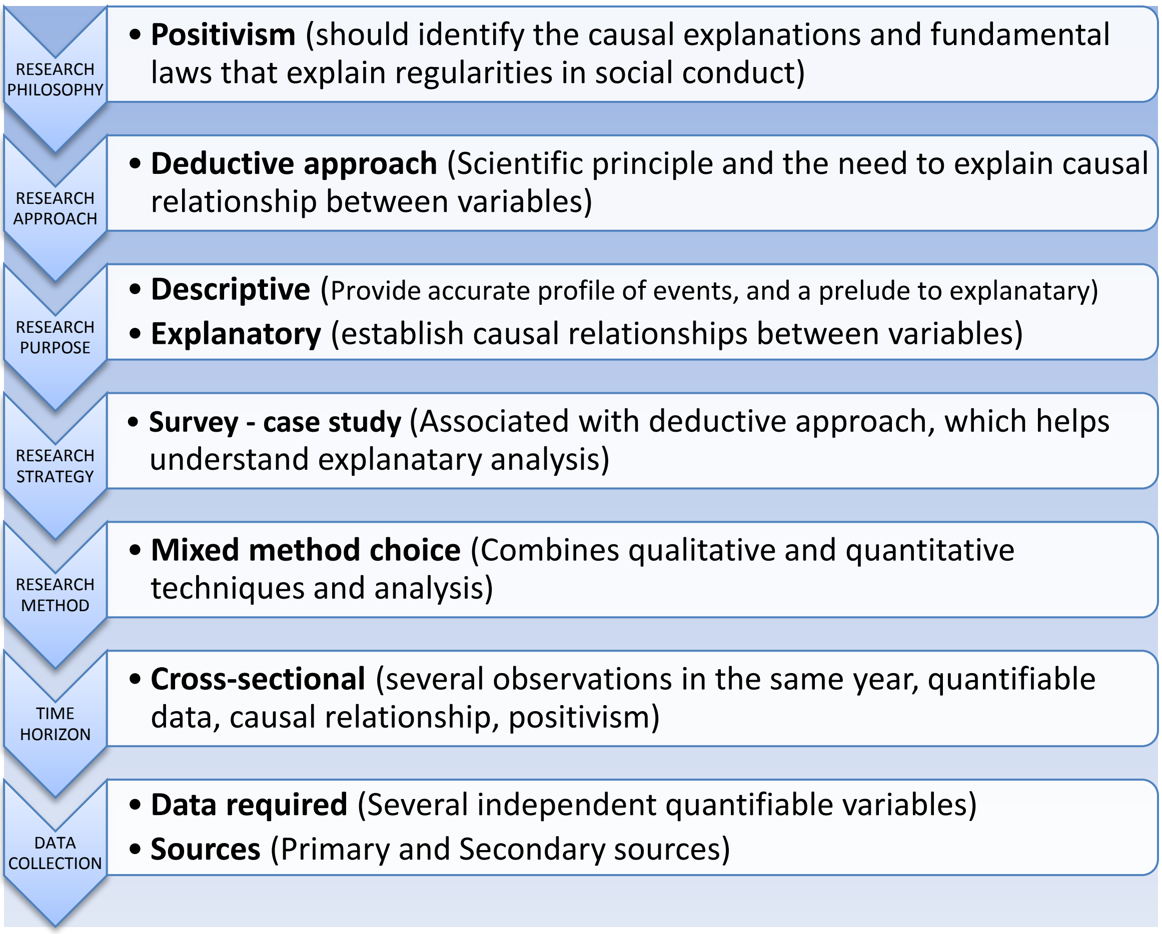

Figure 3.3 Research Design Framework Based on Research Onion

The aim of the research design is to highlight data collection techniques and methodology for the analysis. The data collection involves identification and justification of data requirements and the sources of data, while analysis involves the techniques required for the description and explanation of the variables leading to the research findings.

In addition, the research design is also guided by theories and empirical analysis used in air transport research. For instance, Button and Drexler (2006), Vasigh (2008) and Doganis (2010) stated that demand forecasting techniques in air transport research can have a qualitative or quantitative approach, and are applicable to the study of air service liberalisation. The quantitative methods include time series and causal or econometric methods. The causal model such as the gravity model and multiple regressions are commonly appropriate where country-pair traffic is available. A traditional approach to study the impact of liberalisation can be represented by the schematic diagram below (Grancay, 2009).

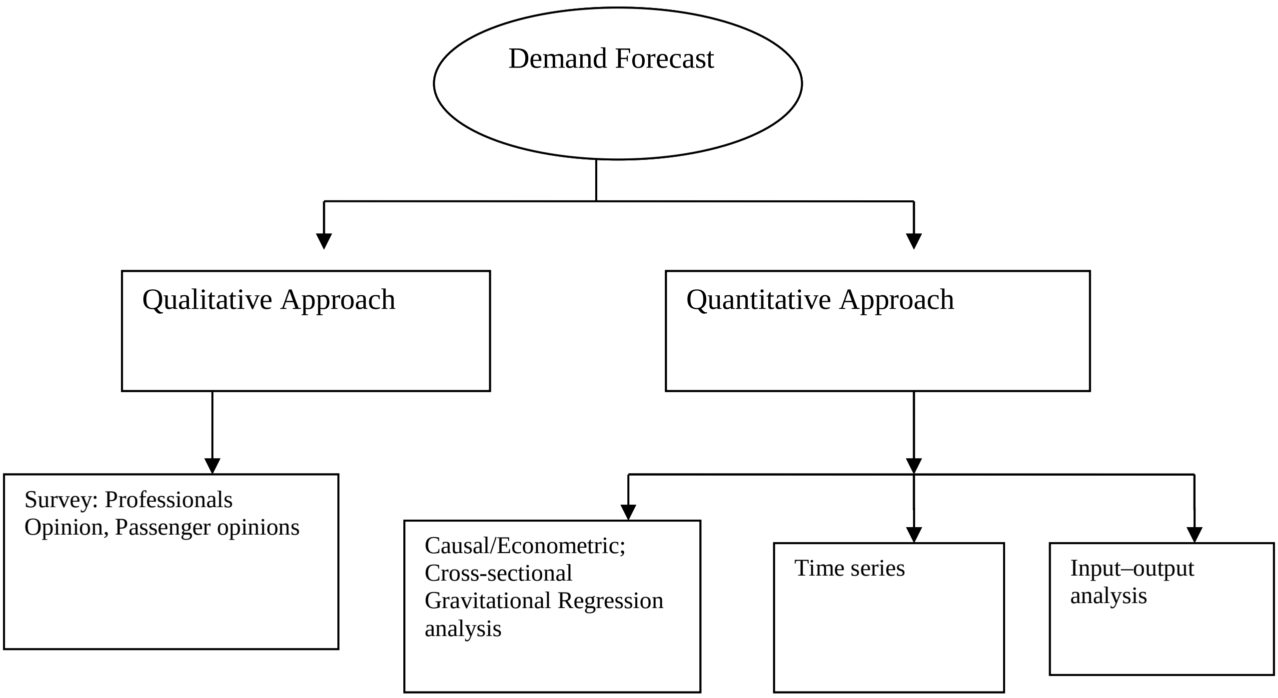

Figure 3.4 Research Methods options

Therefore, from the diagram in Figure 3.4, the research could be approached using any of the following techniques:

- Survey techniques (Qualitative) where professionals and passengers' opinions are sought. However, the major weakness is the possibility of prejudiced responses, which could be a basis for swayed opinion rather than for objective analysis (Grancay, 2009).

- Econometric methods (Quantitative), which is basically developing statistical models, and has the capability of separating the effects of changes in air transport policy on local development (Grancay, 2009). Also, Vasigh et al. (2008) preferred the use of quantitative modelling or regression and time series in the forecasting of air traffic based on the advantages, which include tests of reliability that can determine the accuracy of the forecast and behavioural relationships. Although there is the risk of choosing an inappropriate model, this method seems to be suitable for these research objectives.
- Input–output analysis is another quantitative technique that uses Keynesian multipliers. This is attained through tracing local expenditure on air transportation either by aggregation or multiplication of sectors. The problem associated with this technique is the selection and the difficult estimation of a correct time frame in the analysis and value of the multiplier. It appears that this method may not be appropriate to the objectives of the research analysis. In addition, it involves a lot of classified information that is not easy to obtain.
- Time series analysis is longitudinal and requires data over a long period for the analysis – a minimum period of 15 years (Grancay, 2009). However, the implementation of a liberalisation policy for international markets involving Nigeria only started recently (period of analysis 2000–11). Therefore, this approach may not be feasible for this case.

Therefore, the most appropriate and convincing methodology on the impact of liberalisation in Nigerian international air transport would be to adopt a combination of survey and econometric methods in conducting the research, while theories and empirical studies will provide the framework for analysis that will lead to the research findings as depicted in Figure 3.5 below.

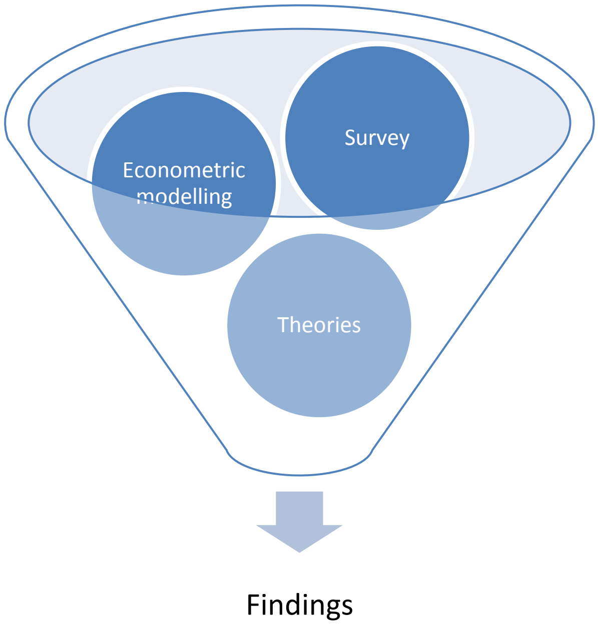

Figure 3.5 Research Funnel

3.9 Data Collection

3.9.1 Secondary Data Required and Identification of Variables

One of the major challenges in the development of a statistical model is the identification of the independent variables (Gujarati, 2003). Also, the development of a causal model that expresses air traffic demand between a pair of countries on a vector of geographic, socio-economic and regulatory variables requires reliable secondary data from the countries involved (Vasigh, et al., 2008). However, the first task is the identification of the required data. Accordingly, Fields (2005) claimed that deciding the actual predictors to use in developing a complex model with several potential predictors involves consultation of previous studies and theories with similar objectives that have yielded a reliable and generalised model. In this regard, the research explores some relevant previous studies on air transport demand and its relationship with liberalisation.

It is common knowledge that air transport is a derived demand for achieving economic, social and political journey purposes. Therefore, demand for air transport hinges on the socio-economic and political needs of the community. To buttress the argument, Doganis (2006) stated that air transport demand from passengers or shippers is related to and affected by one or more economic, social or supply factors. Also, in an economic sense, demand theory suggests that demand for any products or services depends primarily on market price, supply (market regulation), customer level of income and taste, and that change in any one of these variables will affect demand. Therefore, transport demand between two countries depends on the interplay of numerous economic and socio-political variables. Furthermore, explorations of previous studies should guide this research in identifying the appropriate data required for the building of a model that can explain the relationships.

Jorge-Calderón (1997) believed that demand for air transport can be broadly categorised into two types of variable: firstly, geo-economic variables, which arise from economic activity and location factors, determine the level of air transport demand between countries. The variables commonly used to capture the influence of these factors are income and population at the route end points (cities, countries) and the distance between them. Income and population are regarded as generative variables, because air transport demand is positively related to them. Secondly, service-related variables, which include quality of service and price, are used as the main determinants of air transport demand. Jorge-Calderón (1997) pointed out that flight frequency and aircraft size are mostly used to capture the influence of quality-related variables.

Doganis (2006) and Vasigh, et al. (2008) summarised the socio-economic variables affecting levels and growth of passenger traffic demand to include: personal income; air service supply (represented by schedule, frequency and comfort); safety; state of the economy; air fares; distance; population growth/size; economic activity/trade; travel restrictions; historical/cultural links; and other random factors.

In addition to these factors, Piermatini and Rousova (2008b) included language, liberalisation and government regulations, and colonies and borders as influencers of air traffic demand.

One of the key factors presented above that influence air transport markets between countries is the variable pertaining to the BASAs and the level of regulation (Doganis, 2006). The permitted number of airline designations, pricing restrictions, capacity controls and air traffic rights effectively define the level of service supply and market structure for airlines in general. As such, the effect of liberalising these attributes can significantly affect the level of traffic demand, price and service quality.

Dresner and Tretheway (1992) developed an econometric model that analyses price effects of changes in market structure as a result of the liberalisation of the North Atlantic market (between Europe and North America). The theoretical framework estimates the determinants of fares across routes governed by varying degrees of liberalisation are based on a standard profit maximisation equation. The empirical model developed using a two-stage least squares technique considers the problem of endogeneity of including passenger traffic demand in the price equation. The impact of liberalisation is depicted by a dummy variable which separates liberal and restrictive BASA regimes alongside other explanatory variables.

InterVISTAS-EU (2009) used a cross-sectional gravitational modelling approach to prove that economic factors such as GDP, international trade and geographical variables are the most influential determinants of traffic between any country-pair along with ASA regulatory variables. Piermartini and Rousava (2008b) apply a gravity-type model to explain bilateral passenger traffic using a standard Air Liberalisation Index (ALI) developed by WTO. The study estimates the impact of liberalising air transport services on air passenger flows for a sample of 184 countries. The variables employed in the model development apart from ALI include distance, ASA age, common language/culture, colony, border sharing, and country fixed effects. Although the model is more complex with many of the variables as dummies, it finds robust evidence of a positive and significant relationship between the volumes of traffic and the degree of liberalisation of the aviation market using different estimation techniques.

The major strength of Piermartini and Rousava's (2008b) model is the application of a standard ALI, which provides a better gradation of liberalisation that mitigates collinearity between different policies. But a model developed from analysing global airline markets may be less reliable than a model developed from market-specific data. Also, the model did not consider inactive ASAs in the formulation of the ALI. The specific market-based model in this study will take into account all market features.

Similar studies carried out by other scholars with different approaches, variables, numbers of observations, and models on determining the liberalisation impact are summarised for analogy in Table 3.3.

Table 3.3 Strength of explanatory Variables in the Liberalisation Models

Author/study	**Objective**	**Variables used**	**Model used**	**R^2**	**Obs**
Gillen (2001)	Evaluate the impact of ASA changes	ASA, Passengers, Revenue, airport staff	Air Lib Model, demand/supply, I/O model		
Matsumoto (2004)	International air network structure assessment	GDP, Population, distance,	Gravity in log linear form (OLS)	0.70	209
Doganis (2004)	Forecast traffic between airports	Scheduled passenger traffic, air fares, frequency,	Gravity model	0.94	47
Intervistas group (2006)	Impact of lib. International air services	ASA, GDP, service trade, intervening opportunities.	Gravity model, elasticity,	0.67	800
Warnock-Smith &Morrell (2008)	Examines relationship between traffic and lib. policy	Liberalisation scale, GDP, dummy	Regression analysis in log linear form.	0.95	11
Piermartini & Rousova (2008) WTO	Estimate the impacts of lib. on passengers	ALI, distance, ASA age, GDP, language, colony,	Air liberalisation index, Regression model and Factor analysis	0.75	1294
Geleso, & Shepherd (2009)	Examine the link between more liberalisation and trade	Export/import, transport cost, ASA tariff	Air Liberalisation Index in the gravity model	0.97	240

Table 3.3 shows some studies on liberalisation using different explanatory variables, which suggested the use of either macroeconomic variables or industry traffic variables to forecast traffic demand. This is based on a strong relationship with the dependent variable (traffic volume) as indicated by the R^2 values, hence, these justify the use of any of these variables in developing a traffic demand model.

In selecting the appropriate independent variables responsible for determining the dependent variable (traffic demand), from the available market variables and macroeconomic variables as identified by other studies, the influential factors affecting air transport demand in the Nigeria market can be considered. However, some of the factors are statistically correlated and the multicollinearity problem may be present if used together in the model. This informs the choice of the following factors as independent variables and also serves as a proxy for some other variables:

- GDP as a proxy of a state economy, income and population: this will be the combined GDP in US$ of the two countries involved (InterVISTAS-ga2, 2006; Warnock-Smith et al, 2008).
- Trade volume between the two countries as a proxy of economic activity. The total trade value in US$ of goods only will be used, because trade in services data are not available (Geloso Grosso & Shepherd, 2009).
- Liberalisation index as a proxy of service quality, frequency and travel restrictions. This is represented by the air service agreement between two countries (WTO, 2007).
- Dummy variable as a proxy for: common language/historical/cultural link (Piermartini & Rousova, 2008a).
- Distance: average distance in km between the two countries (Matsumoto, 2004).
- Air fare: Average economy fare charged in US$ between the two countries (Doganis, 2006).

The first four variables are positively related to the dependent variable. But, distance and air fare have an inverse relationship with traffic demand levels; that is, the shorter the distance the greater the traffic volume, but as distance becomes very small, maybe just across the border, air transport diminishes in importance owing to competition from alternative transport modes that are cheaper or more flexible (Matsumoto, 2004).

However, some studies argue against the inclusion of air fares in traffic demand estimation, due to high correlation with distance or travel time resulting in multicollinearity problems (Renaraju et al., cited in Grosche, Rothlauf, & Heinzl, 2007). Also, the issue of volatility of fare which is determined by many other factors such as route density, time, competition and operational cost – all these make it difficult to estimate air fares (Jorge-Caldero, 1997; Doganis, 2004).

However, this research considers air fare inclusion as a trial in the analysis so as to determine its impact on the Nigerian market, but if the analysis reveals a very high collinearity of fares against other factors, then it can be dropped from the final model.

The research therefore identifies the above six factors as the variables that affect and determine passenger traffic demand between Nigeria and other countries, although there may be other less significant factors that can be considered as error terms in the relationship.

3.9.2 Justification for the selection of variables

3.9.2.1 Passenger volumes

According to Vasigh, et al. (2008), air transport demand is evaluated in terms of the number of passengers, revenue passenger miles (RPM), or revenue tonne miles (RTM). RPM represents one seat occupied by a revenue generating passenger who is carried one mile. RTM represents one tonne of revenue cargo carried for one mile. It is critical to understand the nature of demand for the industry. Accordingly, the research will use scheduled passenger records for international traffic to and from Nigeria as a proxy for air transport demand as the dependent variable in the model.

Since the approach is cross-sectional, a substantial number of countries' passenger traffic would be required as the number of observations. There should be a ratio of at least 15 countries for each independent variable as recommended by Hair, Anderson, Tatham, and Black (1998). Therefore, with six independent variables, the research should have at least 90 countries' route traffic observations.

Almost all the empirical studies on air liberalisation used passenger records as a basis for assessment of traffic demand.

3.9.2.2 Gross Domestic Product (GDP)

It is generally believed that one of the factors affecting growth in air transport is economic prosperity, measured by indicators such as GDP or GNP per capita, which explains why air travel grows significantly in one country or city, and stagnates in another country or city (Vasigh, et al., 2008).

There is available evidence that demonstrates a close relationship between economic development and air transport activity. For instance, Button and Taylor (2000) claim that there are two key elements that influence air transport growth, namely, GDP and fares. Over the past four decades there appears to have been a change in the balance of importance between GDP and real price factors. Between 1960 and 1990, some 80 per cent of traffic growth globally was explained by GDP growth, with 20 per cent due to price reductions. In the 1990s, this appears to be nearer 60 per cent and 40 per cent respectively. Since 1990, price reductions have become more prominent, with average world GDP growth rates starting to soften. They further argue that air transport activity can be further demonstrated by comparing income per capita with per capita demand for air travel. The per capita demand for air travel is increasing due to an increase in per capita income, which in turn increases the personal disposable income spent on air travel through low frill airlines operating in the air transport market. Therefore, this suggests that people are substituting rail/road modes for the air mode. In addition, air traffic is growing roughly two times GDP growth in developed economies and 1.5 times GDP growth in developing economies (Boeing, 2009). This is witnessed by an increase in aviation activity that provides a useful indicator of a flourishing national economy, as evidenced by the high traffic in most developed countries.

GDP refers to total market value of all final goods and services produced by a country in a given year (Vasigh et al., 2008), which is equal to consumer, investment, government expenditure, and value of exports minus imports. Another proxy for income is GDP per capita which is defined as an approximation of the value of goods produced per person in the country, equal to the country's GDP divided by the total number of people in the country. However, if per capita is used, the inclusion of country population is meant to reflect the total country production capacity.

Population is another factor influencing traffic growth. Strong population growth rates in developing and emerging countries such as China and India have helped spur air traffic demand (Doganis, 2010). However, population growth must be accompanied by income growth, for there to be a significant effect on traffic demand (Vasigh et al., 2008). Since GDP is the product of per capita and the population of the country, the research decided to use GDP as the proxy of both per capita (income) and population. Some previous studies such as InterVISTAS-ga2 (2006) used GDP instead of per capita income. In this regard, aggregate GDP for the two countries involved will be required as an independent variable representing the income level and population of the two countries.

3.9.2.3 Trade value ($)

The need for the inclusion of trade stems from the fact that demand for air transport is a derived demand and trade is one of the main facilitators of links between two countries or cities for the distribution of raw materials, finished products, or human skills.

Air transport, like other transport services, is associated with international trade in two distinct ways (Doganis, 2002). First, air transport is traded as a service in its own right. Second, it is a key intermediate service for many other kinds of trade, in the domain of both goods and services (such as tourism). Numerous studies have highlighted the importance of an efficient, effective and reliable air transport infrastructure, especially in developing countries, to ensure the materialisation of the gains from trade (WTO, 2007). These studies also highlight the crucial role of international civil aviation in contributing to the development process and its role in the leisure and commercial decisions of many people. This importance is expected to increase as a result of technological innovation, deregulation and enhanced market access for foreign companies, which are all making air transport more accessible to a wider set of customers in a broader range of countries (Doganis, 2002).

Notable studies that considered trade value as a predictor variable include InterVISTAS-ga2 (2006) and Grosso and Shepherd (2009). However, the InterVISTAS-ga2 study used service trade only and did not include trade of goods between countries due to the absence of goods trade data. This research intends to use trade value of goods for import and export between Nigeria and other countries. The total value of trade (US$) in a year will be used as one of the predictor variables responsible for traffic between the two partner countries.

3.9.2.4 Distance (KM)

Distance is one of the geographical factors that transport is trying to overcome (Vasigh et al., 2008). Transportation costs play a fundamental role in shaping the pattern of economic activity and the demand for transport (Gillen, et al., 2002). Because of the measurement issues related to transport costs, geographic distance is predominately used as a proxy for transport costs (Behar & Venables, 2010). However, there have been limited studies on the link between distance and transport cost.

Empirical research has extensively relied on geographic distance between the origin of a principal agent and the destination of an economic event as a proxy for transport cost (Doganis, 2010). This approach is justified by the simplifying assumption that distance increases freight costs over space. As the distance is found to have a large negative effect on international trade flows in almost all studies, it is commonly interpreted that transport costs significantly discourage foreign trade (Disdier & Head, 2008).

It therefore means that distance affects transport demand in a negative way: the more the distance the lower the demand. However, air transport has added another dimension – that the closer the distance the less the demand, because as the distance becomes a lot closer, there may be an alternative mode, which may be cheaper, such as road or rail. This suggests that the role of distance in determining air transport demand is estimated to be log linear (Doganis, 2002).

Some empirical studies that used distance include Matsumoto's (2004) assessment of the international air network structure, and Piermatini and Rousova's (2008) estimate of the impacts of liberalisation on passenger traffic. This research therefore considers distance as another factor influencing air traffic demand in the model.

3.9.2.5 Air Fare ($)

According to basic economic demand theory, the law of demand states that "all things being equal as price of a good or service increases, the quantity demanded decreases". That is, at a certain price the passenger would consider it to be too expensive, and some would decide not to fly. The demand curve describes the demand schedule as the number of passengers willing and able to pay alternative prices in a given period, and it is always downward sloping as in Figure 3.6 below (Vasigh et al., 2008).

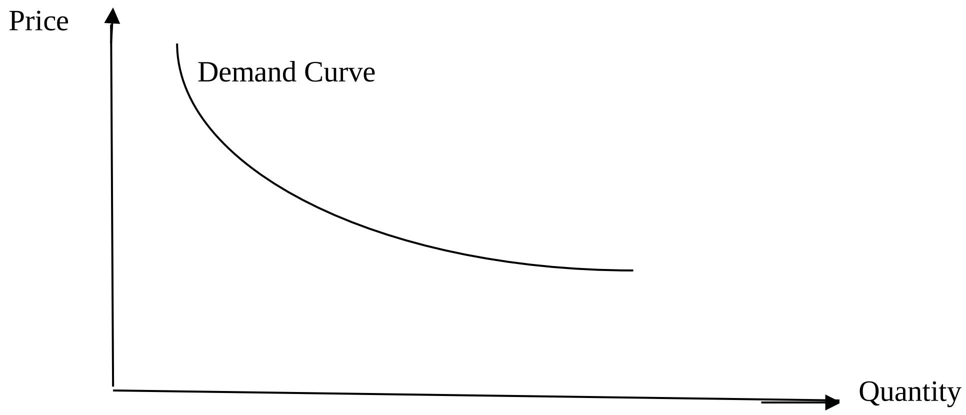

Figure 3.6 Economic Demand Theories; Source: Vasigh et al, (2008)

The graph shows that the effect of the ticket price on the quantity demanded is always causing movement on the demand curve, and it is an inverse relationship.

Therefore, air fare is similar to distance as a barrier to traffic demand. This study, like other studies, considers air fare as another independent variable that can affect international air traffic demand in Nigeria. However, the theory has further argued that some passengers would still pay the price no matter how high; such passengers are considered price insensitive and the demand to be inelastic (InterVISTAS-EU, 2007).

The air ticket price is itself determined by other issues such as the time of purchase, period of the year, competition, route distance, class, and cost of service. This affects the price paid by different passengers for the same journey.

In this context, the average economy fare would be used for the evaluation measure in US$ for all the selected country routes for the period of study. The analysis should be able to come out with the impact of air fare on the demand for international air transport services in the country.

3.9.2.6 Air Liberalisation Index (ALI)

Air liberalisation impact is the key factor in this study. However, in quantifying its impact, liberalisation policy has to be converted from qualitative information to quantitative data in the form of an index. In this regard, the research will construct a liberalisation index similar to the one developed by the World Trade Organization.

According to Piermartini and Rousova (2008b), the ALI developed by WTO in 2006 is a professional-based index. The scales assigned to various aspects of any agreement were based on a consultation of a group of experts in the industry, so as to capture the relative importance of each provision in the agreement. In this regard, each provision was assigned a value scale from 0 to 8, which means an agreement should have a liberalisation index from 0 to 50, where 0 implies the most restrictive ASA and 50 implies the most liberalised agreement (WTO, 2006).

Therefore, the nature of the Air Service Agreements (ASAs) between Nigeria and countries with traffic will be considered. The following components of an ASA will be examined and assigned weight to construct an index.

- Grant of rights (5th freedom/ 6th freedom /cabotage).
- Capacity (predetermination, Bermuda I, free determination)
- Tariffs (dual approval, country of origin, dual disapproval, free pricing)
- Withholding (ownership, community of interest, principal business)
- Designation (single or multiple designation)
- Cooperative arrangement (allowed or not allowed)

The air liberalisation index will be calculated by selecting the provision of each components and assigning a score from zero to eight. A zero value indicates the most restrictive provision and eight the most liberal (see Appendix 3). The ALI is an aggregate weight of scores of the components.

3.9.2.7 Dummy variable

According to Doganis (2010), a historical or cultural link is among the factors affecting passenger demand for international air transport between countries; this is characterised by a common language or common religious beliefs between the countries. This is the reason why countries that share a historical link and common official language have high traffic demand, as the case between Australia or New Zealand and the UK, Hong Kong and the UK, Portugal and Brazil, Nigeria and the UK, and South Africa and the Netherlands. Common language and culture facilitates exchange of ideas/knowledge and transactions among the people of the countries involved. Also, Piermartini and Rousava (2008) argue that a common official language and historical links have a positive impact on passenger traffic demand; hence, their research captures the cultural aspect with dummies for common links.

In this regard, this research also denotes the variable as a dummy, which takes the value of one or zero. Therefore, countries that share a common official language with Nigeria take the value one, and otherwise zero. After identifying and justifying the data required for the research, the research now focuses on the collection method.

3.9.3 Data sources

The only available means of collecting the above data is from secondary sources where such records were compiled for operational and planning uses. However, the main challenges in secondary data collection include reliability and validity of the data (Bryman & Bell, 2007). Also, some of the data involves confidentiality issues.

In order to ensure the reliability and validity of the data, the research adopts triangulation in the data collection from at least two different sources for comparison (Saunders et al., 2009). Hence, the following are regarded as the sources of the variables:

3.9.3.1 Passenger traffic data sources

IATA (PaxIS) is an international source that provides robust traffic data for all country-pairs. PaxIs is a product developed by IATA that provides airline passenger market intelligence and real time data covering ticket information on over 400 global international airlines. The information uses the Billing and Settlement Plan (BSP) which captures data on passenger and ticket information covering passenger volume, average fare in US$, point of origin, connection, and destination airport (IATA, 2012). The database is capable of providing at least 70 per cent of the international traffic data between country-pairs including indirect traffic, because it is based on a Global Distribution System (IATA, 2012). This source is used in many previous studies by academics and professional organisations such as Intervistas group and IATA. Therefore, PaxIS is the source for international traffic demand by passengers between Nigeria and other countries of the world.

The Nigeria Civil Aviation Authority (NCAA) is the air transport regulatory body in the country saddled with the responsibility of monitoring and regulating the system. The airlines provide all passenger coupons to the organisation as part of monitoring. The organisation provides all passenger traffic by airline to countries with a direct link to Nigeria. However, the major weakness of the database is that data for countries without a direct traffic link with Nigeria were unobtainable. That is, the passenger data provided by the agency did not include indirect traffic.

The Federal Airport Authority of Nigeria (FAAN) is responsible for providing an interface between passengers and the airlines. It compiles information on all passengers that embark and disembark from all airlines. This is compiled from the airport passenger tax data. The authority provides passenger traffic data by airlines and country of first destination. However, the data were not able to isolate stop-over passengers from the schedule.

3.9.3.2 GDP data sources

The data on GDP for each country of the world is sourced from the World Bank, which is a global data base of world economic activities and development. The information is a web based database of development indicators. Each country's GDP is sourced and added to Nigeria's GDP to form an aggregate GDP per country pair. This data is reliable and provide sources of information to many international researchers.

Another source for Nigeria GDP data is the country apex bank of the Central Bank of Nigeria (CBN). The CBN provided only Nigeria GDP, and could not provide information on other country GDPs.

3.9.3.3 Trade (Import/Export) data source

The data on trade value representing the sum of imports and exports measured in US$ is sourced from the National Bureau of Statistics in Abuja-Nigeria. This is the organisation responsible for the Nigerian databank. The agency compiles such trade data from the record of customs duty paid at the airports and seaports on all goods imported and exported. The trade data provided include a list of the items, the quantity, value, origin/destination country, and month of the transaction. Therefore, the research had to extract the total amount for each country per annum from the database.

The weakness of the data is that only data on physical goods were provided, without data on services traded. In this regard, it represents a sample instead of the population. Meanwhile, the data are not accessible freely because of ethical and national security issues. They were provided only on the grounds of a request for academic purposes.

The Central Bank of Nigeria is also another source for international trade. However, the two agencies complement each other in data compilation. As a result, the data from the two agencies are the same.

3.9.3.4 Air liberalisation data sources

1) Federal Ministry of Aviation (Nigeria). The ministry is responsible for formulating civil aviation policy and negotiating all air service agreements with other countries including reviews. However, due to government confidentiality, this research was only allowed to examine the documents. Therefore, the ASA signed with each country was examined and the provision on each component of the ASA had to be summarised and not presented.
2) Nigeria Civil Aviation Authority (NCAA). This organisation complemented the ministry data on ASAs with the list of airlines including foreign carriers granted traffic rights in the country (on frequency, designation, and entry point). From these records, the research was able to determine active and inactive air service agreements.
3) Federal Airport Authority of Nigeria. This organisation provided the quarterly/annual flight schedules of airlines in the country's airports, which further complement the data of NCAA.

Some other countries' Civil Aviation Authorities were also consulted in order to confirm the information on ASAs with Nigeria such as:

1) The British Civil Aviation Authority provided a summary of the UK–Nigeria Air Service Agreement.
2) The United Arab Emirates General Civil Aviation Authority provided a summary of the ASA between the UAE and Nigeria.
3) The African Civil Aviation Association (AFCAAC) provided a copy of African countries liberalisation policy called Yamoussoukro Declaration.

3.9.3.5 Air fare sources

IATA PaxIS provided the data of all international average economy fares to and from Nigeria from other countries for the years 2009 and 2010. This was based on e-bookings from airlines and travel agents that covered over 70 per cent of routes, and provides a reasonable sample from the population. However, it is extremely difficult to obtain another source for verification purposes owing to confidentiality issues from the airlines.

3.9.3.6 Distance (KM) sources

IATA PaxIs: IATA provided average distance travelled by airlines in transporting passengers between country-pairs including transit passengers; as such, this provided a source for Nigerian international travel distances covered by the airlines to various destinations in 2009 and 2010. The data were purchased from IATA.
Google Maps: This map computes distances between cities globally, although this provides only a direct link between cities. However, this data is only needed for comparison purposes with the data provided by IATA.

3.9.3.7 Dummy sources

As explained above, the dummy variable represents the country's relationship with Nigeria in terms of common official language (English), or common historical/cultural link. The information on this was sourced from each country's profile as provided by USA (CIA library publication on world facts). Also, the UK Foreign and Commonwealth Office provided another source that confirms the CIA data. This provides a good source for commonwealth country members and their profiles.

In order to ensure data reliability, all data were collected from at least two different sources with the exception of data on air fares for which there was only one source.

3.9.4 Organizing the Data

After collecting the data from the secondary sources, some of the data were in a different format was not suitable for direct substitution in the analysis. Hence, the research transformed such data to fit into the model analysis. The data collected on GDP (US$), Air fares (US$), Trade ($) and Distance (km) did not require further transformation and, as such, were used as provided. For the dummy variable (1 or 0), countries that share a common language or history or culture with Nigeria take the value of one, while countries with no such common linkage are assigned a zero value.

Data on the air liberalisation index (ALI) were derived from the nature of the ASAs between Nigeria and other countries. The information came in qualitative form; hence, the data had to be converted to numerical values by measuring the degree of liberalisation of ASA features. The WTO (2006) identified seven features of ASAs as relevant indicators of liberalisation for scheduled air passenger services, and each of the components is assigned a weight index between 0 and 8, where 0 denotes the most restrictive agreement and 8 denotes the most liberal provision in the seven components of each ASA (see detail in Appendix 3).

Table 3.4 Methods for computing ALI

Features	**Agreement options**	**Weighted index (ALI)**	**Remark**
Granting of right	5th freedom 7th freedom Cabotage	6 6 6	Liberal Liberal Liberal
Capacity	Pre determination Bermuda1 Free determination	0 4 8	Restricted Liberal Most liberal
Tariff	Dual approval Origin Disapproval Zone pricing Dual disapproval Free pricing	0 3 4 6 8	Restricted Less restricted Moderate Liberal Most liberal
Designation	Single designation Multiple designation	0 4	Restricted Liberal
Withholding	Substantial ownership Community of Interest Principle place of business	0 4 6	Restricted Liberal Most Liberal
Cooperative agreement	Allowed Not allowed	3 0	Liberal Restricted
Statistic exchange	Required Not required	0 3	Restricted Liberal

Source: WTO (2006)

The Air Liberalisation Index (ALI) is the aggregate value of all the features in any agreement ranging from 0 to a maximum of 50, where 0 is associated with the most restrictive agreement and 50 denotes the most liberal agreement.

3.9.5 Primary Data from Field survey

Since the scope of the research is limited to passenger traffic, in studying passenger demand, there is a need to understand the socio-economic characteristics of passengers in the market, which might suggest the passenger responses to a liberal air policy, and also to reinforce the quantitative data.

The aim of this approach is to identify the socio-economic characteristics of the passengers in the Nigerian international market, which is one of the study's objectives. The approach would determine the following data:

- The composition of the passengers; business or leisure travellers
- The different nationalities of the passengers
- The age group, profession, and income level of the passengers
- The origin and final destination of the passengers
- The frequency of passenger journeys per annum
- Rationale for the selection of airline by passengers

A field survey was conducted where the above data were collected with the use of a structured questionnaire. The questionnaires were administered to the travelling passengers preparing for departure at Lagos and Abuja international airports.

The information from the survey about the characteristics of the passengers would reinforce and complement the quantitative findings and enrich the discussion for better understanding of liberalisation impacts. It would also be useful in the determination of passenger elasticity coefficients for both business and leisure travellers, where the consumer impact could be evaluated.

3.9.5.1 Sample size

The total passenger population for the international market as at 2010 (research base year) was about 2.7 million passengers. The survey was not able to cover all the population, so in order to be able to generalise the findings a reasonable and acceptable number of responses has to be covered (Saunders et al., 2009; Bryman & Bell, 2007). In this regard, Saunders et al. (2009) recommended an acceptable sample size of at least 384 passengers for a population between one and ten million at the 95 per cent confidence level (5 per cent margin of error). However, despite the minimum sample size, a higher number of samples would be preferable and more reliable (Doganis, 2010). Hence, the research decided to increase the sample size despite the limitation of resources available to 600 passengers. Accordingly, 600 hundred questionnaires were administered to randomly selected passengers at the airports. About 512 passengers successfully responded, which represents the sample of the population of passengers for analysis.

3.9.5.2 Sampling techniques

Since the research has established the actual sample size required that can generalise the findings of the research to the whole market, the research also identified the departing international passengers in the market as the most appropriate sampling frame. The departing passengers have some dwell time that can be used to attend to research questionnaires while waiting for departure.

The consideration of the sampling technique that would enable unbiased inference from the sample of a population depends on the population division/strata, geographical spread, contact approach, and periodic pattern (Saunders et al, 2009). In this regard, the research observed that the international passengers in the market were mainly divided into various international routes for about 25 countries, with each country route having a particular schedule for departure. Also, the passengers in the market were segmented based on journey purpose, business or leisure, taking into account their travels seasons, which are influenced by summer or winter. Face to face contact with the passengers was selected as the most suitable option within the airport departure halls. The questionnaires were self-completed by the passengers, while the researchers waited after administering to them.

As a result of the evident market heterogeneity, the research adopted stratified random sampling in the distribution of questionnaires at the two main international airports of Lagos and Abuja. These two airports handled 96 percent of the market traffic in 2010 (NCAA, 2011). The questionnaires were administered in June (summer) and November (winter), so as to represent any type of travellers in the sample. The proportion of distribution between the airports was based on the market share of each airport. In the year 2010, Abuja Airport handled 18 percent and Lagos Airport handled 73 percent of the international passengers in the market (NCAA, 2011). Hence, the questionnaires were split into 30 percent and 70 percent for Abuja and Lagos Airports respectively.

Furthermore, the distribution of questionnaires at the airport was spread across time, so as to cover all international routes. The research observed that each country route has a flight schedule pattern in the market. The flight schedule in the airports for 2010 indicated that Europe and North America started from 7.00am to 10.30am and another schedule from 6.30pm to 10.30pm. Flight schedules to Asia commenced from 12.30pm to 3.30pm and 7.30pm to 10.00pm. Meanwhile, most West African country schedules commenced from 9.00am to 4.00pm, and other African countries flight schedules started by 10.30am and went through to 4.00pm.

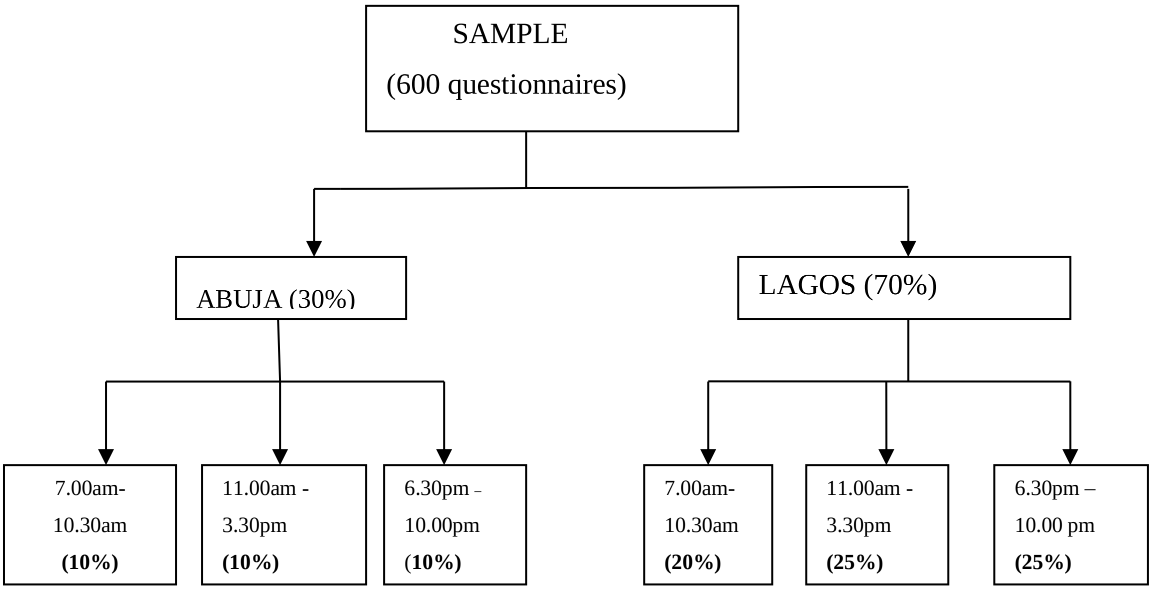

Figure 3.7 Sampling techniques

3.9.6 Triangulation of evidence

Triangulation refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings (Bryman, 2007). Management research that relies on the use of a single research method may be affected by the limitations associated with that method or from the specific application of it; hence, triangulation offers the prospect of enhanced confidence and reliability. Meanwhile, Denzin (1970) distinguished four forms of triangulation namely; data triangulation (entails gathering data through several sampling strategies, or different sources, or different time frames); methodological triangulation (using more than one method for gathering data); theoretical triangulation (the use of more than one theoretical position in interpreting data); and Investigator triangulation (involving more than one researcher in the field to gather and interpret data). In this regard, this research used the first three forms of triangulation.

3.9.6.1 Triangulation of Data

This research used data triangulation in the collection of both secondary and primary data. Secondary data on traffic demand, air fare, distance, trade, ALI, and distance were collected from separate and unrelated sources, so as to verify and ensure the validity of the data collected (see section 3.9.3 for detail). The primary data collection, which involved a questionnaire administered to international passengers, was administered at two different times (summer and winter) and also from two different international airports (Abuja and Lagos).

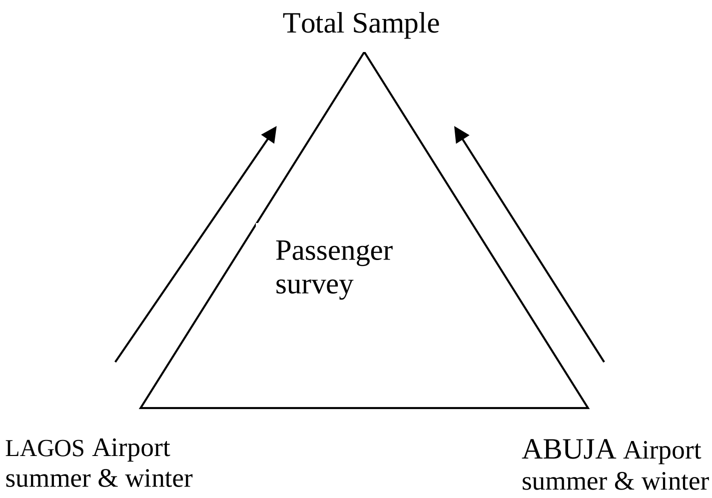

Figure 3.8 Triangulation of data

3.9.6.2 Triangulation of Methodology

This research also used triangulation of methodology in the collection of data. Though the data collected differed from each other, the analysed data converged to answer the research questions. In this research, the main methods involved collection of secondary data using a triangulation approach and a field survey of passengers. The secondary data provided information on country pair traffic demand, trade, air fare, distance, ALI, dummy, traffic trends, and competing airlines and routes, while the field survey supplied the inaccessible information from secondary sources and verified some of the secondary data. The data from the survey included; market trends, routes, competing airlines, passenger profiles, journey type, trip purpose, and motivational factors for selection of airline.

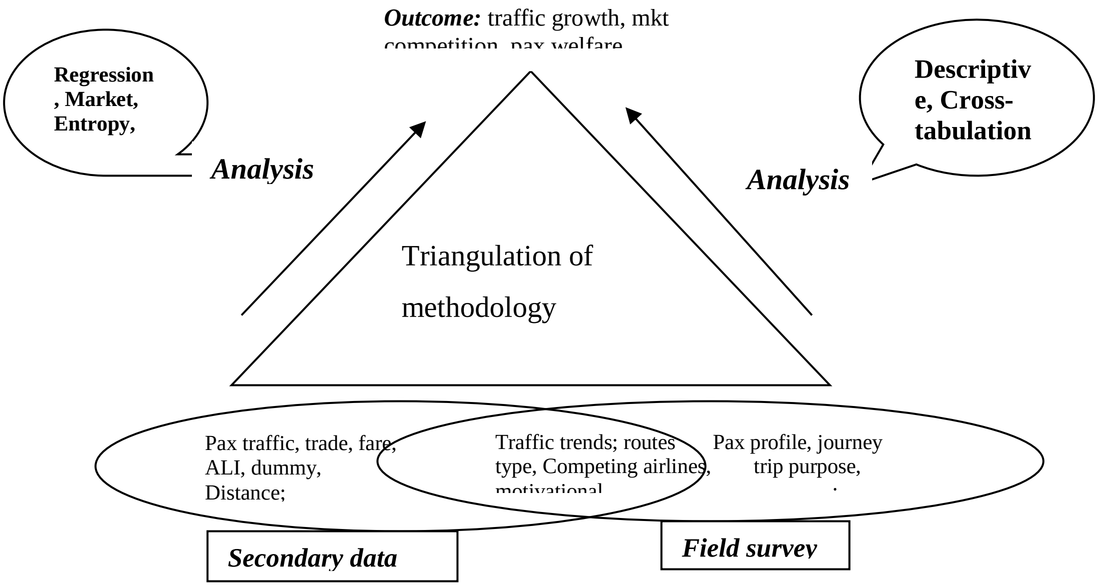

Figure 3.9 Triangulation of research methods

3.10 Model Development

After the research identified the appropriate predictor variables that explain the dependent variable, a valid statistical model using any recognised scientific approach was developed, and lastly the validity of the model was tested. This was followed by the application of the model in forecasting the impact. It was against this background that the model of international passenger traffic in Nigeria in relation with other variables was developed.

Modelling is the determination of the functional relationship by calibration of the variables from the database. However, modelling air transport demand has different approaches, as claimed by various studies.

For instance, Verleger (1972) suggested that demand for air transportation service can be analysed within three different relatively simple theoretical frameworks: cross-sectional, aggregate (time series), and point-to-point. Cross-sectional and aggregate can provide estimates of the average values of parameters.

Also, Doganis (2002) argued that the forecasting methods commonly used in air transport fall broadly into three groups of growing complexity: qualitative methods, time series, and causal or econometric methods such as regression and gravity models. The causal model is commonly appropriate where country-pair traffic is available. This view was further corroborated by Vasigh et al. (2008) who said each of the approaches has its own limitations and strengths.

Furthermore, a recent study on Nigeria suggested that econometric models (regression and gravity models) can be used in quantifying the causal relationship of traffic demand and a set of independents variables: by implementing change in any one of the variables, the consequent impact on demand levels are predicted. The study also claims that multiple regression models are, however, the most reliable method for forecasting air travel demand (Aderemo, 2010).

Verleger (1972) claimed that travel or communication between two cities will decrease as the distance between them increases, similar to the gravitational law of physics developed by the famous scientist Newton, and suggested that the gravity model specification is most frequently tested against cross-sectional data.

A simple formulation of a gravity model for human spatial interaction used for the prediction of travel demand between two cities i and j is

$$\boldsymbol{V_{ij} = K\frac{(A_i A_j)^{\alpha}}{d_{ij}^{\gamma}}} \qquad \text{--------------------} \ (3.1)$$

Where V_{ij} is the passenger volume between i and j. Ai and A_j are attraction factors of i and j, d_{ij} is the distance between the cities, and k is a constant, γ is a parameter that controls the influence of the distance on travel demand and α controls the influence of the attraction factors. Usually, the attraction and deterrence is expressed not only by a single variable but by a combination of various factors. In this study's case, the factors include GDP, trade, air liberalisation index, fare, distance, and historical link.

Parameters are calibrated to ensure the most accurate prediction of the expected travel demand (the difference between predicted and observed travel demand should be low). Thus, data include historical passenger demand between Nigeria and other countries for a particular period as a dependent variable, as well as corresponding data for the influencing factors between the countries. A reasonable observation for samples of countries is required over a particular period; considering the number of variables, there should be a minimum ratio of 5 to 1, but the most appropriate is between 15 and 20 to 1 ratio of observations to independent variable – with such a ratio the results should be generalisable (Hair, et al., 1998). In this case, study of at least 30 countries' traffic data are required to develop the model, but in order to generalise the model, there should be at least 95 observations (country-pair).

Based on the reliability and the advantages of econometric modelling, the research will apply a cross-sectional regression model in determining the relationships between the dependent and the independent variables. The advantages consist of the ability to isolate the effects of changes in air transport policy on local development (InterVISTAS-ga2, 2006).

3.10.1 Estimating the Model Parameters

Data collected from secondary sources will be subject to scientific processing and scrutiny to allow for meaningful understanding, inferences and validations of relationship between variables, which could estimate the impact of the liberalisation policy.

$Traffic_{AB} = F\ [GDP_{AB}, Trade_{AB}, ALI_{AB}, Dummy\ (1,0)_{AB},]\ /Dist_{AB}, Fare$ ------------ (3.2)

Equation (3.2) is the expression of Traffic as a function of the independent variables GDP, Trade, ALI, Air fare, Distance, and a Dummy. The expression can be mathematically expressed as;

$Traffic_{AB} = \beta_0 + \beta_1(GDP_{AB}) + \beta_2(Trade_{AB}) + \beta_3(ALI_{AB}) - \beta_4(Air\ Fare_{AB}) - \beta_5(Dist_{AB}) + \beta_6(Dummy_{AB}\ 0,1) + \varepsilon$ -- (3.3)

This is a multiple regression equation where TrafficAB is determined by independent variables, where; β0 is the intercept and constant term; Gross Domestic Product (GDP_{AB}) is the product of the GDP of the two countries. The specification assumes that changes in the GDP of each country in the country-pair will have identical influences on the level of traffic. The GDP term proved the most influential exogenous variable in terms of significance and explanatory power; $Trade_{AB}$ is the total value of trade in goods exchange between Nigeria (A) and the other country (B) in a year, expressed in

US dollars; Air Fare$_{AB}$ is the average economy fare paid by passengers travelling by air between country A and B in the year, given in US$; Distance$_{AB}$ is the distance between Nigeria's capital city and the other country's capital city in 000 km; Dummy$_{AB}$ is the dummy variable representing cultural links that affect traffic levels in some cases, such as a common language, colony and history. This takes the value of zero or one; The Air Liberalisation Index (ALI$_{AB}$) variable is the nature of ASAs between Nigeria and other countries and is quantified by the degree of liberalisation of the aviation market, measured by the air liberalisation index; Error (ε) is the inclusion of error or residual and is to acknowledge that predicted values in social sciences are almost never exactly correct and that to acquire a true value requires the inclusion of a term that adjusts for the discrepancy between the predicted value and actual value (klienbaum, 1988). Thus, $\beta 0$, $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$ are the coefficients of the model relationship. This is an ideal linear function, which depicts demand relationships very well, and can easily be solved using the method of least squares (Draper & Smith, 1981).

A multiple regression model represented by equation (3.3) will determine the relationship between traffic, the extent of liberalisation and socio-economic condition variables. The model will be estimated using cross-sectional data on about 137 countries from Nigeria (Number of observations). The analysis will use data from the years 2010 and 2009 as the sample years.

The cross-sectional analysis assumes that a particular route to each country will display unique traffic volumes, socio-economic variables, and degrees of liberalisation in the air service agreements (InterVISTAS-ga2, 2006). Through correcting for variations in economic activity and other extraneous factors, this approach seeks to explain variations in passenger traffic between different routes from Nigeria to variations in their bilateral agreements.

Meanwhile, spatial relations of human nature are most often not proportionally correlated, thus could display characteristics of a nonlinear relationship. The marginal effects of each independent variable depend on the value of other variables in the demand function. This type of relationship is estimated by the method of least squares by first transforming values into a linear relationship using logarithms (Zlatopher 1984 cited in Aderamo, (2010).

In this regard, the variables are transformed, so as to meet the criteria of linearity for multiple regression analysis. The model is calibrated using Ordinary Least Square (OLS) with an SPSS package adopting a stepwise elimination method, where the independent variable significance contribution is determined. The stepwise method is capable of removing any independent variable that makes no statistically significant contribution to the dependent variable (Field, 2005). Meanwhile, the statistical indicators will explain the relationship between the predictors and the response variable.

The calibration will determine the coefficients of the equation (α, β0, β1, β2,β3) and other statistical values, such as the coefficient of determination R^2, t-statistic. The values will explain the strength of the exogenous variables including liberalisation in determining the endogenous variable (traffic volume).

3.10.2 Validation of the Model

After calibration of the model using the stepwise method, all the statistical indicators and multiple regression parameters were determined. The next step was to validate the model. There are several purposes to validation: firstly, to test whether the model's parameters are statistically significant; secondly, to test whether the model meets the assumptions of multiple regression; and lastly, to use the model and estimated traffic demand on a particular route and compare it with the actual value, so that the model can be validated (Hair, et al., 1998).

3.10.2.1 Testing the model parameters

Partial Coefficient (β): Beta-coefficients represent the independent contributions of each independent variable to the prediction of the dependent variable. This determines whether the impacts represented by the coefficients β can be generalised to the whole population. The appropriate test of significance is the t-test which is calculated for all variables and is given as the coefficient over the standard error. The calculated value is compared to the table value for a sample size n at a confidence level of 0.05 or 0.01 (α). If the t value is greater than the table value (2.0 or –2.0) at 95% confidence level, then the coefficient is statistically significant in the regression. Anything within the range of –2.0 to 2.0 shows weak statistical significance. Also, for all values of t, the corresponding p value should be less than 5 per cent, and anything above this value is rejected in the model. However, it is possible to accept a t-statistic value between ±1 and ±2 if the p value is below 0.05 (Hair, et al., 1998).

Correlation Coefficient R: Traditionally, the degree to which two or more independent variables are related to the dependent (Y) variable is expressed as the correlation coefficient R, which is the square root of R-square (Hair, et al., 1998). R can assume values between 0 and 1, where 0 suggests no correlation and 1 indicates perfect correlation.

Coefficient of determination (R^2): The R-squared measures the proportions of the variance of the dependent variable about its mean that is explained by the independent variables (Hair, et al., 1998). If the variability of the residual values around the regression line relative to the overall variability is small, the predictions from the regression equation are good (Hair, et al., 1998). In most cases, the ratio and R-squared will fall somewhere between these extremes, that is, between 0.0 and 1.0. Ideally, it is preferred to explain most if not all of the original variability (Hair, et al., 1998). The R-squared value is an indicator of how well the model fits the data (e.g., an R-square close to 1.0 indicates that we have accounted for almost all of the variability with the variables specified in the model).

Adj R^2: Adjusted coefficient of determination is a modified measure of the coefficient of determination that takes into account the number of independent variables included in the regression equation and the sample size. The addition of independent variable Xi will cause R^2 to rise, the adjusted R^2 may fall if the added independent variable has little effect or the degrees of freedom become too small (Hair, et al., 1998).

F value (t-values): The significance testing of regression coefficients provides an empirical assessment of variables' true impact. The F value of a relationship at the 95% confidence level will determine the significance and robustness of the relationship; a higher F value is desirable for a good model and provides evidence of the existence of a linear relationship between the response and the explanatory variables.

According to Heirs et al. (1998), in testing the hypothesis, if the amount of variation explained by the regression model is more than the variation explained by the average (R^2 is greater than zero), the F ratio is used:

$$F = \frac{SSE_r/_{df_r}}{SSE_t/_{df_{rd}}} \quad \text{---} \ (3.4)$$

df_r = no of coefficients + intercepts – 1

df_{rd} = Sample size – no of estimated coefficient

SSE_r = Sum of square error repressors

SSE_t = Sum of square error total

The F ratio for multiple regressions with six variables and a high number of observations should be greater than the critical value (Table value) at 0.05 significance levels. If the F ratio is greater than the critical value, then the null hypothesis is rejected.

3.10.2.2 Assumptions of Multiple Regression

Predicted and Residual Scores**:** The regression line expresses the best prediction of the dependent variable (Y), given the independent variables (X). However, it is natural to have substantial variation of the observed points around the fitted regression line as in a scatter plot. The deviation of a particular point from the regression line (predicted value) is called the residual value, and it should not have any regular pattern – this would imply the model must have left out another significant variable (Hair, et al., 1998).

Assumption of Linearity: In multiple linear regressions it is assumed that the relationship between variables is linear, but in practice this assumption is virtually impossible (Hair, et al., 1998), hence, multiple regression procedures are not greatly affected by minor deviations from this assumption. However, as a rule it is prudent to always look at the scatter plot of the variables of interest. If curvature in the relationships is evident, then consider either transforming the variables, or explicitly allowing for nonlinear components (Hair, et al., 1998).

Normality Assumption**:** It is assumed in multiple regressions that the residuals (predicted minus observed values) follow a normal distribution (Field, 2005). Although most tests (specifically the F-test) are quite robust with regard to violations of this assumption, Hair et al. (1998) suggest a review of major variables' distribution before drawing a conclusion. This can be realised by producing histograms of the residual values as well as normal probability plots.

3.10.2.3 Choosing another Sample

Another way of validating the model is by the use of another sample, different from the first sample. In this regard, the research makes use of the 2010 database for international traffic and all the independent variables recorded in the year in the development of the model. To validate the model, the research makes use of another sample drawn from the 2009 database for the corresponding variables and develops the same model. The two models are compared and correlated.

3.11 Application of the Model to Determine Traffic Demand

From the values of coefficients determined in the calibration, the research will create a quantitative expression between the endogenous variable and the exogenous variables including liberalisation policy to represent equation (3.3).

The research will use the expression to forecasts the demand of traffic in Nigeria if certain components of liberalisation are relaxed. Specifically, the research will forecast the passenger traffic volume due to an increase in the liberalisation index.

3.11.1 Market Access Liberalisation

This refers to liberalisation in terms of the bilateral air service agreements relating to airline designation, capacity restrictions, pricing restrictions, fifth freedom rights and cooperative arrangements. For the case of open skies agreements, there will be multiple airline designation between countries, with the freedom to operate any route without restriction on capacity, frequency or price, and unlimited freedom for services. Therefore, the research simulates other countries' traffic that is regulated by restricted BASAs versus an OSA model, which increases the liberalisation index to 26, while holding other independent variables constant.

3.11.2 Ownership and Control Liberalisation

This refers to liberalisation of ownership and control restrictions placed on the country's airlines operating international services. The analysis considers the impact if these restrictions are removed (e.g. restrictions on foreign ownership). As this form of liberalisation is considered separately from market access liberalisation, it is assumed that a principal place of business requirement replaces the national ownership requirements within the ASAs as is the case with the Yamoussoukro Declaration, which will increase the liberalisation index to 32. The traffic of other countries is also stimulated when carrier ownership restrictions are liberalised and at the same time other independent variables remain constant.

3.11.3 Combined Market Access and Ownership Control Liberalisation

Furthermore, the research will also forecast traffic volumes using a combination of market access liberalisation and carrier's ownership and control freedoms for other countries while holding other independent variables constant.

3.12 Impacts on Air fare and Consumer Welfare

If the model is tested to be significant and meets all the assumptions of multiple regression, then the research will apply the model in forecasting future passenger traffic when air transport is liberalised, with the assumption of the "ceteris paribus" law, which implies that all other factors that could affect the outcome (such as the GDP and Trade) remain constant. The coefficients obtained can be used to estimate passenger volumes for the observations if any variable is changed, which in this case is the liberalisation index. A change in traffic as a result of change in liberalisation will also lead to change in other matters such as prices and airport utilisation as described in Figure 3.10 below.

The change in price is based on the theory of elasticity and empirical evidence (Button, Costa, & Cruz, 2007). Also, a change in airport utilisation is inevitable, possibly with some consequences (Gillen, et al., 2002; A. Graham, 2000).

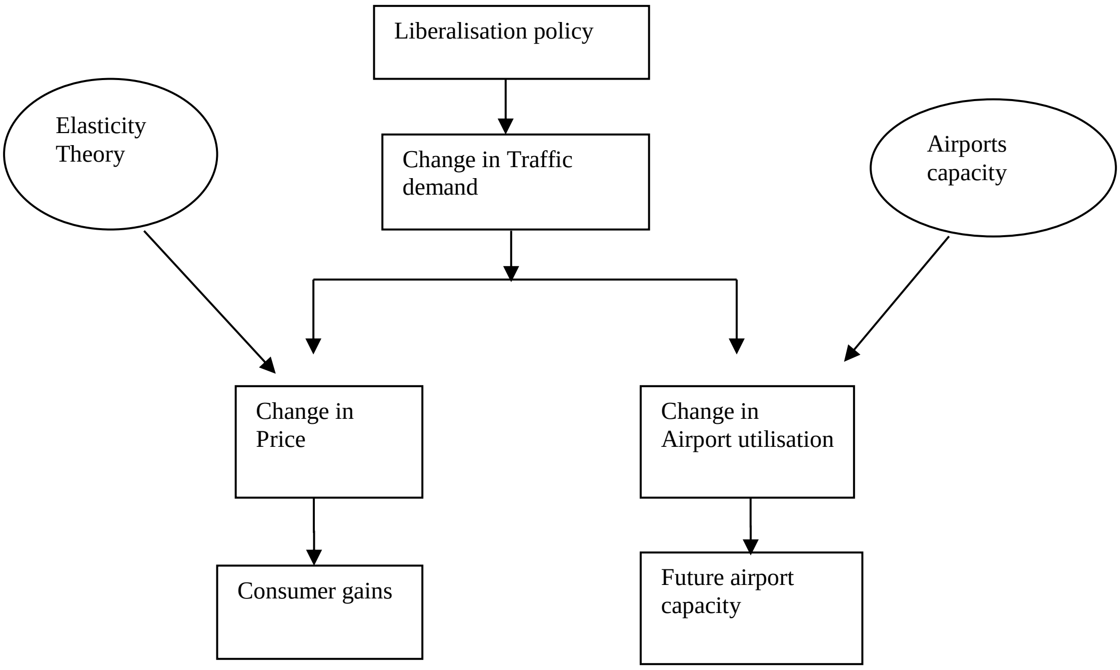

Figure 3.10 Impact of Liberalisation Chart

Change in demand in an economic and market sense can lead to a change in supply and a change in price; in this case, the change in traffic demand can cause a change in service frequency/capacity and also a change in air fares. Further analysis of air fare change can lead to an estimation of its effect on passengers in the form of consumer gains or losses. Furthermore, an increase in service frequency/capacity may lead to additional utilisation of airport facilities in which the designed capacity has to accommodate the increase of passenger services; otherwise, the result will be congestion and delays.

In order to appreciate the impact of change in traffic demand in relation to price, there is a need to apply the theory of demand elasticity in air transport, which, according to Vasigh (2008) measures the sensitivity of demand to a change in price; that is, demand elasticity measures the proportional change of quantity demanded that results from a change in one of the factors influencing the demand. But, generally, the elasticity of transport demand can be elastic to price or income.

3.12.1 Price Elasticity

For this research, the interest will be on price elasticity which is defined as the proportional change in quantity demanded divided by proportional change in price. Price elasticity of demand ε indicates the proportional change in quantity demanded that results from a 1 per cent change in price.

$$\text{Price elasticity } (\varepsilon) = \frac{\%\text{ change in quantity demanded}}{\%\text{Change in price}} \text{ ------------------------------ } (3.5)$$

Different values of price elasticity of demand show different reactions of demand to a price change:

$\varepsilon = 0$: zero elasticity, demand is stable and completely independent from price changes;

$\varepsilon < 1$: inelastic demand, the proportional change in quantity demanded is less than the proportional change in price;

$\varepsilon = 1$: the proportional change in quantity demanded equals the proportional change in price;

$\varepsilon > 1$: elastic demand, the proportional change in quantity demanded is greater than the proportional change in price.

Ticket price is one of the variables in the above model, meaning that it is one of the determinants of traffic demand. In this context, Vasigh et al. (2008) claimed that price is the only determinant of demand that causes a movement along the demand curve while changes in other variables cause a shift in the demand curve.

Meanwhile, price elasticity in international air transport differs from one market to another and also from one period to another, such as summer and winter periods. Also, the length of routes affects demand elasticity: longer routes have lower elasticity than shorter routes, because shorter routes may have substitutes from other modes. Another important factor is the purpose of travel: short-term price elasticity of business passengers is low. On the other hand, demand for leisure travel in economy class is considerably elastic (Grancay, 2009).

Gillen, Morrison and Stewart (2004) studied price elasticity of air transport for different lengths and purposes of journeys globally, and developed a standard chart of price elasticity ranging from –0.26 to –1.7. These are the most widely cited values of price elasticity of demand for air travel (Grancay, 2009). Short leisure flights were identified as the most elastic market segment with median value of 1.52. This means a 1 per cent increase in flight ticket prices leads to a 1.52 per cent decrease in demand. Conversely, the least elastic market segment is constituted by long international business flights with median value of –0.27; a 1 per cent increase in flight ticket prices leads to a 0.27 per cent decrease in travel.

But the weakness of this elasticity chart is that it did not take into account the differences in economic prosperity of various regions or countries of the world. In other words, Gillen, Morrison and Stewart (2004) applied the same value to both low income and high income countries. Hence, this research would determine the average price elasticity of the Nigerian international air travel market.

3.12.2 Passenger Impact: Consumer Surplus

Fare reductions lead to consumer surplus gains, estimated on the basis that much of the traffic stimulation from liberalisation is due to fare reductions and increases in frequency (Gillen, et al., 2002).

Fare reduction estimation assumes that for country-pairs with a direct air service prior to liberalisation traffic stimulation was attributable to fare reductions; while for country-pairs that did not previously have a direct service, two-thirds of the traffic increase was attributable to fare reductions and one-third was attributable to improved service levels in terms of having a direct service and increased frequency (InterVISTAS-EU Consulting, 2009).

Therefore, fare reduction is calculated as follows:

Country Pairs with Direct Service

$$\%\ \text{Fare Reduction}_{\text{AB}} = \frac{\%\ \text{Traffic Increase}_{\cancel{\text{AB}}}}{\text{Fare Elasticity}_{\text{AB}}} \text{ ---------------------------- } (3.6)$$

Country Pairs without Direct Service

$$\%\ \text{Fare Reduction}_{\text{AB}} = \frac{2/3 \text{ x } \%\ \text{Traffic Increase}_{\cancel{\text{AB}}}}{\text{Fare Elasticity}_{\text{AB}}} \text{ ----------------------- } (3.7)$$

Consumer surplus is frequently used in economic welfare analysis and is defined as the amount that consumers save from a purchase of a product or service for a price below the original price that consumers were willing to pay (InterVISTAS-EU Consulting, 2009).

Intervistas (2009) further illustrated the concept of consumer surplus as in Figure 3.11 which shows a standard demand curve representing the relationship between price and quantity demand – as price declines the amount demanded increases.

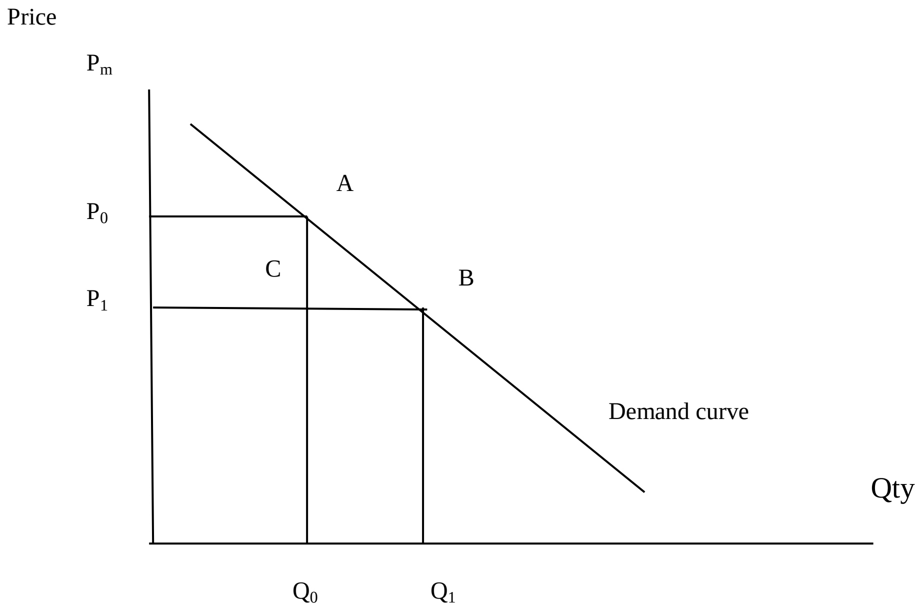

Figure 3.11 Consumer surplus illustrations

For the original price at P_0, the consumer surplus is represented by triangle area $P_m AP_0$. Passengers to the left of Q_0 were willing to a pay a price higher than P_0; summing the difference between each consumer's willingness to pay and P_0produces the area.

If the air fare is reduced to P_1 in the market (due to a liberal policy) then the consumer surplus is increased by an amount equal to Area P_0ABP_1.

The diagram shows that the gain in consumer surplus comprises two parts:

- Area P_0ACP_1: the fare savings for existing passengers is calculated as average fare saving x number of existing passengers. This element represents a transfer of producer surplus to consumer surplus.
- Area ABC: this is a net gain in welfare resulting from additional passengers being able to access air services due to the lower fare. In this analysis, this element of consumer surplus is estimated as ½ x average fare saving x number of new passengers.

3.13 Impact on Airport Utilisation

The study found some evidence of the link between liberalisation and traffic volumes from theories and empirical studies. For instance, a positive correlation is established between air liberalisation reform and traffic capacity growth, with flexibility towards airline entry leading to greater output and competition (Warnock-Smith et al, 2008). This therefore implies that an increase in traffic demand is expected from liberalisation policy in Nigeria, which as a result may increase the utilisation of infrastructure such as airports. Meanwhile, in order not to create an imbalance between traffic demand and infrastructural capacity management, the research evaluates the possible capacity challenges from the expected passenger traffic increase as a result of the liberalisation of the industry. According to ICAO Airport Economics Manual (Doc. 9562) core airport indicators are critical drivers of many other performance indicators, and the core indicator values (whether expressed in passengers, movements, or freight tonnes) influence asset utilisation and airport costs per passenger or movement. Furthermore, ICAO (2005) asserted that the core indicators are also critical drivers of some aspects of service quality, particularly delays, as airports approach saturation. This view is supported by Graham (2012) who reasons that as traffic demand approaches capacity, system congestion and delays increase sharply, a situation that alerts the authority to initiate actions to remedy the situation in the intermediate and long term.

In this regard, the ICAO airport manual suggests that the core indicators used to track the fundamental measures of airport activity involve annual passenger volumes and aircraft movements. It also suggests that airport operational indicators such as service quality that focus on the level of services be measured by Practical Hourly Capacity, Gate Departure Delay, Taxi Departure Delay, Baggage Delivery Time, Security Clearing Time, Border Control Clearing Time and Check-in to Gate Time.

In view of this concern, the research assesses the capacity of the four Nigerian international airports based on three key components, terminal capacity, apron capacity and runway capacity, with a view to determining their capability of accommodating the additional passenger traffic anticipated from liberalisation.

Meanwhile, Ashford, Stanton, and Moore (1997) recommended the assessment of airport capacity based on the design of critical aircraft capability, terminal building design capacity (TBDC), apron holding capacity and number of runways. According to FAAN (2009), all Nigerian international airports are designed to accommodate most critical civilian aircraft normally in use for any commercial services ranging from small aircraft to B747 aircraft, while Lagos airport can even accommodate Concorde aircraft. Also, holding apron and runway capacity are designed to handle a significant numbers of aircraft with appropriate traffic management. In this regard, the envisaged capacity challenge is likely to arise from current TBDC.

To evaluate the capability of TBDC, the research employs the standardised ‘Typical Peak Hour Passengers’ recommended by the US Federal Aviation Administration (FAA) as a measure of assessing the capacity demand model. The Typical Peak Hour Passenger (TPHP) is defined as the peak hour of the average peak day of the peak month in a year (Ashford et al., 1997, p. 34). To compute the TPHP from annual passenger traffic demand, the FAA recommended the relationship as in Table 3.5 below.

Table 3.5 FAA Recommended TPHP as a percentage of Annual Traffic

Total Annual Passenger (Million)	TPHP as % of annual
30 and above	0.035
20.00 – 29.99	0.04
10.00 – 19.99	0.045
1.00 – 9.99	0.05
0.5 – 0.99	0.08
0.1 – 0.49	0.13
Under 0.1	0.2

Source: Ashford et al. (1997)

Table 3.5 shows that if an airport handles 30 million passengers and above, the design TPHP should be 0.035 per cent of the annual passenger traffic. For instance, the current international passenger traffic demand of 2.7 million passengers per annum requires TPHP of 1,350 (0.05 per cent of 2,700,000), but according to FAAN (2007) Lagos international airport alone is designed to have 3,675 TPHP, which suggests that the airport can conveniently accommodate double the total international traffic.

Therefore, the research evaluates the expected traffic passenger demand increase from further liberalisation against the current designed capacity of the airport, so as to determine whether there is likely to be an airport capacity challenge.

3.14 Impact on Market Competition

An increase in liberalisation also causes an increase in airline competition, due to the additional supply of new entrants and the increase in frequency of the incumbent carriers (Button & Drexler, 2006). There are several techniques for evaluating competition in the air transport market, but those commonly in use, according to Dobruszkes (2009), include the number of competitors, the Herfindahl-Hirschman Index (HHI) and Entropy.

The first techniques that measure number of operators on a route are very simple, but the main weakness is overlooking uneven distribution of services by the operators in which one carrier can substantially dominate the market (Fu, Lijesen, & Oum, 2006).

However, to remedy the problem of first method concentration, indexes are often used like HHI and entropy. The traditional HHI is computed by squaring the market share of each firm competing in a market, and then summing the resulting numbers, expressed as:

$$HHI = S_1^2 + S_2^2 + S_3^2 + \cdots S_n^2 \qquad \text{-----------------} \ (3.8)$$

(where, S_n is the market share of nth firm)

The HHI value can range from close to zero to 10,000. A market with very low competition and close to being a monopoly will have a very high market concentration value. If, for example, there were only one firm in an industry, that firm would have 100 per cent market share, and the HHI would equal 10,000 (100^2), indicating a monopoly. Or, if there were thousands of firms competing, each would have nearly 0 per cent market share, and the HHI would be close to zero, indicating nearly perfect competition.

Also, another measure of competition suggested by Frenken, Van Terwisga, Verburg, and Burghouwt (2004) uses an entropy value, which is a capacity share index that provides a good measure of effective competition, calculated by summing the squares of the shares (fractions or percentages) of seats provided by each airline on the route. Entropy has the advantage of additively, where it can be aggregated or disaggregated (Frenken, et al., 2004).

$$H = -\sum_{n=1}^{n} x_i Log(x_i) \text{ ----------------------- (3.9)}$$

Where n is the number of airlines, and x is the market share. On any route H=0 if a market is monopolistic and H=1 if the route is served by an equal distribution of 10 carriers (perfect competition).

Consequently, because of the advantage of entropy over HHI as highlighted by Frenken et al (2004), and the recent acceptability of it, this research adopts this technique in evaluating market competition for each route's network.

3.15 Summary of the chapter

This chapter has identified the various research paradigms and philosophies applied to research studies and concluded that positivism is the most suitable philosophy for the research objectives in this study. Moreover, deductive reasoning is considered as the most appropriate approach in determining the research purpose, which establishes a causal relationship between variables. Also, the research adopts survey and case research as the strategy for achieving the objectives of the study. In addition, the research method is a mixed method choice in a cross-sectional time frame of analysis, which has the ability to isolate the impact of a change in regulation policy across different observations with different regulatory issues. Furthermore, the chapter discovered and justified the selection of variables required for the development of the research model.

The chapter also outlined the method of data analysis using multiple regression techniques; after validation of the model, the model is expected to simulate traffic change from a change in liberalisation on any route. This can lead to a change in price and consumer welfare. The chapter revealed the procedures for the analysis of competition and consumer surplus impacts along with an assessment of these impacts on airport capacity.

Chapter Four : Market Traffic Data Analysis and Discussion

4.1 Introduction

This chapter presents an analysis and discussion of secondary data collected on the Nigerian international air transport market covering the period of international regulatory change over the years 2001 to 2010. It gives an overview of the country's traffic regulation policy, which demonstrates the level of liberalisation for each country's ASA. The chapter also gives an overview and passenger traffic trends in the market across international routes revealing the major operators, and the level of airline competition.

The analysis in this chapter guides the research to achieve the study's first and second objectives. This includes reviewing the country's ASAs with other countries and determining the level of liberalisation based on the World Trade Organization's index of liberalisation, as well as evaluating the performance of the ASAs based on international passenger demand in the Nigerian market. In this regard, the chapter summarises and tabulates the secondary data, and with the help of Excel the data are analysed. The method of analysis involves indexing, descriptive statistics, and entropy.

The presentation, analysis and discussion of the data in this chapter covers a review of the ASAs concerning all active bilateral countries; the level of liberalisation in the ASAs; traffic trends in the market; an origin and destination traffic analysis; airline competition and a summary of the chapter.

4.2 International Air Service Agreements

4.2.1 Agreements Exchange with Other Countries

The research discovered from the Ministry of Aviation that the Nigerian government has signed a number of international air service agreements with over 50 countries for the purpose of facilitating international air traffic between Nigeria and other countries of the world. After a critical review of the agreements and further consultation with ministry officials, the documents show that the nature of ASAs differs from one country to another with various degrees of regulation on some of the provisions. The main provisions for consideration in the study covered: the issue of traffic right exchange; airline designation; capacity controls; tariff regulation; withholding conditions on the designated airline; and provisions for commercial agreement. These six provisions form the key policy levers of traditional air service agreements for all countries of the world (Doganis, 2006; Piermatini & Rousova, 2009). Therefore, the research considers only these six provisions in each country's ASA with Nigeria as the technique for reviewing the country's air service agreement.

Although the agreements for each country differ from each another, all the agreements' provisions are drawn from the standard format of BASA provided by the ICAO standard and recommended practice under the International Air Traffic Manual Doc. 9626 (ICAO, 2004b). However, the agreement on each provision for any country depends on the perceived traffic demand on the route and the capability of each country in terms of supply of air services. This is supported by Kasper (1988), who claims the scope of rights and privileges exchanged is influenced by certain factors such as the bargaining power of each side during the negotiations, the air transport policy of each party – whether liberal or protectionist or somewhere in between – the market share of each party, the size of the national airlines of each party and their potentialities, as well as the political, economic and cultural status of each party in general.

This research examines significant number countries' ASA exchanges with Nigeria as provided by the documents of the Federal Ministry of Aviation in Abuja, which is the custodian of such vital information, and also the chief negotiator with other countries on behalf of the Nigerian government. The information provided is confirmed and verified by the NCAA. In addition, the information is further strengthened by the airport authority schedules of airline timetables released quarterly, which show the frequency and destinations of each airline from Nigerian airports. Furthermore, some countries' CAAs were also contacted and provided useful information on their respective ASA exchanges with Nigeria such as UK, UAE, & the Netherlands. The information collected on each country's ASA covering the six provisions on traffic rights (fifth freedom), capacity (frequency), tariff (air fare), airline designation, withholding (ownership and control of airline) and commercial agreement are summarised and tabulated for ease of comparison in Table 4.1.

Table 4.1 Nature of Nigeria's ASA with Other Countries

Country	5th freedom	Capacity(freq)	Tariff	Designation	Withholding	Comm Agr'ment	Type	Remark
UK	Not permitted	Pre determine	Free	Multiple	Flag carrier	Not available	BASA(restricted)	Active
USA	Permitted	Free determine	Free	Multiple	Flag carrier	Not available	Open Skies	Active
Ghana	Permitted	Free determine	Free	Multiple	Community Interest	Not required	Yamoussoukro	Active
S/Africa	Not Permitted	Pre determine	Free	Multiple	Flag carrier	Not available	BASA(restrict)	Active
UAE	Not Permitted	Pre determine	Free	Single	Flag carrier	Available	BASA/Comm Agmt	Active
Netherland	Not Permitted	Pre determine	Free	Single	Flag carrier	Permitted	BASA/Comm Agmt	Active
Germany	Not Permitted	Pre determine	Free	Single	Flag carrier	Available	BASA/Comm Agmt	Active
France	Not Permitted	Pre determine	Free	Single	Flag carrier	Permitted	BASA/Comm Agmt	Active
Italy	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Active
Spain	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Active
S/Arabia	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Active
Egypt	Permitted	Free determine	Free	Single	Flag carrier	Not available	Yamoussoukro	Active
Qatar	Not Permitted	Pre determine	Free	Single	Flag carrier	Available	BASA(restricted)	Active
China	Permitted	Pre determine	Free	Multiple	Flag carrier	Not available	BASA(restricted)	Unsteady
Ethiopia	Permitted	Free determine	Free	Single	Community Interest	Not required	Yamoussoukro	Active
Cameron	Permitted	Free determine	Free	Multiple	Community Interest	Not required	Yamoussoukro	Active
Cote D'Ivoire	Permitted	Free determine	Free	Multiple	Community Interest	Not required	Yamoussoukro	Active
Kenya	Permitted	Free determine	Free	Single	Community Interest	Not required	Yamoussoukro	Active
Lebanon	Permitted	Pre determine	Free	Single	Flag carrier	Permitted	BASA/Comm Agmt	Active
Turkey	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Active
Morocco	Permitted	Free determine	Free	Single	Community Interest	Not required	Yamoussoukro	Active
Senegal	Permitted	Free determine	Free	Single	Community Interest	Not required	Yamoussoukro	Active
Sierra Leone	Permitted	Free determine	Free	Single	Community Interest	Not required	Yamoussoukro	Active
Sudan	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Active
India	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restricted)	Inactive
Australia	Nil	Pre determine	Free	Single	Flag carrier	Not available	BASA(restrict)	Inactive
Ireland	Nil	Pre determine	Free	Single	Flag carrier	Not available	BASA(restrict)	Inactive
Malaysia	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restrict)	Inactive

Israel	Nil	Nil	NIL	NIL	NIL	NIL	Nil	Inconclusive
Gabon	Not Permitted	Pre determine	Free	Single	Flag carrier	Not available	BASA(restrict)	Inactive
Singapore	Nil	Nil	NIL	NIL	NIL	NIL	Nil	On plan

Source:FMOA(2011)

Table 4.1 shows a sample of 30 countries that have a BASA with Nigeria out of a total of about 50 countries. These countries were selected because of the reasonable amount of passenger traffic demand to and from Nigeria. The sample represents about 60 per cent of the country's BASAs, while the traffic to these countries represents over 95 per cent of the country's overall traffic.

The most important part of any agreement is the exchange of traffic rights between the countries. The decision of exchange of traffic rights is chosen from the "Freedoms of air" template provided by the ICAO (see Appendix 1). As noted earlier in the literature, the first two, regarded as technical freedoms, were multilaterally agreed by all member countries, but for the third to the ninth freedoms, regarded as commercial freedoms, member countries are allowed to negotiate among themselves (Doganis, 2002).

In this regard, the Nigeria permits the third and fourth freedoms for commercial purposes in all its agreements, and even permits the fifth freedom to some selected countries based on mutual understanding.

Meanwhile, the provisions of other freedoms are merely specific conditions accompanying the traffic right exchange between the countries, and include: capacity, tariffs, designation of carriers, withholding rules and commercial agreements. In view of the similarities between various countries' conditions, the research categorised the agreements into four types, namely: restricted BASA, BASA with commercial agreement, Yamoussoukro Agreement (YD), and Open Skies Agreement (OSA).

4.2.2 BASA restricted

This is a bilateral air service agreement that is designed with a strictness based on the principle of protectionism for each carrier. Table 4.1 shows that a significant number of countries' traffic is governed by BASA restricted terms, in which the following provisions apply:

5th Freedoms Traffic rights, regarded as more liberal arrangement, are not allowed. Instead, third and fourth freedoms of traffic are allowed. Capacity in terms of frequency and seats is set as predetermined regarded as the most restrictive. In this case, frequency has to be agreed prior to the commencement of service. However, the capacity of aircraft size was updated by the Bermuda I regime, where airlines were given limited rights to set capacity based on market demand, which involve changing aircraft gauge but the same permitted frequency.

Tariffs refer to the setting of prices for air services; under a restricted BASA, most countries' agreements allow airlines to set tariffs freely and independently, except in the case of some restricted BASAs. Designation refers to the naming of carriers to operate services between two countries. In the restricted BASA, most of the agreements permit a single carrier designation from each country, except in the UK agreement, which allows for multiple designation.

Withholding defined as the condition required for the designated airline of the foreign country to operate in another country. Under a restricted BASA agreement, permitted carriers had to be flag carrier, which means the carrier should be substantially owned and controlled by nationals of the country by at least 51 percent. Also, under a restricted BASA, commercial agreement amendments are not observed, but could be granted to airlines if the need arises.

There are thirteen countries with restricted BASAs, although there are a few variations in some countries' provisions. The countries with restricted BASAs from the table include: the UK, South Africa, Italy, Spain, Turkey, Saudi Arabia, Qatar, China, Sudan, India, Australia, Ireland, Malaysia and Gabon.

The restricted BASA used to be the starting point for most other types of agreement and is most regulated agreement. However, in most of Nigeria restricted BASA price and capacity setting were allowed to be determined freely by the airlines, while frequencies and points of entry were strictly regulated by the authority concerned; this indeed inhibits airlines from quickly responding to market demand. This may be the reason why some airlines that were designated in the Nigeria market were not able to respond to the increases in demand through additional frequencies, as such airlines respond by increasing air fares, because of the monopoly or duopoly power they have on the route; such airlines include British Airways and Saudi Airways. The UK agreement is restrictive but with some compromise such as partial fifth freedoms granted to some airlines, multiple designation and free pricing.

Furthermore, the research found from the ministry that the BASA with Israel showing significant traffic to/from Nigeria is inconclusive due to some conditions being imposed by Israel concerning matters of extra security.

Below is a summary of a restricted BASA between the UK and Nigeria:

According to the UK CAA (2011), the UK - Nigeria BASA was signed in 1988, and has been amended by Memoranda of Understanding (MoU) that contain the following provisions: First, on the Designation provision, the Agreement allows each country to designate up to three airlines; on the UK side, currently there are BA, BMI and Virgin, while for the Nigeria side, the current designate includes Arik Air, Air Nigeria and Kabo Airline (a designation exists for Bellview, but this airline has long ceased operations). Secondly, on traffic rights, the agreement allowed the UK airlines to operate scheduled services on the following routes: points in UK – (intermediate points) Abidjan, Accra – Kano, Lagos and Abuja – (points beyond) Abidjan, Accra, Douala, Harare, Lusaka and Libreville. Nigerian designated airlines have the following routes available to them: Points in Nigeria – (intermediate points) Rome, Paris, Zurich, Frankfurt – London and Manchester – (points beyond) Amsterdam, Copenhagen, Moscow. Thirdly, on the issue of fifth freedom traffic rights, Nigerian airlines may exercise fifth freedom traffic rights between Rome and the UK on three services per week. There are no fifth freedom traffic rights currently available for UK airlines. Fourthly, the capacity provision requires UK designated airlines to operate up to 21 services per week between the UK and named points in Nigeria (Abuja, Kano, Lagos), in total. Also, the Nigerian designated airlines have up to 21 services per week from Nigeria to London Heathrow or any other London airport, in total. With regard to destinations in Nigeria other than Kano, Abuja, Lagos, airlines might be subject to having to pay royalties or subject to commercial agreements under Nigerian guidelines. Frequencies to such destinations would be outside the bilateral ASA. Fifthly, the tariff provision allowed airlines to set fares freely and independently (NB: the original provisions of the bilateral agreement included ones where tariffs had to be agreed between airlines). Lastly, with regards to corporate or commercial agreements, it is common in Nigeria for airlines to be required to enter into such arrangements, or be subject to demands for ‘royalties’. However, the UK-Nigeria Air Services Agreement is silent on such topics.

Also, from the agreements signed by Nigeria with these 14 countries, only the UK and South Africa routes have Nigerian carriers competing on the routes, which gives rise to a duopoly situations – as such these agreements were considered very active. Furthermore, agreements with Qatar, Turkey and Sudan were also active but with only one airline from these countries servicing the routes without any Nigeria carrier participating; this may be due to inadequate number of aircraft or market demand.

Meanwhile, agreements with Australia, India, Ireland, Malaysia, and Singapore were regarded as inactive due to the absence of any direct air services on the routes. This may be due to inadequate market demand coupled with distance in some cases. Also, countries like China, Gabon, Congo, and Zambia have an agreement with Nigeria, but the direct traffic was observed to be unstable, due to the withdrawal of the designated carriers on the routes like China Southern Airlines, and Air Gabon. The suspension of these carriers in the market could not be established by the research but the ASAs of the countries are still valid, suggesting that airlines can voluntarily withdraw due to market conditions or any other supplier related problems.

4.2.3 BASA with commercial agreements

This type of agreement has the same provisions as the restricted BASAs but allows some compromise that permits commercial agreements with the airlines if the need arises.

According to the ministry, this agreement does not permit fifth freedom rights. The airlines are not permitted to carry commercial passengers from any third party country directly to/from Nigeria. However, the airlines can provide such services via their respective hubs before connecting the passengers to various final destinations in other countries. This arrangement requires prior agreements, though not specifically mentioned in Nigeria's ASAs.

Also, under the withholding provision, only flag carriers were permitted to be a designated carrier, which is regarded as a less liberal arrangement.

The agreement, however, was liberal with regard to tariffs, where airlines were free to set the fare based on market equilibrium. This may be the reason why the fare used to vary periodically, with higher fares in November/December during the peak period, and lower fares used in February and March each year.

Capacity in terms of frequency and point of entry is fixed at initial agreement stage, but permits a commercial agreement in the future if any of the designated airlines wish to expand their service capacity in terms of frequency or airport of entry. Such airlines have to pay royalties to the Nigerian's government (Federal Ministry of Aviation, 2001). There is no restriction on aircraft size/gauge, the airlines being expected to provide a reasonable aircraft size based on the market demand.

Usually, commercial agreements come after airlines have tested the market and realised a growing passenger demand for their services; then the carrier will push for a commercial agreement permitting the airline to increase service frequency or entry points. Commercial agreements usual come separately from the BASA, but under a Memorandum of Understanding (MoU), during the BASA reviewing process (Federal Ministry of Aviation, 2001). Countries with this type of agreement include:

(1) UAE with Emirates airline providing seven flights per week from Lagos to Dubai in the initial agreement, which has been reviewed to 14 flights from Lagos airport. However, an additional request to fly from Abuja to Dubai has yet to be granted.

(2) France's designated carrier Air France has increased its frequency and entry points to Port Harcourt. The airline enjoys 11 flights from Lagos and Port Harcourt. Moreover, the airline's request for expansion to Abuja airport has recently been granted.

(3) The Netherlands, with KLM as a designated carrier in the agreement, has expanded its operations to two additional airports, Abuja and Kano. The airline's total number of flights per week has risen from seven to 16 per week.

(4) Germany which designated Lufthansa as the only carrier, with an initial seven flights per week from Lagos airport, later was reviewed to 14 flights from Lagos and Abuja airports.

Table 4.2 Countries with Additional Commercial Agreement and the Airlines

S/No	Country	Foreign carrier designated	Nigeria carrier	Initial flights per week	Current flights per week
1	Netherlands	KLM	-	3	16
2	UAE	Emirates	-	7	14
3	Germany	Lufthansa	-	3	12
4	France	Air France	-	3	11

Sources: FMOA & FAAN (2011)

It is worth noting that there were no Nigerian carriers partaking in the service provision to these destinations; as such, these airlines enjoyed an absolute monopoly in these markets, even though the majority of passengers on these airlines were in transit as shown in the survey data and the secondary data from IATA PaxIs (2011) and NCAA (2011) (see Appendix 5).

The Nigerian government benefitted immensely from the revenue realised in these commercial arrangements, as the government is involved in running the affairs of the air transportation system (Nigerian Civil aviation Policy, 2001). The revenue realised (termed as the BASA fund) is shared between 5 government agencies namely, NCAA, FAAN, NAMA, NIMET, and NCAT.

4.2.4 Open Skies Agreements

A fully liberal bilateral air service agreement would allow any number of airlines to be designated by each state, and also permit the airlines to operate unrestricted on any routes between the respective countries with unlimited fifth freedom rights available. It would allow airlines to set fares freely without seeking approval from the aeronautical authorities (Doganis, 2010). A typical example of this type of agreement is the open skies agreement (OSA) designed by the USA that has become its model of BASA with other countries including Nigeria.

According to the Nigerian and USA governments (2002) the open skies agreement signed between Nigeria and the United States of America in 2002 was aimed at promoting an international air transport system based on competition among the airlines in the market place with minimum government interference and regulation. The summary of the 12 page agreement has these provisions among others:

On traffic right, each party grants the other party traffic rights for scheduled and unscheduled flights from points before the US via the US and immediate points to a point in Nigeria and beyond; and similarly, from points before Nigeria via Nigeria and immediate points to a point or points in the US and beyond.

Regarding designation, each country has the right to designate as many airlines as it wishes to conduct international air services and withdraw or alter the designation.

Also, the agreement allows for fair competition; accordingly, each party shall allow each designated airline to determine the frequency and capacity of the services it offers based upon commercial consideration in the marketplace. Also, neither party shall impose on the other party's designated airlines a first refusal requirement, uplift ratio, objection fee or any requirement with respect to capacity, frequency or traffic.

On the air fare, each party shall allow prices for air services to be decided by each designated airline based on market competition.

However, the withholding regulation states that "each designated airline should be substantially owned and effectively controlled by nationals of the party". Therefore, this is a restricted arrangement similar to a restricted BASA.

In terms of cooperative arrangements, each designated airline is allowed to enter into code-sharing or leasing arrangements with airlines of either country, or with those of third countries, subject to the usual regulations. An optional provision authorises code-sharing between airlines and surface transportation companies.

The OSA indicates the two countries' airlines have been granted unlimited fifth freedoms on routes between the countries. While capacity is determined freely for any airline wishing to increase its flight frequencies or points of entry, as such, airlines entering into a commercial agreement for additional traffic with another country is not required (as is the case for BASA). Also, tariffs and air fares are freely determined based on market forces. But carriers must be owned and controlled by the nationals of the countries involved. Another significant liberal arrangement is the designation of the carriers, where each country can designate as many as it wants without any limitation.

The agreement was signed in 2002, but became effective as from 2005. It only became fully active after Nigerian aviation attained a category 1 FAA safety standard in 2008. The route has traffic with two or three airlines from the US side while from the Nigeria side there have been one or two carriers as well. The number of carriers on the route has been fluctuating due to the free entry and exit agreement. In 2007, Virgin Nigeria Ltd was designated as one of the Nigerian carriers, but the USA government objected on the ground of violating the condition of withholding, and as such, the carrier was not allowed to operate on the route.

In general, the OSA has liberalised full market access but still regulates carrier ownership and control and as such, this type of ASA is not fully liberalised.

4.2.5 Yamoussoukro Declaration

Another type of more liberal air service agreement is the Yamoussoukro Declaration which was signed by Nigeria as part of a multilateral agreement with other African nations in 1998. It is the most liberal agreement signed by the Nigeria government.

The agreement emanated from a meeting of African heads of state held in Yamoussoukro in Côte d'Ivoire in 1998.

According to the African Civil Aviation Commission-AFCAC (1999), YD was based on considering the need to harmonise air transport policies in order to reduce non-physical barriers that impede the sustainable development of air transport services in Africa. Furthermore, YD was mindful of the globalisation of the world economy which required safe, reliable and affordable air transport services necessary for the free movement of persons, goods and services in Africa. In this regard, African states agreed for the gradual liberalisation of scheduled and non-scheduled intra-African air transport services in the areas of traffic rights, capacity, frequency, designation and air fare among others.

According to the YD agreement, the guidelines of the key provisions of the agreement are summarised as:

The traffic rights provision required countries to grant each other free exercise of the first, second, third, fourth and fifth freedoms of the air on scheduled and non-scheduled flights by an eligible airline to/from their respective territories. This differed from EU multilateral agreements (liberalisation) which allows up to 6^{th}, 7^{th}, 8^{th} and 9^{th} freedoms.

In case of tariff charges by the designated airlines for the carriage of passengers, cargo and mail there is no approval required by the aeronautical authorities of the countries. The airlines shall in this case file such tariffs before competent authorities 30 working days before they enter into effect.

On the capacity and frequency provisions, the agreement sets no limit on the number of frequencies and capacity offered on air services linking any city-pair combination between the country parties concerned (subject to the provisions of Article 3 - http://www.afcac.org/en/documents/conferences/July2012/yde.pdf). Each designated airline will be allowed to mount and operate such capacity and frequency as such airline deems appropriate. Consistent with this right, no state party is unilaterally allowed to limit the volume of traffic, the type of aircraft to be operated or the number of flights per week, except for environmental, safety, technical or other special consideration.

On the designation right, each country has the right to designate in writing at least one airline to operate intra-Africa air transport services in accordance with this decision. It is required to notify the other country party through diplomatic channels. A country may also designate an eligible airline from another state party to operate air services on its behalf. Also, the country has the right to designate an eligible African multinational airline in which it is a stakeholder and this airline has to be accepted by the other state parties. However, for an airline to be eligible for designation, it must meet these requirements:

- Legally established in accordance with the regulations applicable in a country;
- Have its headquarters, central administration and principal place of business located in the country concerned;
- Duly licensed by a country as defined in Annex 6 of the Chicago Convention;

- Fully own or have long-term leases exceeding six months on an aircraft.

Regarding cooperative arrangements on the agreed routes, a designated airline of one country party may enter into cooperative marketing arrangements such as blocked-space, code-sharing, franchising or leasing arrangements with an airline or airlines of the other country party.

Meanwhile, YD is the only multilateral agreement signed by the Nigerian government with other African countries; the agreement was coordinated by the Economic Commission for Africa, an arm of the United Nations Economic and Social Council Organisation (UNESCO). Moreover, the YD is not automatically applied to all African countries, as in the case of Nigeria and South Africa which still had a restricted BASA as at 2011. This therefore implies that, even after multilateral ratification, countries have to review their former agreement and allow YD to be effective.

YD is the most liberal air service agreement when compared with the previous agreements; it is more liberal than the open skies agreement in that the former allows only flag carriers as designated airlines while YD accepts an airline with a principal place of business in a member country as a designated airline.

From the top 30 countries with traffic to/from Nigeria as depicted in Table 4.5, eight African countries ratified the YD agreement with Nigeria at different periods from 1999 to 2005. The countries include Ghana, Egypt, Ethiopia, Cameroon, Côte d'Ivoire, Kenya, Morocco, Senegal and Sierra Leone. Hence, this supersedes the former bilateral agreements with these countries as evidenced by the flight traffic schedules released by the Federal Airport Authority of Nigeria in September, 2010, showing the flight schedule of each country's airlines and destinations. For instance, EgyptAir had up to 3 flights in some days from three different Nigerian airports. Also, three different Nigerian carriers had four flights to Ghana on daily basis. As a result of these agreements, there have been significant levels of passenger traffic to/from Nigeria.

Further observation from the traffic trends shows that only the Ghana route has more than one carrier providing a commercial service and all the airlines were observed to be Nigerian carriers competing in the market. It is likely that Ghana did not have adequate carriers to compete with Nigeria, despite the viability of the routes in terms of the short distance and high demand. Similarly, only one carrier or sometimes two from the Nigerian side provided scheduled air services to other West African countries, namely Côte d'Ivoire, Senegal and Sierra Leone.

It was only in the Cameroon market where there has sometimes been one carrier from each country competing, even though the route may not have had adequate demand to attract more than two carriers based on the traffic demand in 2010 as shown in Table 4.5.

However, other African countries with very strong carriers such as Egypt, Ethiopia and Kenya were making the best used of the YD agreement. The airlines were aggressively providing scheduled flight services from the Nigerian market to other parts of the world via their respective country hubs. In this regard, Kenya's airline had seven flights a week; Ethiopia's airline had 14 flights per week from Abuja and Lagos; while Egypt's airline provided about 12 flights per week from Abuja, Lagos and Kano. Furthermore, the research observed from the survey and secondary data, that the majority of these airlines' passengers were in transit to other destinations. There were no Nigerian carriers on these three routes, due to inadequate fleets from the Nigerian carriers that were expected to reciprocate and compete with their counterparts. As such, the three carriers were enjoying some form of market monopoly.

In summary, the research observed that since 1999 the Nigerian government has signed a lot of new ASAs and also reviewed several of the existing agreements that incorporate current market needs. Consequently, the industry has witnessed the entry of many new international airlines such as Emirates, Qatar, Delta Air Lines, Virgin Atlantic and China Southern.

4.3 Liberalisation Level of ASA

The level of liberalisation of any agreement depends on the strictness of the regulation on each provision in the policy. The research has observed that among the four types of ASA, restricted BASA, BASA commercial, OSA and YD, each have some level of liberalisation. The ASA information was provided in a qualitative form. Therefore, for computation purposes the study assigned a scale to measure the level of liberalisation in each of the four agreements as designed by WTO in 2006 (WTO, 2006).

Table 4.3 Different Types of Nigerian ASA and Level of Liberalisation

S/N	ASA Provisions	BASA (Restricted)	BASA (Commercial)	Yamoussoukro Declaration	Open Skies
1	Grants of Rights 3^{rd}–4^{th} Freedom – 0 5^{th} Freedom (5^{th}FD) – 6 7^{th} Freedom – 6 Cabotage – 6	3^{rd}–4^{th} FD = 0	3^{rd}–4^{th} FD = 0	5^{th}FD = 6	5^{th}FD = 6
2	Tariff Dual Approval (DA) – 0 Origin disapproval (OD) – 3 Dual Disapproval (DD) – 6 Free pricing (FP) – 8	DD = 6	DD = 8	FP = 8	FP = 8
3	Withholding Flag carrier (FC) – 0 Community of Interest (CI)–4 Principal Place of Buss(PP)–6	FC = 0	FC = 0	PP = 6	FC = 0
4	Designation Single designation (SD) – 0 Multiple designation (MD) –4	SD = 0	SD = 0	MD = 4	MD = 4
5	Capacity Predetermined (PD) – 0 Bermuda regime (BR) – 4 Free determination (FD) – 8	PD = 4	BR = 4	FD = 8	FD = 8
6	Commercial agreements	CA=0	CA = 4	Not Required	Not required
7	Liberalisation index	10	16	32	26

Source: WTO, 2006

The above liberalisation scale or index was developed by the WTO secretariat, based on the judgement of experts in aviation. The experts assigned various weight on each provision of ASA on the basis of the effect of removing obstacles in freeing trade in air services (Piermartini & Rousova, 2008a). The scaling of each provision is explained in detail in Appendix 3.

Table 4.3 shows that the most liberal agreement Nigeria signed was the YD with a total Air Liberalisation Index (ALI) of 32 on the WTO scale, made up of these provisions: granted fifth freedom rights (6 points), tariffs as free pricing (8 points), withholding decided as principal place of business (6 points), multiple designation (4 points), and capacity set as free determination (8 points); as such the need for commercial agreements did not arise.

The second most liberal agreement allowed in Nigeria was an open skies agreement (OSA), which has the same provisions as YD but with a withholding provision set as flag carrier (0 points). Therefore, OSA has a total weight of 26 on the ALI.

The most restrictive BASA has an ALI value of 10, which grants up to the fourth traffic right only (0 points). The agreement allowed double disapproval (6 points), but capacity control on frequency predetermined (0 points). The agreement designated only a single carrier for each country, and provision was made for any airline to seek a commercial agreement if there is a need.

The BASA with a commercial agreement has the same provisions as BASA restricted but a bit more liberal by allowing additional frequencies/capacity (4 points) bringing the total ALI to 16 values. Therefore, the liberalisation index for each model of ASA comprising the various component provisions is depicted in Figure 4.1 below.

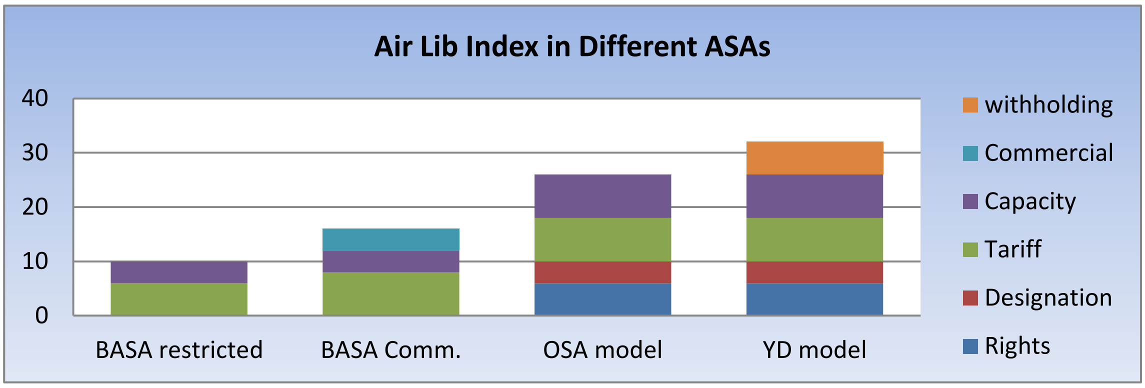

Figure 4.1 ALI in different ASAs; source: FMOA (2011)

4.4 Traffic Trends in the International Market

As a result of the air service agreements signed with other countries of which some have been liberalised, many of the designated international airlines entered the Nigerian air transport market for passengers, cargo, and mail providing scheduled and unscheduled services. One of main ways of assessing the performance of these air service agreements is by studying the traffic trends generated by the designated airlines.

In this regard, the research collected data from both NCAA and FAAN, and charted the pattern of international passenger traffic over ten years from the airports of Lagos, Abuja, Kano, Calabar, and Port Harcourt as shown in Table 4.4 and 4.5. About 76 per cent of the passengers were from Lagos International Airport, while Abuja had 18 per cent of the passenger market, Kano and Port Harcourt had about 4 per cent and 1 per cent of the annual passenger traffic respectively (details of the airport analysis and airline distribution are attached as Appendix 5).

Table 4.4 Annual International Scheduled Passenger Traffic and GDP in Nigeria

Year	Total Passenger	Annual GDP Billion $	% Passenger change	% GDP change
2001	1,506,878	161.08		
2002	1,798,063	169.84	19.32	5.44
2003	1,719,533	175.27	-4.37	3.2
2004	1,843,154	197.49	7.19	12.68
2005	1,700,252	224.61	-7.75	13.74
2006	1,514,656	244.64	-10.92	8.91
2007	2,323,949	268.26	53.43	9.65
2008	2,557,264	295.34	10.04	10.1
2009	2,619,918	319.91	2.45	8.32
2010	2,758,086	340.92	5.27	6.57
Total	20,341,753		74.67	78.6

Sources: NCAA (2011) and World Bank (2011)

Table 4.4 shows the country's international market has witnessed unsteady passenger traffic growth in the observed ten year period. The industry recorded a total of 20,341,753 international passengers in scheduled services with a growth rate of 83 percent over the ten years (2001-10), implying an average growth rate of 8.3 per cent per annum. This value is not far from the global air traffic estimated by ATAG in 2008 to be around 5.5 per cent. This shows the market is in a growth phase which is typical of a growth economy, similar to what developed countries witnessed in the 1980s and 1990s. This also suggests that the market is not near its saturation point. The market appears to be both cyclical and strongly influenced by external factors – mostly economic activity represented by GDP. Meanwhile during the same period

(2001-10) the country's economy (GDP) witnessed a similar growth rate of 111% according to World Bank, showing that the traffic growth rate is slower than the GDP growth rate, which appears similar to the global picture. ATAG (2008) claimed that 60 to 80 per cent of global air traffic growth is attributed to economic activity growth and estimated that air traffic growth outpaced GDP by 1.2–2.0 per cent.

The research compares international traffic growth in Nigeria with the country's economic growth measured in GDP over the ten years as shown in column 3 of the Table 4.4. Economic growth per annum for the country was consistent but traffic growth was unsteady due to the influence of other factors as depicted in Figure 4.2 below. However, total growth of the two variables over the ten years indicated a significant correlation. Therefore, the average ratio of the growth rate of the traffic and GDP is estimated as:

Total % change of GDP/ Total % change in Traffic

Thus, 111/83 = 1.34

This therefore means that for an increase in the country's GDP by 1.34 per cent there is a corresponding increase in passenger international traffic by 1.0 per cent, which is within the range estimated by ATAG. This implies that the two moves in a simlar direction over the longer term, with traffic rates slightly lagging behind GDP.

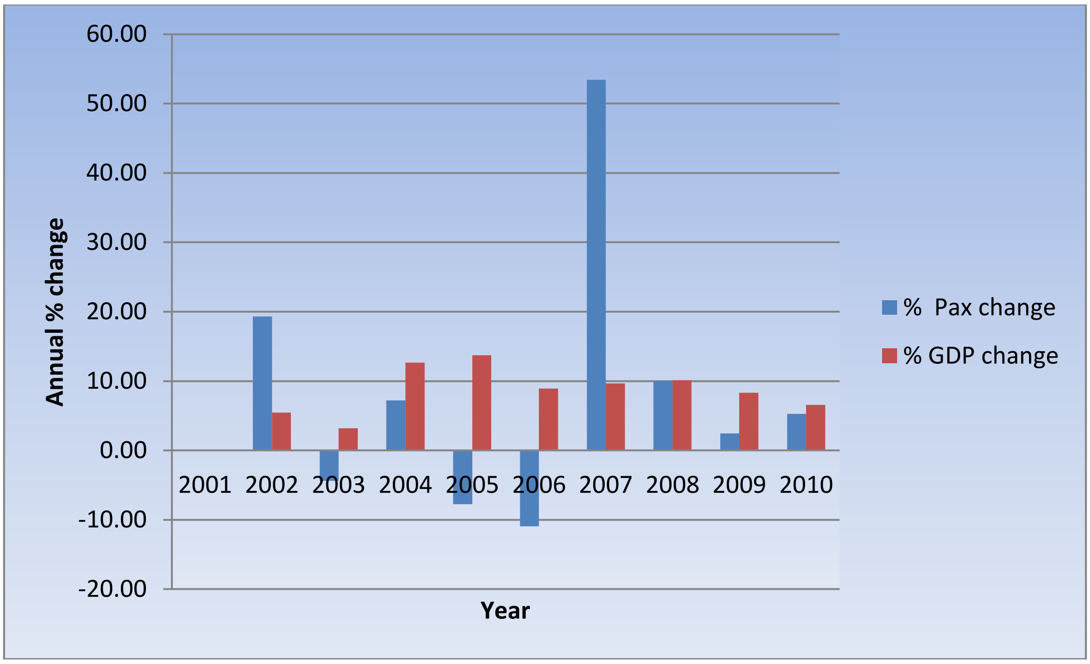

Figure 4.2 Annual International traffic Vs GDP; Sources: NCAA (2011) and World Bank (2011)

In addition to GDP (proxy of economic activity in the country), there were other factors that affect the growth of international passenger traffic in the country. Boeing (2010) alleges that the remaining 20 to 40 per cent of global air travel growth results from the stimulation provided by the value travellers place on the speed and convenience that only air travel can offer. For example, travellers value choice of arrival and departure times, routings, non-stop flights, choice of carriers, service level, and fares. Liberalisation is the primary driver enabling value creation in the global air transport network and typically gives rise to a "bump" in traffic demand (IATA, 2007; Boeing, 2010).

The research observed that the country's reform of liberalisation policy may have contributed to the growth by allowing more foreign carriers to have access to the market, despite the absence of capable carriers from Nigeria to reciprocate the foreign market access. For instance, Emirates of UAE entered the market in 2004, Qatar airways and Turkish Airlines joined the market in 2007 and 2005 respectively. These three airlines in 2010 airlifted a total of 479,442 international passengers, representing about 18 per cent of the annual total.

Also, the policy enables existing carriers to expand their scheduled operations by allowing additional frequencies and points of entry into the country as in the case of KLM, Lufthansa, Air France and Ethiopia Airways. All of them now operate scheduled services from Abuja airport in addition to Lagos airport. The additional services contributed 7.2 per cent of the annual total traffic in 2010.

Another influential liberalisation matter was the open skies agreement with the USA signed in 2002 which became more effective in 2009 when US carriers started accessing the Nigerian market after the country attained a CAT 1 assessment from the US FAA. The FAA conducts an International Aviation Safety Assessment (IASA) Program on each country's CAA that holds traffic rights to the US market. The IASA assessment determines if the foreign CAA provides oversight to its carriers according to international standards. If the CAA meets these standards, the FAA gives it a Category 1 rating, which means airlines from the assessed country may initiate or continue services to the USA in the normal manner and take part in reciprocal code-share arrangements with US carriers.

Meanwhile, the research discovered from the secondary data that the decline in growth in the middle of the period from 2003 to 2006 may not have been unconnected with the collapse of some home carriers that had a significant market share such as Nigerian Airways (liquidated in 2002), Ghana Airways (ceased in 2005), Swissair (collapsed in 2002), Sabena (ceased in 2002), Air Gabon (collapsed in 2006) and Air Afrique (ceased in 2002). These airlines lifted 274,014 passengers in 2001 representing 18.2 per cent of the annul total. These entire airlines left the market at different periods of time mostly due to the financial crisis that bedevilled international carriers caused by an unprecedented increase in fuel prices and the US September 11 crisis. During that period, there were no new carriers that entered the market and the existing carriers were limited by ASAs from expanding their operations.

Therefore, in summary, international air passenger traffic from 2001 to 2010 exhibited an overall growth of 83 per cent due mainly to the corresponding growth in the country's GDP of 111 per cent. Even though the growth of GDP was steady, that of traffic was patchy, which signified there were other factors responsible for the development of international air passengers. Further, the research believes that the supply of services, which depends partly on liberalisation policies and other business matters, may have contributed to the unsteady growth of the industry. The analysis shows that the growth rate of Nigerian international traffic is not far from the global value as obtained by ATAG in 2010.

The research further assesses the actual impact of liberalisation on traffic growth in the country in chapter six.

4.5 Analysis of Origin and Destination for Direct Traffic

4.5.1 Market Outlook

A thorough examination of the origins and destinations of the airlines involved in the ten years of the study indicates that the structure of the market and players have a consistent pattern with slight variation of countries and operators within the period of review. Most of the time, the availability and conditions of the operators shape the structure of the traffic. For instance, in the early period of the study there was traffic to some countries before the collapse of the countries' national carriers, such as Belgium (Sabena), Switzerland and Gabon. Table 4.5 summarizes the pattern of the origin and destination routes in the year 2010 for the country, indicating the passenger traffic for each country route, percentage traffic of the total, average growth rate per annum of the route traffic, number of flights per week, airlines' market share, entry/departure airports, and nature of the market.

Table 4.5 Origin and Destination Direct Traffic

Country/ route	Pax traffic	% Share	AGR /yr	Flgt/ wk	Airlines & mkt share	Airport	Market
UK	574,076	20.81	6.30	32	BA (49%),Virgin (33%), Arik (18%)	LOS, ABV	Competition
UAE	310,048	11.24	44.70	14	Emirates (100%)	LOS	Monopoly
Neth'land	223,146	8.09	4.70	10	KLM (100%)	LOS, ABV	Monopoly
Germany	212,238	7.70	13.70	7	Lufthansa (100%)	LOS	Monopoly
Ghana	211,630	7.67	21.70	49	Air Nig (35%), Arik (35%), Aero (30%)	LOS	Competition
S/Africa	175,630	6.37	11.40	11	SAA (72%) and Arik (28%)	LOS	Duopoly
France	175,381	6.36	-0.70	11	Air France (100%)	LOS, PHC	Monopoly
Ethiopia	138,527	5.02	4.70	21	Ethiopian Airline (100%)	LOS, ABV	Monopoly
USA	135,659	4.92	47.20	15	Delta Air (89%) and Arik (11%)	LOS, ABV	Duopoly
Qatar	128,468	4.66	55.50	7	Qatar airways (100%)	LOS	Monopoly
Egypt	105,712	3.83	19.40	9	Egypt Air (100%)	LOS, KNO	Monopoly
Kenya	63,678	2.31	4.70	7	Kenya airways (100%)	LOS	Monopoly
Turkey	40,926	1.48	10.00	4	Turkish airline (100%)	LOS	Monopoly
Senegal	38,229	1.39	89.00	3	Air Nig (100%)	LOS	Monopoly
Libya	29,221	1.06	16.50	4	Afriqiyah Air (100%)	LOS	Monopoly
Lebanon	27,456	1.00	-3.60	6	Middle East Air (100%)	LOS, KNO	Monopoly
Italy	26,708	0.97	1.80	3	Alitalia (100%)	LOS	Monopoly
Spain	26,152	0.95	-0.30	3	Iberia (100%)	LOS	Monopoly
S/Leon	21,978	0.80	3.00	4	Arik (100%)	LOS	Monopoly
Cameroun	19,656	0.71	-5.40	4	Air Nig (100%)	LOS	Monopoly
S/Arabia	18,317	0.66	-1.90	3	Saudi Airline (100%)	LOS	Monopoly
Morocco	16,996	0.62	332	4	R. Air Morocco (100%)	LOS	Monopoly
Benin	15,234	0.55	27.50	3	Air Nig (100%)	LOS	Monopoly
Sudan	14,754	0.53	-3.10	3	Sudan Airline (100%)	LOS	Monopoly
C D'Ivoire	8,266	0.30	-8.90	3	Air Nig (100%)	LOS	Monopoly
TOTAL	2,758,086	100					

Sources: NCAA and FAAN (2010) [Key: AGR-Average growth rate; Flgt-flight]

Table 4.5 above suggests that, as at 2010, the country had direct international passenger traffic to 25 countries with a total passenger volume of 2,758,086 on scheduled services (NCAA, 2011). According to Piermartini and Rousova (2008b), the total passenger traffic represents the degree of liberalisation of the agreement between countries that defines the operating conditions of the carriers. This implies that an absence of carriers to operate direct traffic renders the agreement inactive as in the case of some countries such as Australia, Malaysia, Ireland and Gabon (in Table 4.1).

In this regard, the ASAs signed with the 25 countries governed the conditions of the carriers' operations in the market. The research discovered that about 85 per cent of the total passenger traffic comes from the top ten destination countries, with reasonable and consistent traffic with possibility of liberalisation impact. Therefore, the research intends to carry out further in-depth analysis of the top ten destination countries so as to expose some aspects of liberalisation impacts such as traffic growth, competition, expansion to other airports, and frequency of services. However, the remaining 15 countries had 15 per cent of traffic, may have a very limited liberalisation impacts due to low traffic demand which led to inconsistent traffic on the routes.

4.5.2 UK – Nigeria Market

This is oldest route in Nigerian international traffic dating back to the early 1950s and the service has been consistent. However, from 2001 to 2010 the route had total scheduled traffic of 5,082,924 passengers which was higher than any other single route. For instance, in 2010 the route passenger volume of 574,076 accounted for 20.8 per cent of annual international passenger traffic in the country. The high passenger traffic on the route may have been fuelled by the suspension of direct traffic from the US to Nigeria for technical reasons; this route was reopened in 2009/2010. This was evident from the fact that a significant number of UK-bound passengers were in transit to the US. For instance, NCAA (2010) indicated that in 2005, there were 39,516 passengers on transit to the US via the UK route. Also, after the restoration of direct traffic to the US in 2009 the demand on the UK route declined in 2010, as shown above in Table 4.5.

Traffic growth: The route also has an average traffic growth rate of 6.3 per cent per annum which is close to the global industry average of 5 per cent estimated by Doganis (2010) and Boeing (2010).

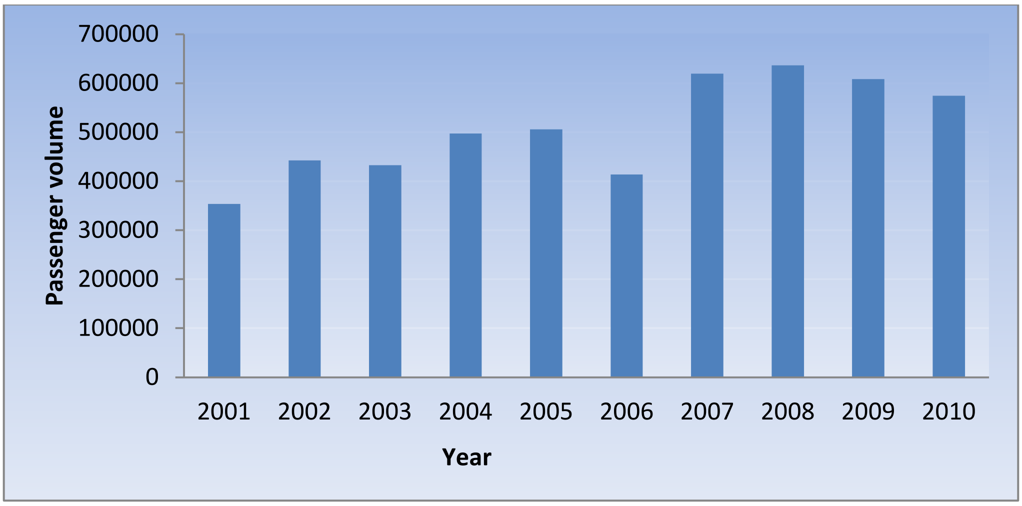

Figure 4.3 Annual Pax; UK – NIG; Source: NCAA (2011)

Apart from GDP growth in the two countries, other contributors to the high passenger traffic may have been some other obvious factors, prominent among them being the historical colonial link and common language between the countries. Also, the colonial relationship influences the growth of international trade and investment between the countries. The National Bureau of Statistics-NBS (2011) claims the value of trade (export/import) between the countries was worth US$ 2.54 Billion in 2010 alone.

The route was still governed by a restricted ASA (as in Table 4.1) with some level of liberalisation such as partial fifth freedom to some airlines, multiple designation, free pricing, additional frequencies and multiple airports of entry. These liberalisation provisions may have added value to the traffic. The route should have a maximum of 42 flights per week from three carriers from each side, but only 28 flights from three carriers existed as at 2010. This may be attributed to lack of capacity from the Nigeria carriers, and shortage of airport slots at Heathrow Airport in the UK and lack of interest to operate from the other 2 airports at Gatwick and Manchester even though the agreement allowed.

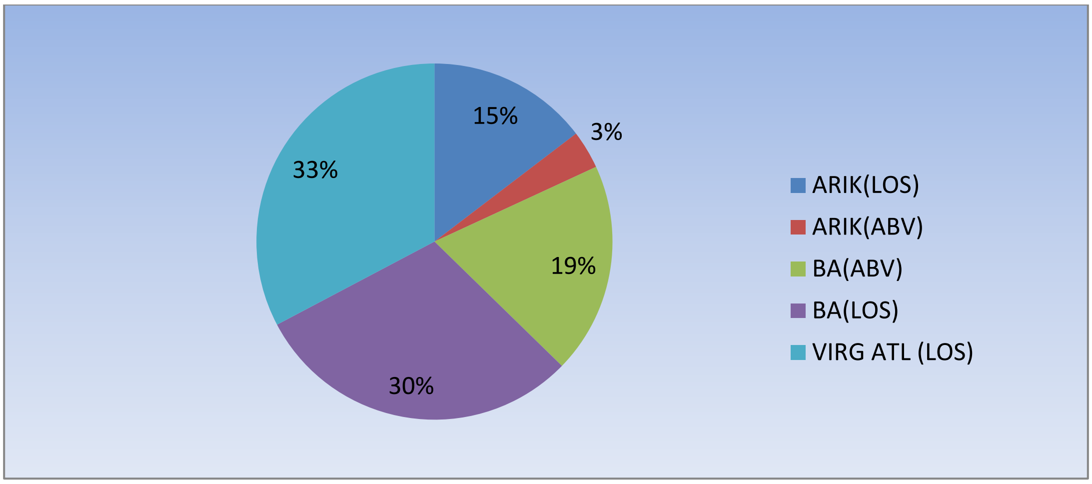

Figure 4.4 2010 UK –Nig traffic by airline; Source: NCAA (2011)

Meanwhile, the designated UK carriers, British Airways and Virgin Atlantic provided 14 and seven flights per week, respectively, while the Nigeria designated carrier Arik Air was only able to offer 11 flights per week from 2 airports Lagos(with IATA code LOS) and Abuja (IATA code ABV). The market traffic data (Appendix 5) shows the market share of the carriers, UK airlines have 83 per cent of which BA controlled 49 per cent as depicted in Figure 4.4.

Competition: The nature of the UK–Nigeria route market suggested a market competition based on Graham's (1998) arguments that competition begins to be effective once there are three or more carriers competing in a route. However, unequal distribution of the services among the carriers and possible domination by one carrier should not be regarded as perfect competition.

Entropy (H) as indicator of competition was used to evaluate the competitiveness in the route, thus;

$H = -\sum_{n=1}^{n} x_i \mathrm{Log}(x_i)$; Where, n is the number of airlines, and x is the market share. On any route H=0 if a market is served by one carrier and H=1 if the route is served by an equal distribution of ten carriers. Therefore, a high value of H is most desirable.

Therefore, the entropy (H) of the Nigeria–UK route, for three airlines (Arik, 18 per cent; BA, 49 per cent; and Virgin, 33 per cent) is given as:

H= 0.18Log (0.18) + 0.49Log (0.49) + 0.33Log (0.33) = 0.44 -------------- (4.1)

Therefore, the level of competition on the route is given by an entropy value of 0.44 which is regarded as moderate competition level, which means an absence of domination and dictation of the market by one operator. In such a situation passengers stand to gain in terms of price competition and quality of service. However, because of the few competitors, there is the possibility of collusion between two or three competitors for anti-competitive behaviour by surcharging the passengers, as was the case in 2007 when the British Office of Fair Trading (OFT) accused BA and Virgin Atlantic of collusion and charging high fuel surcharges to passengers sometime between 2004 and 2006, which led to the heavy penalty of the carriers.

Another constraint to effective competition was the unsteady supply of services by operators from the carriers, most especially on the Nigerian side. Initially, Nigeria Airways was involved in the route but ceased in 2002, and another carrier, Bellview, entered the route from 2005 but ceased operating in 2009 as shown in the full traffic data (Appendix 5). However, another airline from the Nigeria side, Arik Air, just started operating in 2009. Therefore, frequent carriers exiting from the market affects the competition level by changing the entropy value.

Traffic to other Airports: Forsyth (1998) alleged that among the impacts of liberalisation is the development of traffic to secondary and regional airports. In this regard, the ASA permitted traffic expansion to some airports in Abuja and Kano (Nigeria), likewise in the UK the traffic could be extended to Gatwick and Manchester. Hence, BA and Arik Air expanded the scheduled service to Abuja airport, this accounted for about 22 per cent of the total annual traffic in 2010 on the route as depicted in Figure 4.4.

The survey also found out that over 80 per cent of the passengers on the route were Nigerian, either on business travel or visiting friends and relatives, with few other nationals on business to Nigeria. The high traffic demand on the route was as a result of economic propensity, trade, and historical link/common language between the countries. Moreover, liberalisation facilitates the supply of air service between the countries leading to more growth, increased competition and additional airports of entry/departure. Meanwhile, the research found some constraints that militate against growing traffic on the route which include an airport slot situation at Heathrow. This is evident from the suspension of Arik Air traffic from Abuja airport to Heathrow due to the scarcity of a slot at the airport sometime in May 2012 (Arik, 2012) . Another constraint to traffic demand is the issue of entry visas by the UK Border Agency, where most of the time there were delays, or entry was even denied to prospective travellers, as claimed by the travellers in the survey. This suggested that visa delay is one of the challenges to travellers, which do not give the passengers opportunity to make adequate choice of the available carriers due to limited time from the visa release and travelling date. However, this research is not capable to evaluate how it affects demand.

4.5.3 UAE – Nigeria Market

This route was second in the country with high traffic, and it accounted for 11.24 per cent of the total traffic market share in 2010. The route traffic was governed by the restricted BASA as claimed by the FMOA which was confirmed by the United Arab Civil Aviation Authority (UAE CAA). However, due to market demand, a commercial agreement in the form of a MoU by the two countries was formulated outside the agreement, which granted additional capacity of frequency to the operators while in turn the operators pay royalties to the Nigerian government. Therefore, the BASA was liberal as it allowed commercial agreements in response to the needs of the airline; in addition, the agreement also permitted free pricing which is an aspect of liberalisation.

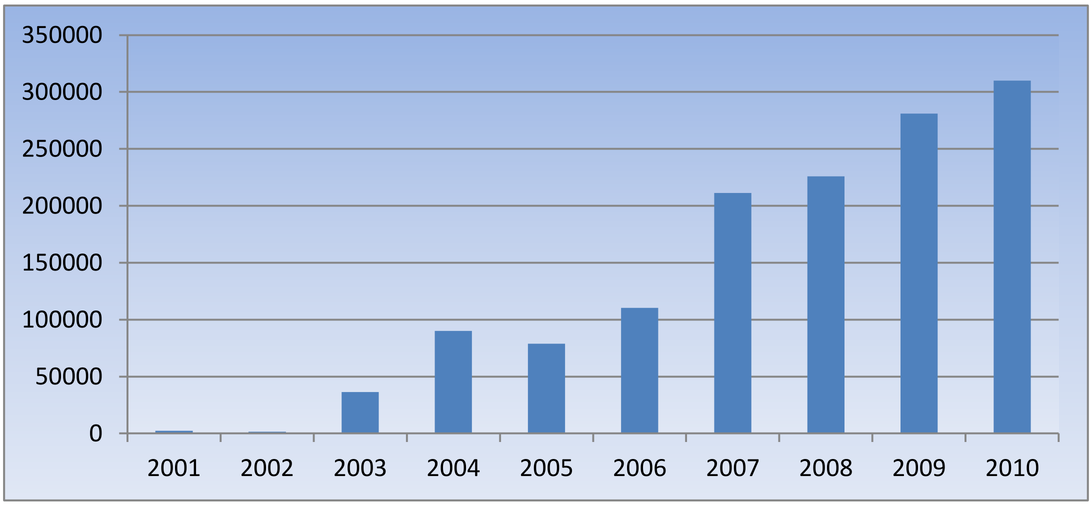

Figure 4.5 Annual Pax UAE –Nig; Source: NCAA (2011)

The route had a growing traffic trend as depicted in figure 4.5 above. The route had a low traffic volume until 2003 when Emirates airline entered the market, making it the second busiest in 2010 with 14 flights per week. Emirates airline has two flights per day from Lagos to Dubai (100 per cent increase from the initial capacity agreement, courtesy of a commercial agreement). The route has had an average growth rate of 44.7 per cent per annum in seven years (2003 to 2010).

Moreover, Emirates airline was the only operator on the route for direct service which suggested a monopolistic market. However, due to the nature of passenger distribution in which a substantial number of them were on transit to other countries, the airline was competing with other network carriers for transit passengers. For instance, an analysis of the 2005 traffic indicated that a significant proportion of the passengers' final destination was to Asian countries, as shown in figure 4.6 below. The alternatives carriers for the passengers include Qatar Airways, Ethiopian Airways, Turkish Airline, Saudi Airways, and South Africa airline.

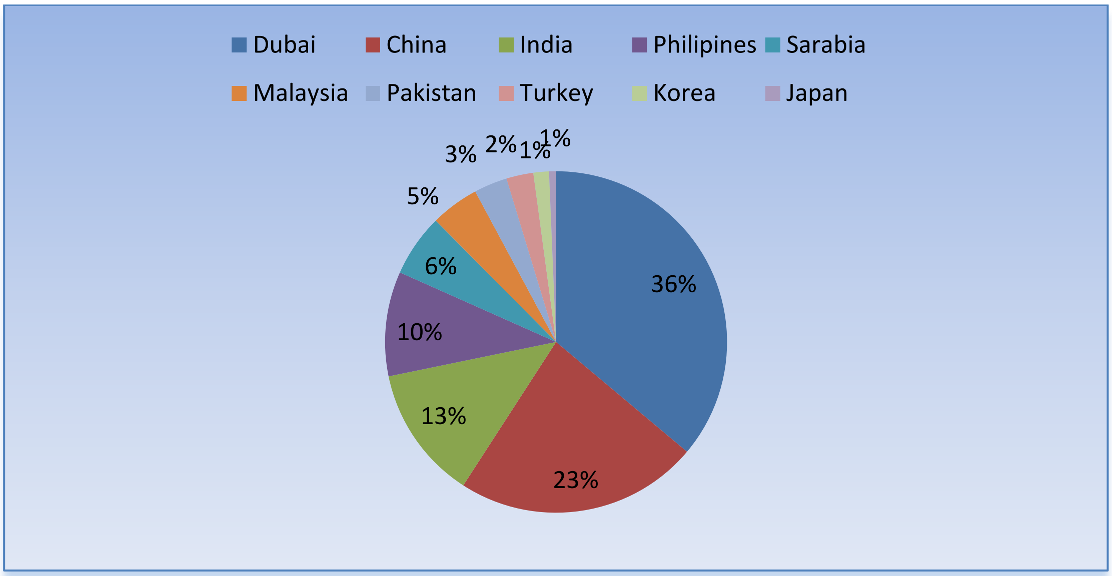

Figure 4.6 UAE Pax final destinations; Source: NCAA (2011)

An analysis of 2005 data indicates that only 36 per cent of the passenger destination was Dubai while 64 per cent were destined for other countries as depicted in Figure 4.6. Similarly, the data from NCAA (2011) and IATAPaxIs (2012) revealed that 59.5 per cent and 65.6 per cent of the total passenger traffic on the route in 2009 and 2010 respectively were on transit to other country destinations. This suggested that some element of competition exists with other network carriers in the transit of passengers to Asian countries. Another competition level exists in the route with other carriers that provide indirect traffic to Dubai. For instance, in 2005 the detail of the route passenger traffic by airlines from Lagos airport as shown in table 4.6 indicated that there were other network carriers competing for the route such as Ethiopia and Kenya airlines. These two airlines may have been able to compete favourably with Emirates because their hub lies between the two destinations and they enjoy liberal rights more including the fifth freedom.

Table 4.6 Market share of airlines on Nig–UAE route in 2005

Airlines	Passengers Airlifted	Market Share (%)
EMIRATES	8,342	24.95
ETHIOPIAN AIRLINES	14,259	42.65
KENYA AIRWAYS	9,201	27.52
OTHERS	1,628	4.87
TOTAL	33,430	100.00

Source: NCAA (2011)

Therefore, the liberal aspects of the agreement permit free pricing and commercial arrangements that grant additional frequency to the carrier, which has contributed to the growth of traffic and airline competition.

Also, the research survey discovered that over 80 per cent of the passengers were Nigerians on business and leisure travel to Dubai. The high growth may be attributed to a number of reasons such as level of trade (import and export) between the countries, which according to the Nigeria Bureau of Statistics (2011) reached $1.13 Billion in 2010 from $84.79 Million in 2005 (1229 per cent increase). Other noticeable factors that contributed to the traffic growth discovered during the survey include the booming of the tourism industry in Dubai, facilitated by the easy visa process. Also, language may be another factor because the English language is the main official language in Nigeria and it is the second official language in Dubai, which attracts Nigerian students and civil servants for studies and conferences/workshops.

4.5.4 Netherlands - Nigeria Market

This was the third busy route of the Nigerian market in 2010, and was governed by BASA which permitted commercial agreements between the airlines and the Nigerian civil authority. The route was operated by a lone carrier KLM which operates scheduled service from two Nigerian airports (Lagos and Abuja).

Table 4.7 KLM passenger traffic from Nigeria airports

Year	Passenger	% change
2001	164,332	
2002	172,658	5.0666
2003	189,909	9.9914
2004	222,585	17.2061
2005	215,810	-3.0437
2006	154,302	-28.5011
2007	233,044	51.0311
2008	224,675	-3.5912
2009	233,783	4.0538
2010	223,146	-4.5499
Total	2,034,244	47.6632

Source: NCAA (2011)

Table 4.7 shows that the route had a total of 2,034,244 passengers carried by the designated carriers over ten years with an average growth rate of 3.58 per cent per annum which was below the country's market growth rate of 8.3 per cent.

A cursory look at the configuration of the passengers from the survey indicates that about 75 per cent were Nigerian travellers to various European and American cities. Meanwhile, the breakdown of passengers on Lagos to Amsterdam in 2005 shows that 15 per cent of the passengers had Netherlands as their final destination, while 38 per cent of them headed for various cities in the USA, 26 per cent had destination to various cities in the UK, 3 per cent to Asian countries and the remaining 33 per cent were on transit to other European cities as shown in Figure 4.7 below.

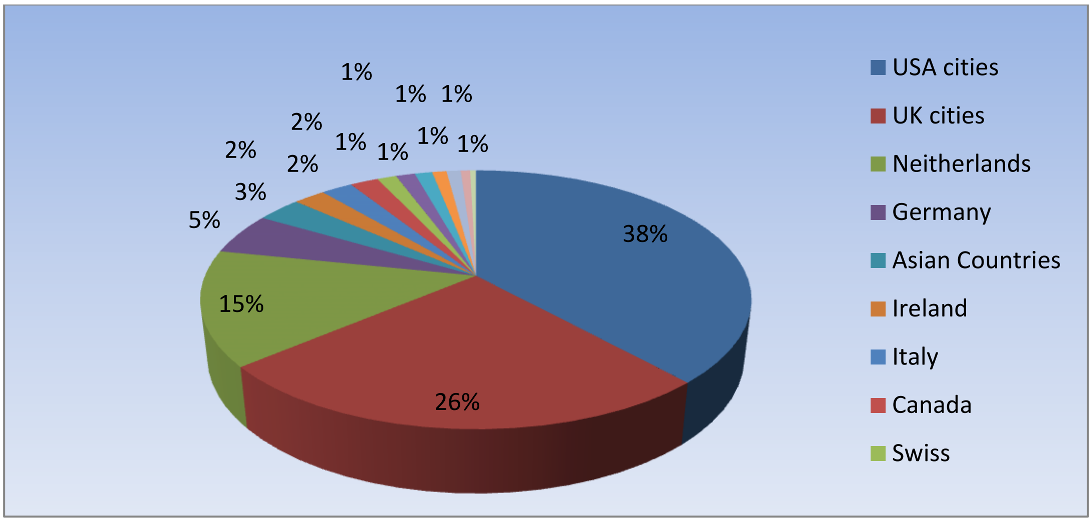

Figure 4.7 Nigeria – Netherlands route passengers' destinations in 2005; Source: NCAA (2011)

Similarly, in 2009 the research estimated from NCAA and IATA data that only 47,423, representing about 20 per cent of the total route passengers of 233,783, were destined for the Netherlands, while the remaining were on transit. But in 2010, the percentage of transit passengers rose to 84 per cent. This suggested a greater significance for the number of Nigeria–Netherlands route passengers in transit and signified an element of competition with other network carriers in the distribution of passengers worldwide.

Meanwhile, the significant developments on the route associated with liberalisation impacts include moderate traffic growth, elements of competition with other network carriers for passengers travelling to European cities and the US, and additional airports for departure/arrival. This was because the liberal aspects of the ASA permitted commercial agreements that eventually led to an increase in frequencies at new points of departure/arrival. Also, the growth of the aggregate GDP of the countries may have contributed, since the research had estimated the ratio of GDP growth to traffic growth as 1.3 to 1 in Nigeria. The growth of international trade between the countries might have also contributed because according to the NBS (2011) the two countries' trade witnessed an average growth rate of 36 per cent per annum from 2005 to 2010.

4.5.5 Germany - Nigeria Market

This was another busy route to Europe with one flight per day from Lagos airport based on the restricted BASA which allowed a commercial agreement with airlines when needed. The route air service has been provided by a lone designated German Carrier (Lufthansa) and had a market share of 7.7 per cent of the total passengers in 2010, with an average steady growth rate of 20 per cent per annum in ten years as shown in Figure 4.8. However, as a result of traffic growth, the airline commenced flights from Abuja airport with five flights per week to Germany as from 2011.

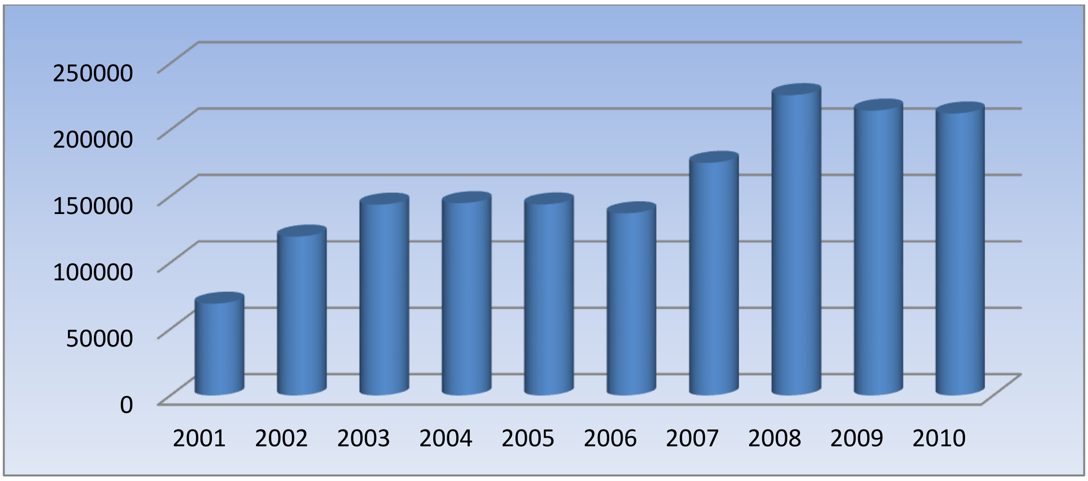

Figure 4.8 Nigeria–Germany traffic: Source NCAA (2011)

Further analysis of the passengers suggests that a significant percentage were on transit to other European cities including where direct traffic exists; this is evident from the survey and the 2005 passenger final destination breakdown in figure 4.9 below.

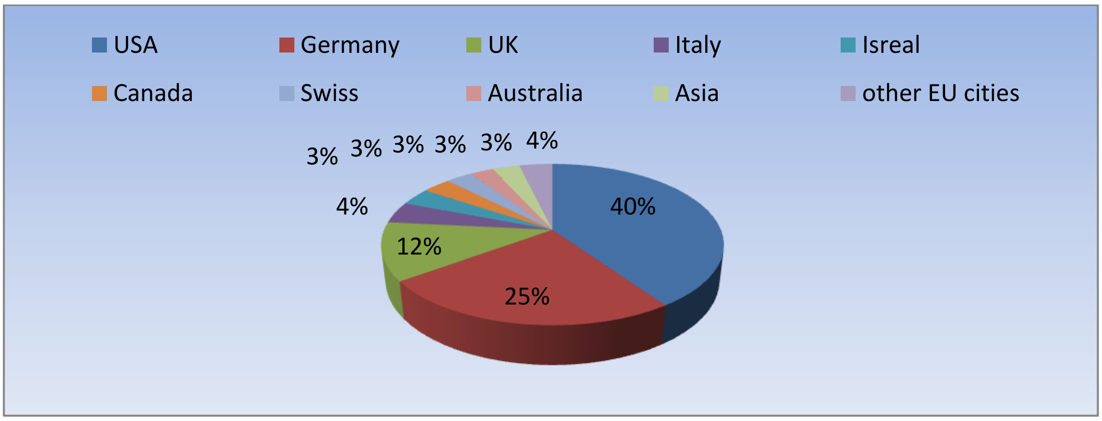

Figure 4.9 Lufthansa Passengers final destinations; Source: NCAA (2011)

Figure 4.9 shows that 40 per cent of the passengers had a final destination to USA cities and about 51 per cent were destined for European cities, while Australia, Canada and Asian countries had 3 per cent each. This confirmed the belief that the only carrier on the route may be in competition with other network carriers in the distribution of passengers from Nigeria to European and USA cities.

Therefore, the liberal aspects of the Nigeria–Germany ASA that granted commercial agreements may have played a role in the growth of traffic and, hence, the competition; although other factors such as passenger income (a proxy of GDP) and trade between the countries were also capable of influencing traffic growth. However, subsequent analysis would be able to isolate the contribution of each factor.

4.5.6 Ghana - Nigeria Market

This was the shortest distance among the top ten routes with an average distance of about 517 km which means that there was the possibility of competition with other modes of transport on the route. Moreover, the route was ruled by the Yamoussoukro declaration which liberalised the ASA completely between the countries. The traffic demand on the route has been threatened by instability of the airlines involved, and as a consequence, the route had unsteady traffic growth as shown in figure 4.10. Despite the challenges, the route had an average growth rate of 11 per cent per annum over the ten years and a market share of about 7.6 per cent of international passenger traffic in the country in 2010. The traffic trend in ten years is shown in Figure 4.10.

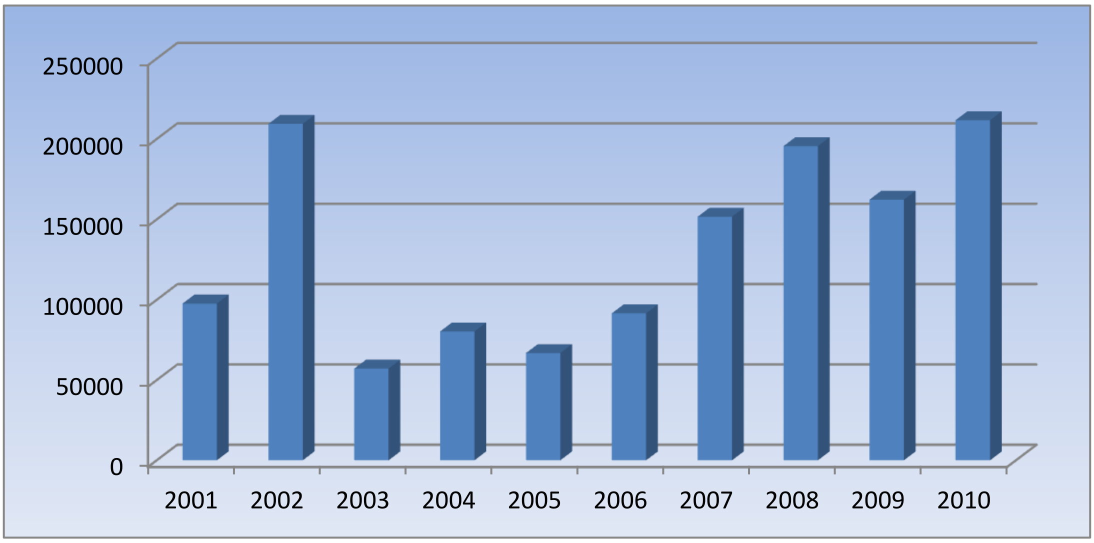

Figure 4.10 Nig- Ghana annual Pax; Source: NCAA (2011)

The drop in traffic in 2003 may not be unconnected with the unstable service by the major service provider (Ghana Airways, which eventually collapsed in 2005), which created a shortage of supply of airline services. Meanwhile, passenger traffic picked up steadily as from 2006, mainly from designated Nigerian private carriers. The route was always in competition with several carriers over the ten years. However, during the period about seven different carriers provided service on the route at different times (see Appendix 5), but as at 2010, only three Nigerian carriers were in the market competing for passengers. Therefore, the level of competition on the route using entropy (H) developed by Frenken et al. (2004) can be evaluated as:

$$H= 0.3Log(0.3) + 0.35Log(0.35) + 0.35Log(0.35) = 0.47 \text{ ---------------- } (4.2)$$

Table 4.8 Airline Traffic between Nigeria and Ghana in 2010

Airlines	Passengers carried	% share of market
Aero contractor	63,009	29.8
Arik Air	74,527	35.2
Virgin Nigeria	74,094	35
Total	211,630	

Source: NCAA (2011)

The entropy value of 0.475 indicates fair competition among the airlines which suggests price and quality service competition.

It therefore implies that the YD agreement which was the most liberalised agreement Nigeria had was responsible for a multiple designation of airlines flying to Ghana, making them compete in terms of frequencies, price and quality of service.

Furthermore, a strong link between the neighbouring countries was inspired by the common language which facilitates exchange of manpower resources and trade between the countries. Also, the shape of the two countries' economies had significant impacts on the traffic level because the two countries were the largest economies in the West African region and their economies witnessed significant growth during the time of review.

4.5.7 South Africa - Nigeria Market

According to FMOA (2011), the route was still governed by BASA instead of YD as recommended by AFCAC, because the two countries could not reach agreement on the YD principle; despite this, the ASA had made some compromises which allowed multiple designations and free pricing. The route had a market share of about 6.4% of the total annual international passenger traffic in 2010. The route had duopoly market structure traffic from Lagos to Johannesburg, with one airline from each country providing service in 2010.

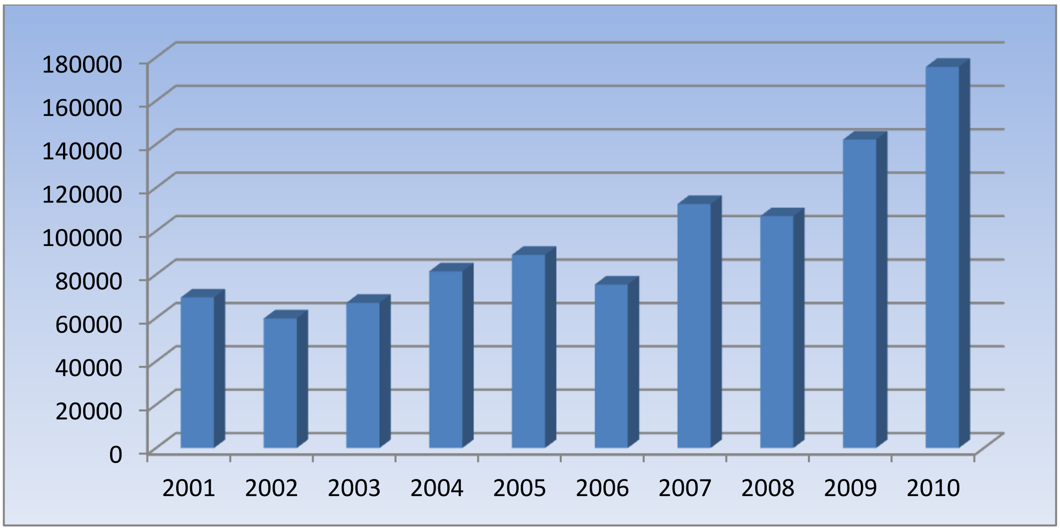

Figure 4.11 Nig- SA Annual Pax; Source: NCAA (2011)

Figure 4.11 depicts modest traffic growth in the route with an average rate of 15.4 per cent per annum over the ten years. The majority of the passengers were destined to South African cities while about 30 per cent of the passengers were on transit to other southern African countries such as Zambia, Zimbabwe and Botswana, based on the 2005 traffic data.

The growth of traffic may be attributed mainly to aggregate economy of the two countries as well as huge investment and trade between the countries. This was also encouraged by the common official language which facilitates communication, exchange of human resources and academic knowledge among others. However, the role of liberalisation in this case may be minimal because of the low level of liberalisation index.

4.5.8 France - Nigeria Market

This was another route to Europe governed by a BASA which permitted commercial agreements between the airline and the Nigerian government. The route was operated by a single carrier (Air France) which operates a scheduled service from two Nigerian airports (Lagos and Port Harcourt). The airline had a market share of 6.3 per cent of the total passengers in 2010, with an average growth rate –0.7 per cent per annum over ten years as shown in Figure 4.12. This was far below the industry average growth rate, estimated earlier to be 8.3 per cent in the period.

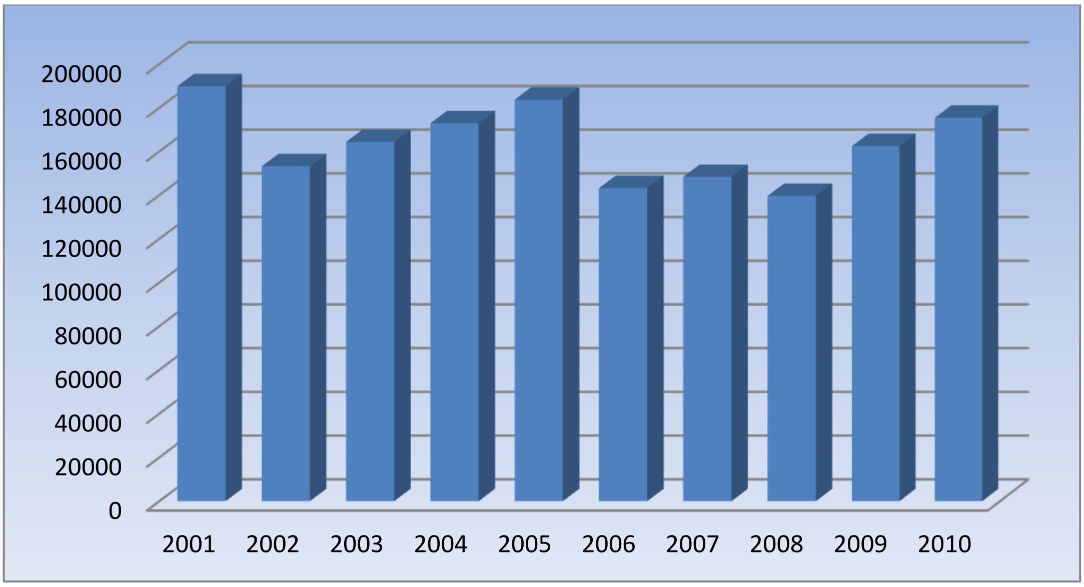

Figure 4.12 Nig- France annual Pax; Source: NCAA (2011)

Nevertheless, the negative trend of the traffic on the route was very difficult to postulate by the research because all factors that should promote growth were available, such as economic growth of the country's GDP, increase in trade by 33 per cent between the countries, and favourable ASA. Although the airline enjoyed monopoly on the route, competition with other European airlines in the market could have affected the airline's market growth. The analysis of the airline passengers' destination in 2005 strengthens the competition argument among European carriers, as depicted in Figure 4.13.

Therefore, the research believes that the only possible impacts of liberalisation on the route were: increase in flight frequency, additional airport of departure/arrival, and enhancement of competition with other network carriers for passengers travelling to EU cities and the USA.

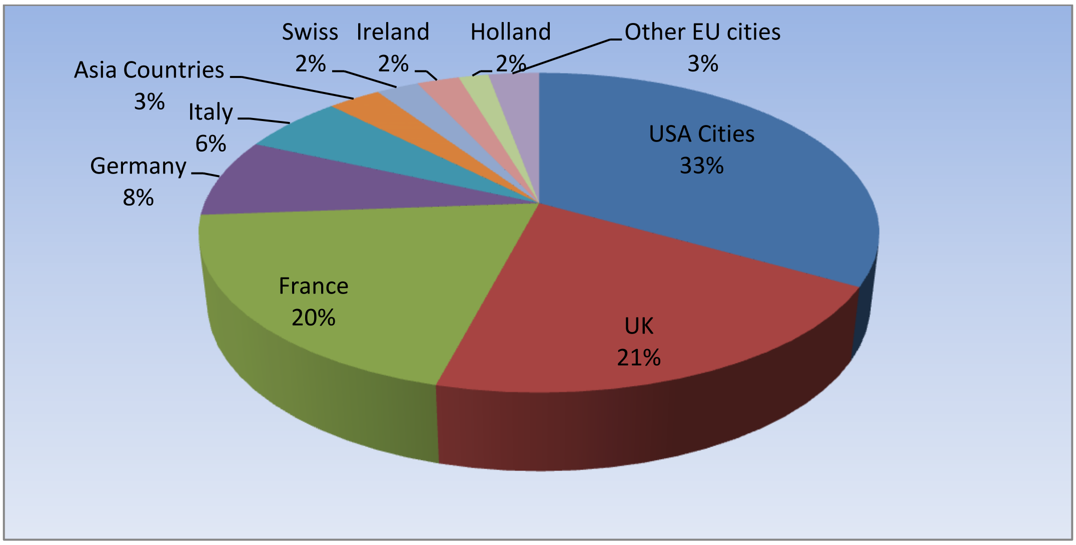

Figure 4.13 AF Pax destinations; Source: NCAA (2011)

4.5.9 Ethiopia - Nigeria Market

This was another route with high traffic within the Africa region governed by YD that permits unlimited fifth freedom. The route traffic was provided by one of the most vibrant African carriers, Ethiopian Airlines, which enjoyed considerable monopoly because Nigeria does not have a designated carrier on the route. According to NCAA (2011), the airline passenger traffic accounted for 5 per cent of the Nigerian total international passenger market in 2010.

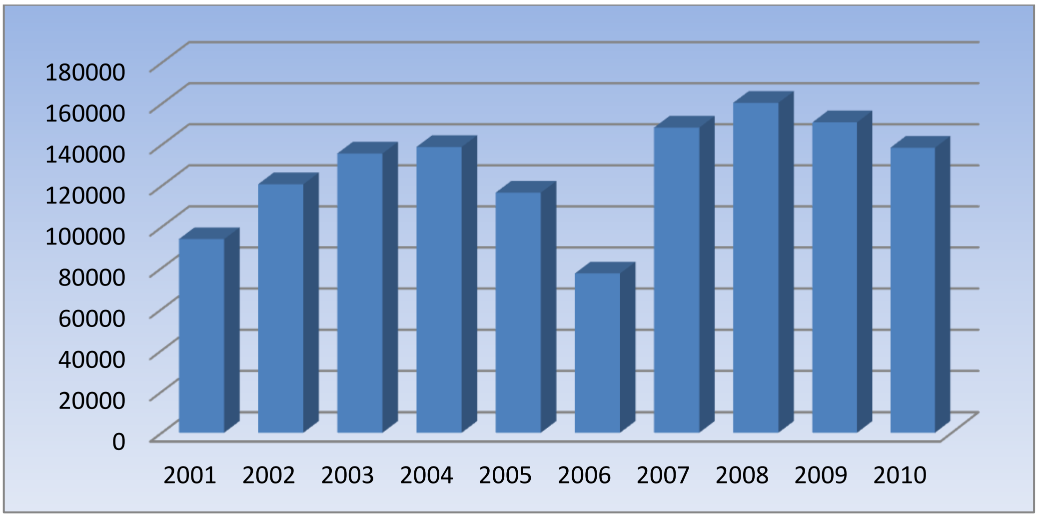

Figure 4.14 Nig- Ethiopia annual passenger; Source: NCAA (2011)

The airline during the ten years of the review had a considerable growth rate of 4.7 per cent of passenger traffic in Nigeria. The airline used the fifth freedom to connect traffic from Nigeria to West African countries when the need arose, such as in 2003 the airline had flights to Ghana and Côte D'Ivoire from Nigeria. The airline had three flights on a daily basis from Nigeria to its hub in Addis Ababa, with two flights from Lagos airport (morning/evening) and Abuja airport. Further analysis showed that a significant proportion of the passengers were on transit to other destinations, mostly Asia and Middle East countries; this is evident from a sample of 2005 passenger traffic from Lagos Airport as depicted in Figure 4.15.

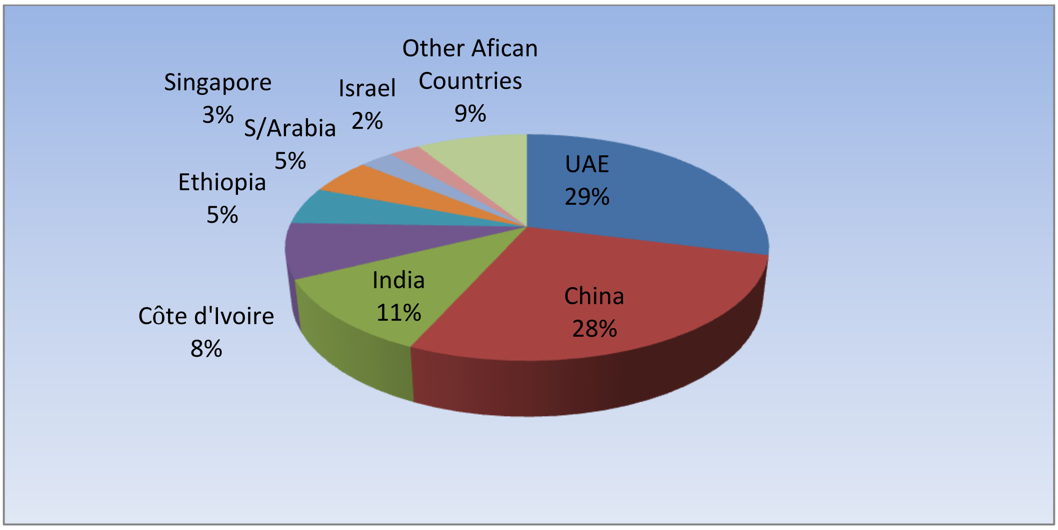

Figure 4.15 Ethiopian Air Pax destinations; Source: NCAA (2011**)**

The distribution of the final destination shows about 78 per cent of the passengers travelled to Asia and Middle East countries, while the other 22 per cent of passengers travelled to African countries. However, the airline passenger destination pattern shows a correlation with other Middle East carriers such as Emirates and Qatar, which suggests viable competition among the carriers.

The traffic volume and growth on the route could be attributed solely to the liberalisation (YD), which permitted a vibrant carrier to carry on traffic in the market where the flag carriers' capacities were floppy. However, it would be absurd to associate the traffic with other factors, because the Ethiopian economy was very weak (as indicated by GDP values in the Appendix 9), so also trade with Nigeria was insignificant when compare with traffic volume, and there was no common language or cultural relationship between the countries.

Therefore, the only attribute of the route was the high liberalisation index which instigated traffic growth and competition with other network carriers for travellers to Asia, the Middle East and African countries which constituted about 95% of the route passengers as shown in Figure 4.15.

4.5.10 USA – Nigeria Market

The route was regulated by an open skies agreement of the US and Nigeria governments signed in 2002, but normal direct flights resumed in 2009 after a long term of suspension by the US government on the grounds that Nigerian air transport system safety was not able to meet the US FAA criteria for category 1. As a consequence, all airlines from the US withdrew from the route for safety concerns. However, North American Airlines returned to the route in 2005 while Delta Airlines also resumed in 2007, and in 2008, the US FAA lifted the suspension on the route traffic after the country met the criteria for category 1 safety standards. Before the route traffic suspension, travellers had to fly through other countries, especially Europe; this boosted the market of European carriers as evident in the breakdown of airline passengers in the 2005 data (NCAA, 2011).

After the resumption of scheduled direct traffic in 2007, passenger traffic increased with an average growth rate of 45 per cent per annum in three years as shown in Figure 4.16, while the traffic on the route accounted for about 4.9 per cent of total international passenger traffic in 2010.

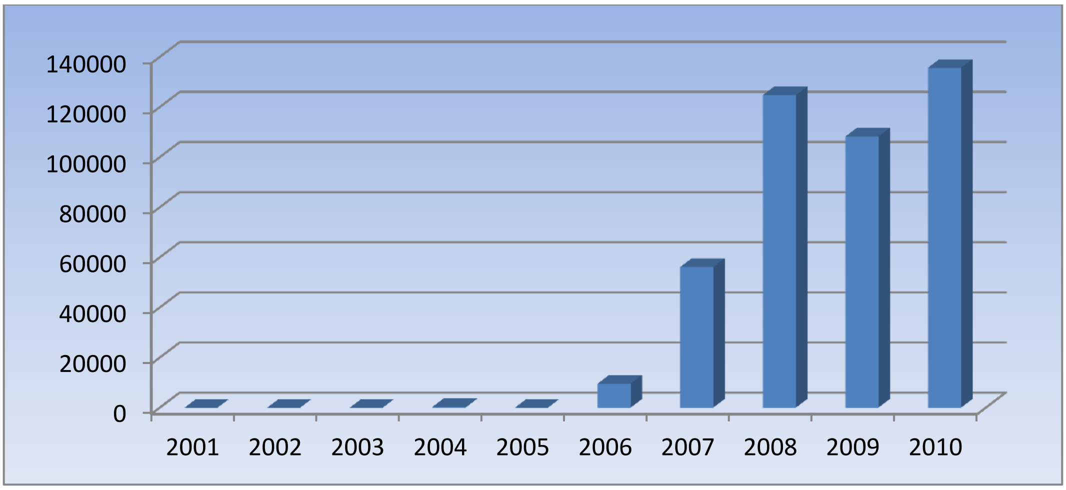

Figure 4.16 Nig-USA direct annual Pax traffic; Source: NCAA (2011)

The route was a duopolistic market with Delta Airlines (US carrier) dominating with 89 per cent of the passengers, while Arik Air (Nigeria carrier) handled only 11 per cent of the route passengers. Due to growing market acceptability in 2009, Delta Airlines expanded its entry point to Abuja airport since the airline has the right based on liberal agreement. Furthermore, the airline has the right to exercise the fifth freedom from the Nigeria route as permitted in the agreement.

Meanwhile, a substantial numbers of passengers were destined to USA cities with a few travelling to Canada, as discovered by researching the passengers' survey.

The liberalisation benefits include growth of traffic, additional frequency, airline alliance, and additional airport of entry/departure. However, traffic growth could not be associated with liberalisation alone, other factors such as economy, trade, and common language played a significant role as well, as evidenced from the cross-sectional analysis.

4.5.11 Qatar – Nigeria Market

The route traffic started in 2007 and governed by restricted BASA signed by the governments of the countries. As a result, Qatar Airways was designated as the operator of the service and as at 2010; the airline enjoyed seven flights per week and was able to convey around 4.7 per cent of Nigeria's annual total international passengers. Three years after the commencement of the flight the airline had an average unprecedented traffic growth rate of 42 per cent per annum, as shown in Figure 4.17 below.

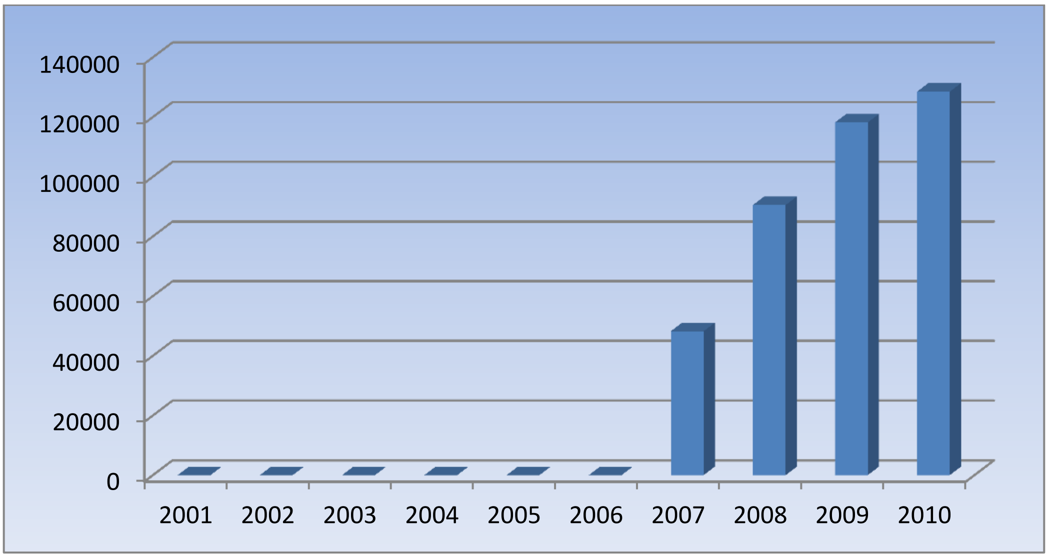

Figure 4.17 Nig – Qatar annual Pax; Source: NCAA (2011)

Moreover, based on the research survey, a substantial number of route passengers were on transit to other Middle East and Asian countries. The survey also confirmed the data collected from NCAA and IATA (2011) which showed that, out of a total 128,468 airline passengers carried from Nigeria, only 26,029 passengers had their destination at Doha (the hub of the carrier) – the other passengers were on transit. This also suggested another carrier choice for travellers to Asia, the Middle East and Pacific region from Nigeria which increased the level of competition in the market among the carriers from Africa and the Middle East.

Therefore, liberalisation on the route permitted the carrier to convey passengers for direct and indirect traffic, allowed free pricing, and alliances. As a result, there was traffic growth and competition among airlines. However, it would be hard to associate other factors such as trade and language with the traffic growth since the two countries have no significant trade link or common language or culture, as evident from the secondary data collected (Appendix 9).

4.6 Competition by Airlines

As observed from theories and empirical evidence, one of the benefits of liberalisation is to increase competition between airlines in terms of air fares, frequencies, schedules, comfort, and other airline services which improves the quality of the services for the benefit of the passengers. However, Graham (1997) argued that competition exists on a route when there are at least three airlines on a route in operation. It therefore implies that only two routes from the 25 international routes in the market were competitive. Also, there were two routes with a duopolistic market, while the rest had monopolistic situations.

As expected, the research observed from the 2005 data and the research survey that another level of competition exists in the market from network carriers on two segments, the eastbound segment and the northbound segment. The competition was precipitated by the composition of the passengers which the survey discovered to be mostly business travellers, whose concern, according to Doganis (2006) was the availability of convenient flights in respect of the route and cost.

The eastbound segment includes travellers to Asia, the Middle East and Pacific countries where passengers have the option to select from the available airlines whose hubs fall on the routes, such as Ethiopia Airlines, Emirates, Qatar, Egypt Air and Middle East Airline. According to NCAA (2011), the traffic in the segment accounted for 30 per cent of the annual traffic in 2010 with eight carriers in competition, as depicted in Figure 4.18. Also, the composition of the passengers' final destination from the survey in Table 5.21 and the data in Table 4.5 attested to the competition between the airlines on this segment.

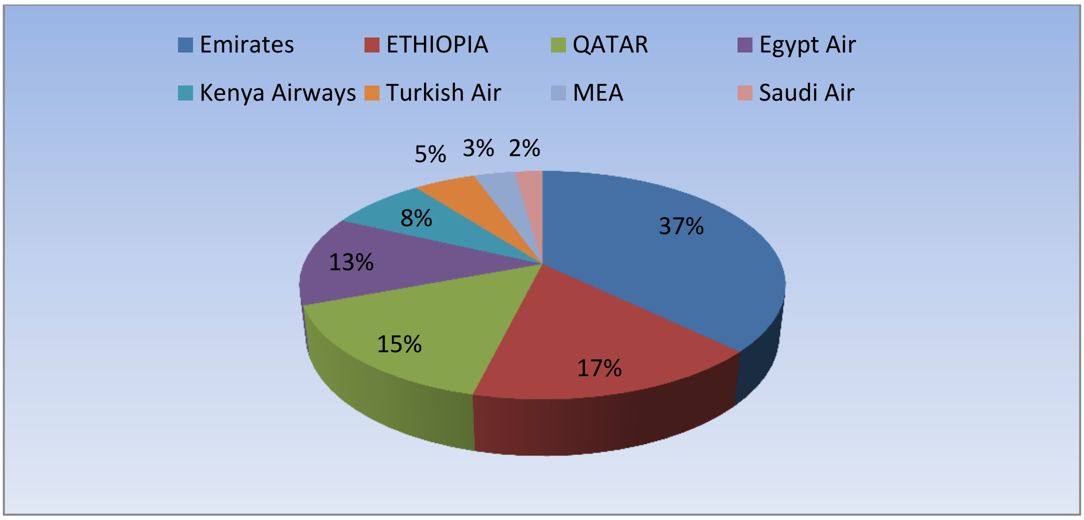

Figure 4.18 Eastbound Traffic segment; Source: NCAA (2011**)**

The route traffic had a final destination to about 24 countries in the regions, based on IATA PaxIs (2011), although it was possible to have a small fraction of passengers in these carriers heading to other destination outside the region, but this may not be more than 5 per cent, based on the 2005 traffic data. Also, it was possible to have a small fraction of passengers travelling to the regions with different carriers other than the eight competitors, which may not be more than 2 per cent, according to the 2005 traffic data from NCAA.

Therefore, using the passenger traffic for the year 2010 of the East bound airlines as depicted in Figure 4.18; the competition level of this market segment using entropy is as follows:

Entropy (H) = 0.37Log (0.37) + 0.17Log (0.17) + 0.15Log (0.15) + 0.13Log (0.13) + 0.08Log (0.08) + 0.05Log (0.05) + 0.03Log (0.03) + 0.02Log (0.02) = 0.749 -----(4.3)

The entropy value of 0.749 indicates a high competition level among the eight carriers for the eastbound traffic segment, which affects the quality of services, air fares, comfort, service accessibility, and convenience of the passengers.

The second market segment comprises European and North American bound routes where passengers have the option to select an airline whose hub falls in Europe, such as BA, Air France, KLM, Lufthansa, Iberia or Alitalia. The survey and data from NCAA, and IATA PaxIs showed that travellers choose an airline based on seat availability, convenience and price in respect of a direct or indirect service on this segment. The segment traffic accounted for 49.8 per cent of the market share with nine carriers in competition. This also confirmed some of the previous empirical evidence on the liberalisation effect of European carriers; for instance, InterVISTAS-EU Consulting (2009) argued that EU formation of a single aviation market had increased competition on many routes. However, it was possible some fraction of passengers used other airlines which may not be so significant, according to 2005 traffic data provided by NCAA.

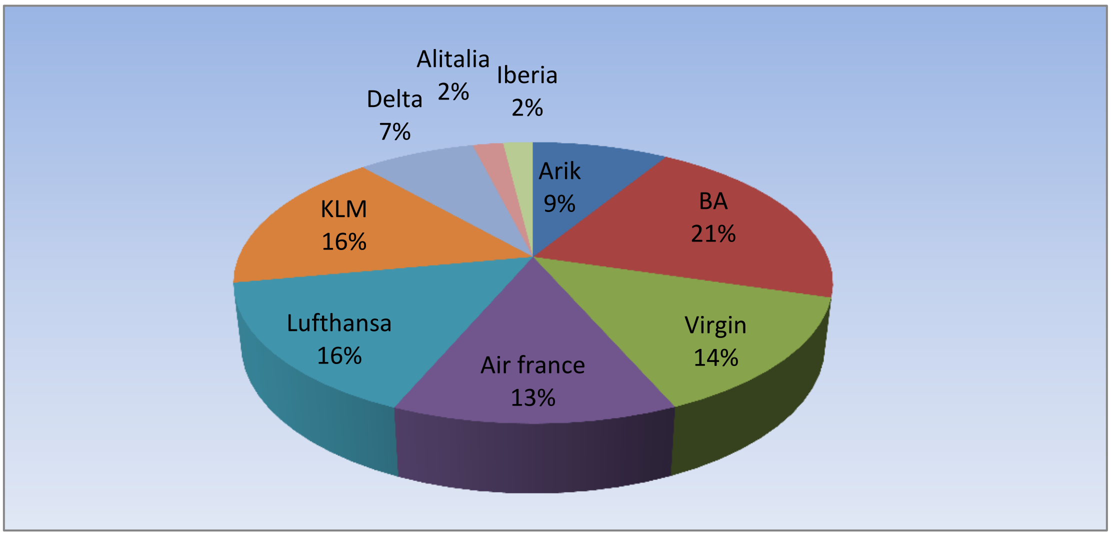

Figure 4.19 Northbound Segment traffic in 2010; Source: NCAA (2011)

The research observed the existence of competition among airlines on the Northbound segment from the composition of their passengers final destinations in the survey carried out in 2011 (see Table 5.21) and the secondary data of 2005 traffic as presented in Table 4.5.

Therefore, using Northbound airlines traffic for the year 2010 as depicted in Figure 4.19, the competition level of this market segment using entropy (H) is as follows;

H = 0.21Log (0.21) + 0.16Log (0.16) + 0.16Log (0.16) + 0.14Log (0.14) + 0.13Log (0.13) + 0.09Log (0.09) + 0.07Log (0.07) + 0.02Log (0.02) + 0.02Log (0.02) ---- (4.4)

H = 0.873 is a very high competition level (maximum of 1.0)

This suggests very high competition in this market, which approaches perfect market competition if the entropy value reaches 1.0.

In conclusion, the chapter observed that there was some level of liberalisation in all the routes, from the minimum of free pricing, applicable to all the routes, to a maximum of permitting fifth freedom, applicable to some routes. This inspired the supply of air services in many of the routes when other socio-economic factors such as GDP, trade and cultural links trigger the demand for traffic growth in the market. This resulted in competition in some of the routes for direct traffic and also for indirect traffic from two market segments. Another effect of liberalisation in the market was the growing expansion of traffic to other secondary markets at Abuja, Kano and Port Harcourt.

4.7 Summary of the Chapter's Findings

This chapter has presented and analysed secondary data collected from the Nigeria's traffic market. It appraised the current ASAs signed between Nigeria and other countries where various levels of liberalisation concerning some fundamental issues, namely traffic rights, airline designation, capacity controls, tariff regulation, withholding conditions on the designated airline, and provisions for commercial agreements in each agreement were ascertained. The findings show that some countries' provisions were similar and could be categorised into four different types, namely restricted BASA, BASA with commercial agreements, YD, and open skies agreement. The YD signed as a multilateral agreement with African countries was the most liberal type with an Air Liberalisation Index value of 32 while the restricted BASA was the least liberal with an index value of 10.

Traffic trends generated by the designated airlines were evaluated over ten years from the four international airports in Nigeria. Traffic saw an unsteady passenger average growth of 8.3 per cent per annum for the ten years with a total record of 20.34 million international scheduled passengers. The market appeared to be both cyclical and strongly influenced by external factors, mostly social and economic in nature.

The examination of origin and destination markets involving Nigeria indicated direct traffic to 25 countries mostly with the partner countries' carriers as the major operators in the market. An in-depth analysis of the top ten destination countries exposed various aspects of liberalisation impact such as traffic growth, competition, expansion to other airports, and frequency of services in most of the routes, which could be attributed to the various levels of liberalisation in the country's ASAs.

Meanwhile, only the UK and Ghana country-pairs were found to benefit from a competitive market, while the remaining routes had monopoly situations with the exception of the US and South African, where duopoly markets exist. In addition, there was strong evidence of indirect competition among the network carriers for Europe-bound traffic on one hand, and also more competition for Middle East/Asia bound traffic, which suggested that almost all the routes had alternative operators, providing indirect traffic. The European market competition level had a very high entropy value of 0.87 while the Asia/Middle East market segment had entropy of 0.75, which was also regarded as a high level of competition.

The analysis therefore, highlighted the effects of liberalisation together with other factors like GDP, Trade and market conditions in the areas of traffic growth, competition and entry points. But in estimating the actual impact of these factors, including liberalisation, the research would subsequently apply a cross-sectional analysis in multiple regressions, capable of isolating the effect of each factor as discussed in chapter six.

Chapter Five: Results and Analysis of Passenger Survey

5.1 Introduction

One of the research objectives is to determine the socio-economic characteristics of international passengers in the Nigerian market. This information was virtually absent from the market secondary data; hence a field survey of international air passengers in Nigeria was conducted. This chapter's aim is to present the findings obtained from the field research of Nigerian airports.

The passenger field survey is part of the research work with the aim of gaining insight into and knowledge of the nature of international passenger traffic in the Nigerian market. International passengers are one of the major consumers that tend to be affected by liberalisation policies. Hence, appreciation of the nature of passengers will enable the prediction of the likely impact on passengers when a liberalisation policy is changed. The survey ascertains the demographic profile and nature of international travellers, route patterns, market competitors, and the rationale for selection of carrier by passengers in the market. Specifically, the survey data consist of journey purpose, final and intermediate origins/destinations, airlines, airports, routes flown, and country of residence, nationality, age group and income. The information generated is to complement the secondary data findings and verify some assumptions made by the research such as dominance of business travellers and route network competition.

A clear view of the passengers will enable the research to understand the likely qualitative impacts of further liberalisation in the market.

5.2 Sampling

A sample of six hundred passengers was randomly selected at Lagos and Abuja Airport on departure, and a questionnaire was administered to each of them. Of the 512 questionnaires returned, 502 were found to be valid and were coded for analysis. The remaining 10 had some errors and incomplete information which render them invalid. The sample represents a population of about three million international passengers in the country as at 2010, which exceeded the minimum sample size recommended by Saunders, Lewis, and Thornhill's (2009) of 384 for a population of 2 to 10 million. The sample size is based on the 95% confidence level and 5% margin of error, as well as equal proportions of responses expected to have particular attributes (see section 3.9.5).

The questionnaire comprised two sections – one on passengers' demographic profile and the other on their journey profile. The reliability of the data is obtained by the high correlation of the data collected from the questionnaire administered at two different airports (Lagos and Abuja), as well as the time of the administering of the questionnaires (June, 2011 and November, 2011).

The obtained data were analysed using appropriate methods, which involved descriptive and frequency analyses, then a bivariate analysis using cross-tabulation, and lastly inferential statistics using a one-way and two-way chi squared test.

5.3 Analysis techniques

After the data collection and coding, there is generally a need to examine trends in variables' distribution, which show the frequency of occurrence of each event. Accordingly, all the variables were explained by using frequency analysis so as to observe the trend in the distribution. The quantifiable variables were also analysed descriptively, covering age group, annual income and frequency of travel over three years by the passengers. This information broadened our understanding of the passenger's social values and their travelling patterns, which have impacts on the other variables observed. For instance, income level has an impact on the journey purpose be it business or VFR or leisure (Shaw, 2011). The analysis was run by SPSS software, and the results indicate the following observations.

5.4 Passenger Nationality

The first question in the questionnaire was the nationality of the passengers in the market; this provided a picture of the user's identity which can be useful to airlines and decision makers. Therefore, the frequency distribution of the passenger's nationality from the sample is shown in Table 5.1 below.

Table 5.1 Passengers Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	American	10	2.0	2.0	2.0
	Other Asian	16	3.2	3.2	5.2
	British	11	2.2	2.2	7.4
	C/African	12	2.4	2.4	9.8
	Caribbean	1	0.2	0.2	10.0
	E/African	4	0.8	0.8	10.8
	Other European	8	1.6	1.6	12.4
	Middle East	11	2.2	2.2	14.5
	Nigerian	298	59.4	59.4	73.9
	S/African	34	6.8	6.8	80.7
	Other W/African	97	19.3	19.3	100.0
	Total	502	100.0	100.0	

Source: Field survey (2011)

Table 5.1 shows the nationality of the passengers in the market in which 502 passengers responded. The pattern shows that market passengers were made up of 298 Nigerians, representing 59.4 per cent of the total passengers, followed by 97 other West African nationals from neighbouring countries that were mostly in transit for intercontinental traffic. This was because Lagos international airport with high connectivity serves as a hub for West African travellers. This was facilitated by the provision that West African nationals do not require visas to enter Nigeria by ECOWAS charter. The nationality of the passengers in the market is represented by Figure 5.1 below.

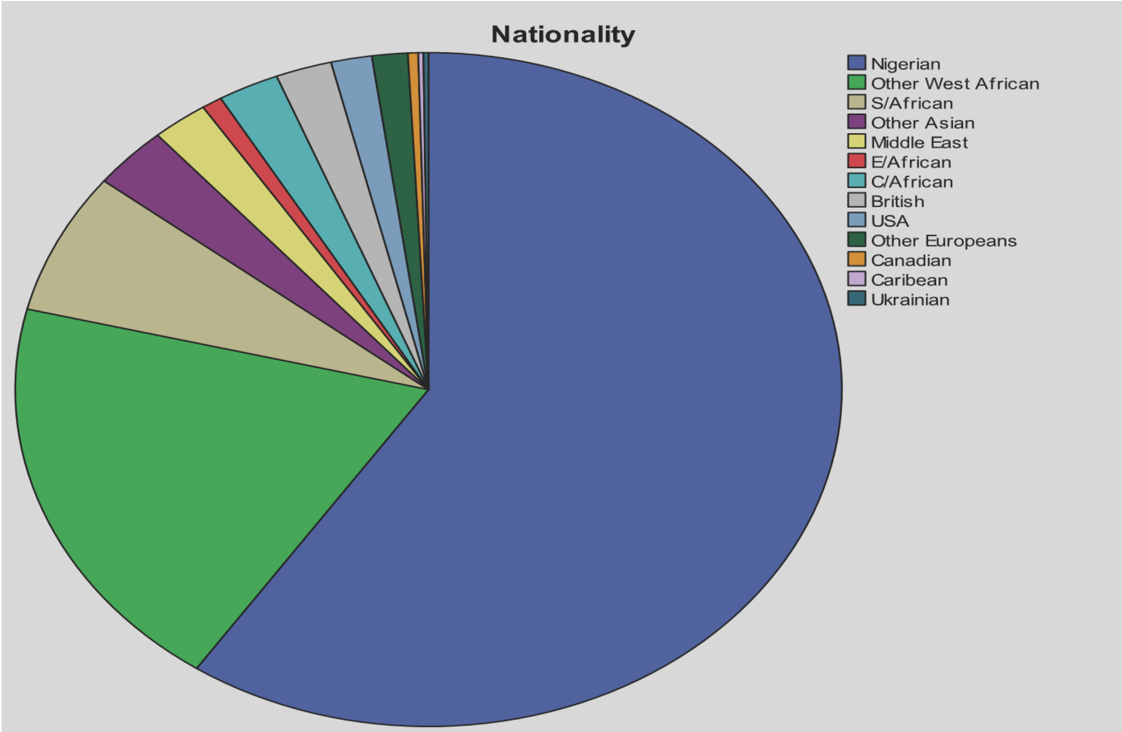

Figure 5.1 Passengers nationality: Source: Field survey (2011)

Furthermore, other African national passengers (East, Central and southern African) comprised 10 per cent (54 passengers). Most of them were on business missions to Nigeria or other West African countries. The passengers came from Botswana, Congo, Cameroon, Gabon and Uganda. Also, among the passengers, 20 European nationals (3.8 per cent) comprise 11 British, as well as Irish, German, Dutch, Spanish and Swiss, most of them on business missions to Nigeria; also, the presence of multinational corporations (MNCs) involved in oil and gas exploration may have provided a basis for such nationals' frequent visits to Nigeria. Other nationals included eight Lebanese residing in Nigeria for business, and visiting friends and relatives. Also, there were 14 Asians from China and India on business missions, and 8 Americans and 2 Canadians. In total, the market configuration consists of about 60 per cent Nigerian and 40 per cent other nationals.

The configuration of international passengers' nationality in Nigeria is similar to the pattern obtained in the UK, as evidenced by the survey carried out by UKCAA in 2010 on passenger nationalities in five UK airports that revealed that UK citizens constituted about 64 per cent, while foreign nationals constituted about 36 per cent

(UKCAA, 2011). This similarity with UK suggests that nationality of each country tends to be the dominant passengers in the country international air travel market.

5.5 Passengers' Country of Residence

The information on nationality is complemented by information on the country of residence of the passengers as depicted in table 5.2 below.

Table 5.2 Country of Residence

Country	Frequency	Percent	Valid Percent	Cumulative Percent
Angola	1	0.2	0.2	0.2
Barbados	1	0.2	0.2	0.4
C/African	10	2.0	2.0	2.4
Cameroun	8	1.6	1.6	4.0
Canada	3	0.6	0.6	4.6
China	3	0.6	0.6	5.2
Denmark	2	0.4	0.4	5.6
Dubai	6	1.2	1.2	6.8
E/Africa	6	1.2	1.2	8.0
Germany	2	0.4	0.4	8.4
Hong Kong	2	0.4	0.4	8.8
India	7	1.4	1.4	10.2
Italy	2	0.4	0.4	10.6
Korea	1	0.2	0.2	10.8
Lebanon	6	1.2	1.2	12.0
Netherland	1	0.2	0.2	12.2
Nigeria	261	52.0	52.0	64.1
Norway	1	0.2	0.2	64.3
Pakistan	1	0.2	0.2	64.5
Portugal	1	0.2	0.2	64.7
Russia	1	0.2	0.2	64.9
Spain	1	0.2	0.2	65.1
Ss/African	36	7.2	7.2	72.3
Switzerland	2	0.4	0.4	72.7
Thailand	1	0.2	0.2	72.9
UK	32	6.4	6.4	79.3
Ukraine	2	0.4	0.4	79.7
USA	14	2.8	2.8	82.5
W/African	88	17.5	17.5	100.0
Total	502	100.0	100.0	

Source: Field survey (2011) [Key: Ss/African- Southern African countries]

Table 5.2 indicates that 52 per cent of passengers resided in Nigeria, while 6.4 per cent were based in other West African countries. In summary it shows that about 48 per cent of the passengers were on a visit to Nigeria for either business or leisure.

However, further analysis by cross-tabulation of the country of residence of the passengers against their nationality is depicted in Table 5.3 below.

Table 5.3 Country of residence against Nationality

	Passengers' nationality											Total
Country of Residence	NA	OA	Br	CA	Cr	EA	EU	ME	Nig	SA	WA	
Angola	0	0	0	1	0	0	0	0	0	0	0	1
Barbados	0	0	0	0	1	0	0	0	0	0	0	1
C/African	0	0	0	10	0	0	0	0	0	0	0	10
Cameron	0	0	0	0	0	0	0	0	0	0	8	8
Canada	2	0	0	0	0	0	0	0	1	0	0	3
China	0	2	0	0	0	0	0	0	1	0	0	3
Denmark	0	0	0	0	0	0	2	0	0	0	0	2
Dubai	0	1	0	0	0	0	0	0	5	0	0	6
E/Africa	0	0	0	1	0	4	0	0	1	0	0	6
Germany	0	0	0	0	0	0	1	0	1	0	0	2
H' Kong	0	0	1	0	0	0	1	0	0	0	0	2
India	0	7	0	0	0	0	0	0	0	0	0	7
Italy	0	0	1	0	0	0	0	0	1	0	0	2
Korea	0	0	0	0	0	0	0	0	1	0	0	1
Lebanon	0	0	0	0	0	0	0	6	0	0	0	6
Neth'land	0	0	0	0	0	0	1	0	0	0	0	1
Nigeria	1	3	3	0	0	0	0	5	242	0	7	261
Norway	0	0	0	0	0	0	0	0	1	0	0	1
Pakistan	0	1	0	0	0	0	0	0	0	0	0	1
Portugal	0	0	0	0	0	0	0	0	0	0	1	1
Russia	0	0	0	0	0	0	0	0	1	0	0	1
Spain	0	0	0	0	0	0	0	0	1	0	0	1
Ss/Africa	0	0	0	0	0	0	0	0	1	34	1	36
Swis'land	0	0	0	0	0	0	1	0	1	0	0	2
Thailand	0	0	0	0	0	0	0	0	1	0	0	1
UK	0	0	6	0	0	0	1	0	24	0	1	32
Ukraine	0	0	0	0	0	0	1	0	1	0	0	2
USA	7	0	0	0	0	0	0	0	7	0	0	14
W/Africa	0	2	0	0	0	0	0	0	7	0	79	88
Total	10	16	11	12	1	4	8	11	298	34	97	502

Source: Field survey (2011) [Key: NA-North American; OA-other Asians; Br-British, CA=central African; Cr-Caribbean; EA-East African; EU-other European; ME-Middle East; Nig-Nigerian; SA-South African; WA-West African]

Table 5.3 shows that out of 261 passengers residing in Nigeria, 20 were foreign nationals and the rest were Nigerian. Similarly, out of 298 Nigerian passengers, 56 resided outside the country and 242 resided in the country. The results suggest that air traffic right granted to various airlines as a result of the country BASA is benefiting passengers across all nationals.

Also, 88 out of 97, representing about 90 per cent of the other West African nationals, resided in their various countries, which serve as evidence that the Nigerian Airport (Lagos international airport) is serving as one West African hub for intercontinental travel because of its high connectivity. This is supported by statistics from FAAN (2012) which shows that Lagos International Airport (MMAI) had 28,128 international schedules flights to 34 destinations in 2011, which was followed by Ghana International airport (Kotoka, Accra) with 22,082 flights to 23 destinations in the same year (Ghana Airport, 2013). Furthermore, only Lagos International Airport had direct traffic to other West African countries in 2010 as shown in Table 4.5.

5.6 Passengers' Journey Purpose

According to Vasigh, Tacker, & Fleming(2008), there are two major classes of trip purpose: business and leisure travellers; while Doganis (2010)further divided the pattern of air travel into business, leisure, visiting friends &relatives (VFR) and others. Furthermore, Shaw (2011) claimed that each class of passenger group shows a different characteristic attitude towards price change: leisure travellers are regarded as price sensitive, while business travellers, in most cases, are more concerned with frequency timing and convenience.

Information on passenger journey purpose not only helps airlines in planning but also provides policy makers and other service providers with the information to predict the likely response of each class of passengers when certain policies or market strategies such as liberalisation are implemented. However, the questionnaire combined the VFR and leisure travellers in to one class of leisure travellers, which were clearly distinct from business travellers as shown in Table 5.4.

Table 5.4 Journey Purpose

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	3	0.6	0.6	0.6
	Business	370	73.7	73.7	74.3
	Leisure	129	25.7	25.7	100.0
	Total	502	100.0	100	

Source: Field survey (2011)

There were 370 passengers in the business travellers' category representing 73.7 per cent of the sample, most of them travelling for the purpose of official assignments, or business trips, or pursuing education/training or religious pilgrimage. Meanwhile, only 129 passengers, representing 25.7 per cent, were visiting friends/relatives or travelling for leisure purposes, with the majority of them being Diaspora Nigerians visiting friends/relatives at home, while 0.6 per cent did not respond to the question.

Further analysis of journey purpose based on the passengers' nationality is shown in Table 5.5 which indicates the same dominance of business passengers over leisure travellers in all nationalities except Middle East nationals, mostly Lebanese, who were discovered to be visiting friends and relatives in Nigeria or Lebanon.

Table 5.5 Passenger's nationality against Journey purpose

		Journey purpose			Total
		NA	Business	Leisure	
Passengers' nationality	American	0	8	2	10
	Asian	0	10	6	16
	British	0	6	5	11
	C/African	0	11	1	12
	Caribbean	0	0	1	1
	E/African	1	3	0	4
	European	0	6	2	8
	Middle East	0	2	9	11
	Nig	2	205	91	298
	S/African	0	31	3	34
	W/African	0	88	9	97
Total		3	370	129	502

Source: Field survey (2011)

Moreover, the three variables are summarized into one table that shows the interface between the journey's purpose and country of residence in relation to the nationality, as depicted in Table 5.6.

Table 5.6 Nationality, Country of residence, and Journey purpose

Passengers	**Business**	**Leisure/VFR**	**Total**
Nigerian resident at home	189	64	253
Nigerian resident abroad	34	28	62
Foreign nationals resident in Nigeria	15	20	35
Foreign nationals resident outside Nigeria	132	17	149
Total	370	129	499

Source: Field survey (2011)

The finding of the dominance of business travellers over leisure travellers is as expected. This is because Nigeria is not a tourism destination country, and has not made significant development in tourism attraction infrastructure compared with countries like South Africa, Kenya and Egypt. Furthermore, the level of individual income represented by per capita income in the country given by the World Bank as $1,452.00 per annum is not adequate enough to support a high level of leisure travelling.

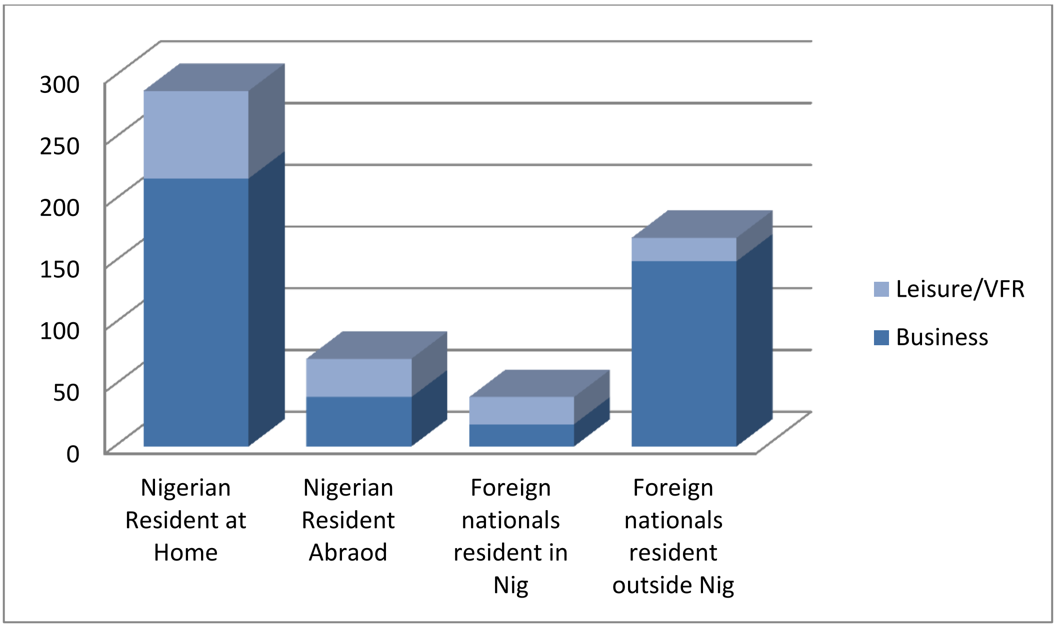

Figure 5.2 Cross tabulation Passengers' nationality/country of residence; Source: Field survey (2011)

However, cross-tabulation of the passengers' nationality against country of residence of the passengers and travel purpose as depicted by Figure 5.2 indicates passengers resident in Nigeria constituted 50.97 per cent while Nigerian residents in Europe constituted 15.51 per cent, and other West African residents constituted 14.13 per cent, which was very close to the number of West African nationals. This confirms the assumption that the West African nationals were either in-transit or on missions to Nigeria, but resided in their respective countries.

The pattern of dominance of the business travellers over leisure travellers was typical in the developed countries during the 1970s (Doganis, 2002). However, recent evidence shows the dominance of leisure travellers in developed countries. For instance, the survey of passenger profiles at five UK airports in 2010 by CAA shows the dominance of leisure travellers by 78 per cent to 22 per cent of business travellers.

One interpretation of the data is that the dominance of business travellers in international traffic in the country indicates that the passengers were price insensitive and concerned more about schedules and convenience of airlines that guarantees ease of flight availability. This finding corroborates the analysis of the secondary data collected on the country's traffic which shows that price was not a factor in determining passenger traffic demand (see Chapter 6).

Therefore, the research noted the ratio of this key segment of the international air market, whereby the research could use the information in predicting the reaction of each segment to the policy of liberalisation, if further implemented.

Similarly, other African residence passengers constituted 14.4 per cent which nearly correlates with the number of other African nationals (13.02 per cent), indicating that most of them were on a mission to Nigeria or the West African region.

5.7 Passengers' Professions

The occupations of the passengers in the market show different professional categories, namely BE (business & entrepreneur), CS (civil servant), retiree, students, and others (artists, athletes, consultants). The frequency distribution of the sample is shown in Table 5.7 below.

Table 5.7 Passengers professions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	0.2	0.2	0.2
	BE	160	31.9	32.0	32.2
	CS	108	21.5	21.6	53.8
	Diplomat	10	2.0	2.0	55.8
	Others	150	29.9	30.0	85.8
	Retiree	11	2.2	2.2	88.0
	Student	60	12.0	12.0	100.0
	Total	500	99.6	100.0	
Missing	00	2	0.4		
Total		502	100.0		

Source: Field survey (2011)

The occupation of the international passengers from a sample of 500 indicates that business/entrepreneurs constitute 31.9 per cent with 160 passengers in number. The group of other professionals comprising consultants, politicians, policy makers, sportsmen/athletes, artists and the rest constituted the next most significant category with 29.9 per cent with 150 passengers. Also, civil servants in both the public and private sectors were equally significant in the distribution of international passengers, with 108 in number representing 21.5 per cent of the sample. This was followed by the student group, most of them Nigerians studying outside the country, particularly England, the USA and Malaysia, representing 12.0 per cent of the sample with 60 in number. There were also 11 retirees and 10 diplomats in the mix of passengers (Figure 5.3).

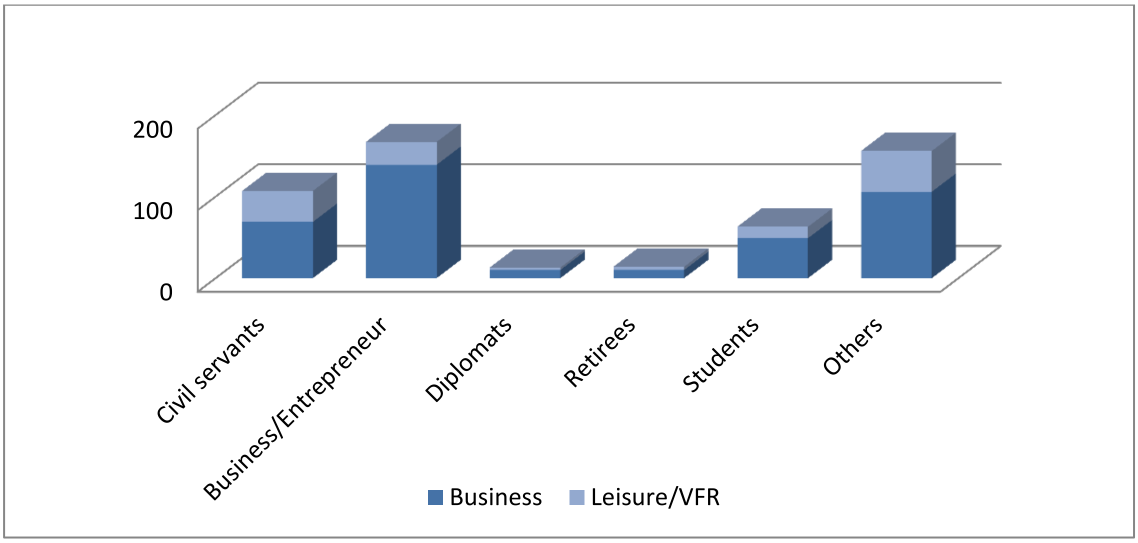

Figure 5.3 Pax occupations; Source: Field survey (2011)

Furthermore, in each group of professionals, the dominance of business travellers over leisure travellers was visibly noticeable. There was a disparity in the ratio of business and leisure travellers in the categories of the passengers' profession. Under the business/entrepreneur group the ratio of passengers travelling for business purpose to that of leisure travellers was 83 per cent to 17 per cent, while under the group of others the ratio was 67 per cent to 33 per cent, respectively.

It therefore means that substantial proportions of the passengers were businessmen, civil servants, students and others, constituting 96.35 per cent of the distribution. This also confirms the dominance of the socio-economic group in the configuration of international passengers in Nigeria. This group will be more interested in liberalised air traffic with respect to more frequent flight schedules and greater accessibility.

Meanwhile, examination of the passengers' profession across nationality shows the dominant pattern of business/entrepreneur, civil servant and others across all nationalities. Moreover, most of the students in the market were from African countries except one British national as shown in Table 5.8 below

Table 5.8 Passengers' Nationality and Profession

		Passengers profession							Total
			BE	CS	Diplomat	others	Retiree	student	
Passengers nationality	American	0	5	2	0	3	0	0	10
	Asian	0	8	1	0	7	0	0	16
	British	0	6	3	0	1	0	1	11
	C/African	1	0	1	0	9	0	1	12
	Caribbean	0	0	1	0	0	0	0	1
	E/African	0	3	0	0	1	0	0	4
	European	0	5	0	1	2	0	0	8
	M/East	0	6	2	0	2	0	1	11
	Nigerian	0	91	79	8	64	6	49	297
	S/African	0	8	12	0	9	0	5	34
	W/African	0	28	7	1	52	5	3	96
Total		1	160	108	10	150	11	60	500

Source: Field survey (2011)

5.8 Passengers' Current Job positions

The profiles of the passengers also include their level of responsibility in the place of work, since the majority are business travellers from civil servants, businessmen and other professionals. The research classifies the various positions from top management, senior/middle level management, senior officers to junior cadre and others as shown in table 5.9 below.

Table 5.9 Passengers' job position

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	N/A	92	18.7	18.7	18.7
	Junior	23	4.6	4.6	23.3
	S/Mdl mng	80	15.9	15.9	39.2
	Other	105	20.9	20.9	60.2
	Snr officer	87	17.3	17.3	77.5
	Top mng	113	22.5	22.5	100.0
	Total	502	100.0	100.0	

Source: Field survey (2011)

From the sample, only 410 of the passengers disclosed their current status, of which 113 of them were in top management, representing 22.5 per cent. This was followed by the others group (not defined) with 105 passengers representing 20.9 per cent. Additionally, senior officers among the passengers occupied the third hierarchy with

87 passengers in number which was 17.3 per cent. Also, senior and middle cadre management positions occupied the third hierarchy with 80 passengers, representing 15.9 per cent. Lastly, passengers employed in junior cadre were 23 only, representing 4.6 per cent, and 92 passengers did not disclose their position, representing 18.3 per cent of the distribution.

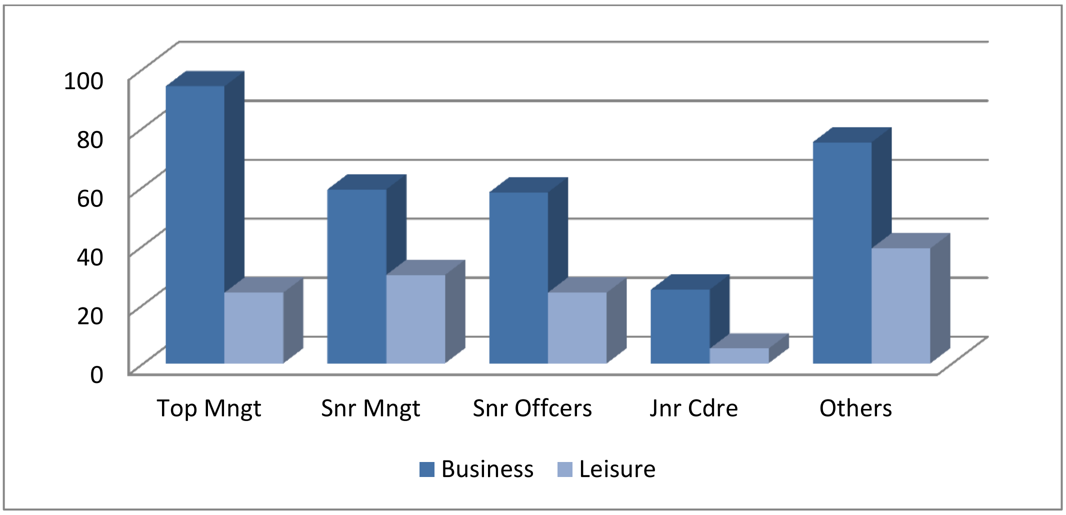

Figure 5.4 Pax positions; Source: Field survey (2011)

A cross-tabulation of the passengers current position against journey purpose shows that there were both leisure and business travellers in each category as shown in Figure 5.4 above. As observed earlier, the top management group leads the other groups in terms of size. Meanwhile, leisure travellers were greater in number in the group of others which comprise students and retirees that travel for holiday.

5.9 Passengers' Age Variable

A total of 488 passengers responded to age enquiry which has a distribution pattern as shown in Figure 5.5.

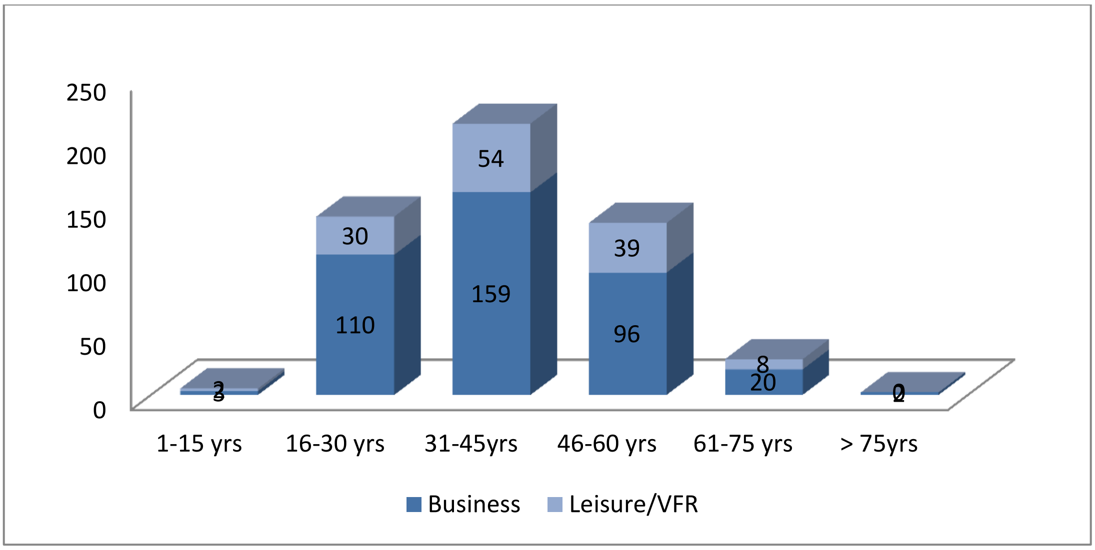

Figure 5.5 Pax Age distribution;Source: Field survey (2011)

The survey discovered that the working age group dominated the travellers in the country. The working age ranged from 18 to 60 years of age with 488 passengers combined, which constituted 93.3 per cent of the distribution. The distribution also shows a similar pattern in both business and leisure travellers. The highest frequency age group was 31–45 years and was reflected in both leisure and business travellers. Also, the analysis approximately maintains the ratio of business travellers to leisure travellers to be 3 to 1 in both age groups, except in the first group (1–15 years) where there were three business travellers and two leisure travellers. However, the business travellers in the first group were students, and the leisure travellers were also students on holiday. There were only two business travellers in the last group, above 75 years old, with no leisure travellers.

Table 5.10 Descriptive statistics of passengers' age group

Stat Value	Leisure	Business	All Passengers
Mean	40.4	39	39.4
Median	40.6	39	39.2
Mode	40.4	39	39.4
Range	74	89	89
Variance	187.1	181.2	189.9
Std Deviation	13.68	13.46	13.78

The descriptive analysis of the age distribution of the international passengers in the country from the survey depicts a near normal distribution pattern with mean, median and mode all lying in the centre and nearly the same, as shown in Table 5.10. This was reflected in all the passengers as well as in the two groups of travellers.

Also, the variance and standard deviation of all the passengers were found to be 189.9 and 13.78 respectively. However, since the standard deviations across the various categories of travellers are small relative to the means, it therefore implies that the mean responses were reliable measures of the central tendency to infer about the average response of each category. Hence, the average age of international traveller in the country was 39–40 years for both leisure and business travellers.

This implies that any policy on air transport to be taken by the government or the airline should be geared toward satisfaction or motivation of this age group. Therefore, understanding the needs of this group is paramount in formulating appropriate strategy and policy.

5.10 Passengers' Annual Income Level

The importance of passenger's income level in air transport cannot be overemphasized because it is the significant factor in the determination of air transport demand (Vasigh, et al., 2008).

In the questionnaire, not all respondents were able to disclose their income level. Therefore, only 238 (representing 45.68 per cent) contributed in the income level questions as shown in Figure 5.6 below.

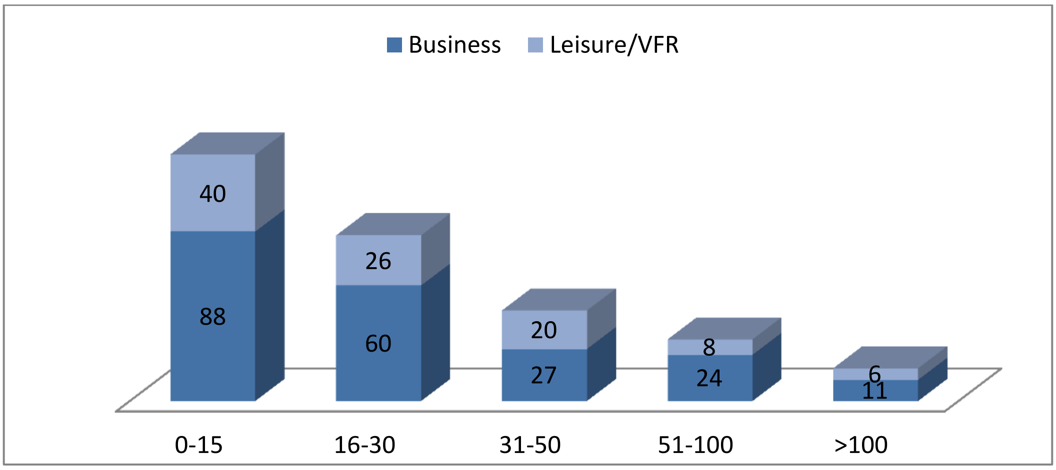

Figure 5.6 Pax Annual Income level; Source: Field survey (2011)

The analysis indicated that passengers earning from 0 to $15,000 per annum constituted 41.3 per cent (128 passengers). This was followed by 86 passengers earning from $16,000 to $30,000, representing 27.7 per cent; while passengers earning from $31,000 to $50,000 were 47 in number, representing 15.2 per cent. Also, higher income earners (above $50,000 but less than $100,000) were just 32 in number, representing 10.3 per cent; while highest income earners (above $100,000 per annum) comprised just 17 passengers only (5.5 per cent). This shows that a substantial proportion of the passengers (70 per cent) earn below $30,000 per annum. But for most business travellers, travel demand is not much affected by relative low incomes, because the travel expenses are usually paid by his employer (Doganis, 2010).

Table 5.11 Descriptive statistics of passengers income level in $ (000)

Stat Value	Leisure	Business	All Passengers
Mean	32.18	31.48	31.72
Median	21.77	20.25	20.71
Mode	11.11	11.37	11.29
Range	100.00	100.00	100.00
Variance	1247.58	1213.15	1224.36
Std Deviation	35.32	34.83	34.99

The distribution of the income data shows a skewed curve towards the left (0.998) with a mean distribution of $31,720 for all passengers. The mean income for leisure travellers was a bit higher than the mean of business travellers. There was a slight difference in the median of each group from the total, but the mode of the distribution was almost the same for each group. Hence, the average income of the Nigerian international traveller was $31,720 per annum. This is higher than the average GDP per capita of $2,200 estimated for 2007–11 by the World Bank. The huge disparity is as expected because, out of a population of 152 million from the 2006 census, only about 3 million people used international air travel in the year 2010, which is presumed to have higher income than the average of the country.

The relationship between liberalisation and passengers' income is that income enables passengers to afford tickets(Moselle, et al., 2002). Hence, all things being equal, a more liberal policy leads to a reduction in air fares which enables passengers to afford more tickets from their income, most especially leisure travellers and some business travellers, such as travellers for religious purposes, medical research and education.

Table 5.12 Nationality and Annual income of passengers

		Passenger Annual income						Total
		$0-$15,000	$16,000-$30,000	$31,000-$50,000	$51,000-$100,000	$101,-$150,000	Above $150,000	
Passengers nationality	American	0	1	1	6	0	1	9
	Asian	3	1	1	0	0	0	5
	British	2	0	3	3	2	1	11
	C/African	1	0	0	0	0	0	1
	Caribbean	0	1	0	0	0	0	1
	E/African	2	1	0	0	0	0	3
	European	1	1	0	1	2	0	5
	Nigeria	77	61	31	14	4	0	187
	S/African	9	2	1	1	0	0	13
	W/African	8	2	1	1	0	0	12
Total		103	70	38	26	8	2	247

Source: Field survey (2011)

The major setback of the income analysis is the number of respondents of 247 which is less than the minimum sample size required of 384; consequently, it will be difficult to generalize the findings on income to the general population.

5.11 Frequency of the Trip

The various categories of response on the number of international flights made in the last three years is summarized and presented in Figure 5.7 below.

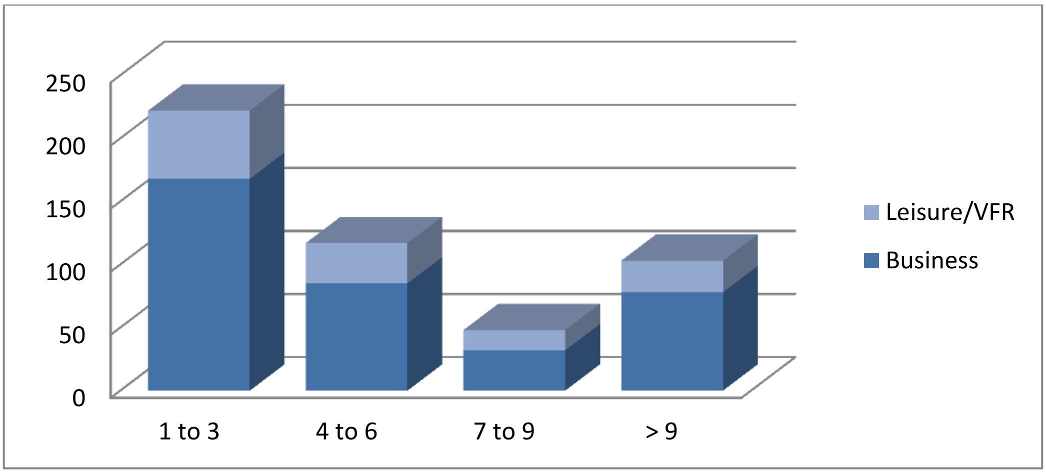

Figure 5.7 Frequency of flights; Source: Field survey (2011)

The number of trips made by passengers in the last three years indicated that 221 of them made 1–3 trips or an average of 2 trips in 3 years, which constituted 45.3 per cent of the total distribution. This was followed by 104 travellers that had made 4–6 trips in the last three years which corresponds to 23.9 per cent of the passengers; while the passengers that made 7–9 trips in three years were 43 in number, representing 9.8 per cent. The last group is for the most frequent travellers that made more than nine trips in the last three years with 98 respondents representing 21.02 per cent.

Meanwhile, the frequency of travel by nationality of passengers shows that all nationalities have frequent travellers as well as non-frequent travellers as shown in Table 5.13.

Table 5.13 Passengers' nationality against frequency of trip

		Frequency of trips in 3 yrs											Total
		1	2	3	4	5	6	7	8	9	10		
Passengers nationality	American	0	1	0	0	5	0	0	1	0	3		10
	Asian	0	4	0	1	6	0	0	0	0	5		16
	British	0	1	0	3	0	0	0	3	0	4		11
	C/African	0	9	0	0	2	0	0	1	0	0		12
	Caribbean	0	0	0	0	1	0	0	0	0	0		1
	E/African	0	2	0	0	0	0	0	0	0	0		2
	European	0	1	0	0	3	0	0	0	0	4		8
	Mid/ East	0	1	0	0	3	0	0	3	0	4		11
	Nigerian	5	113	15	9	42	9	3	21	1	59		278
	S/African	0	22	0	0	2	0	0	4	0	1		29
	W/African	0	46	1	3	14	1	0	6	0	18		89
Total		5	200	16	16	78	10	3	39	1	98		467

Source: Field survey (2011)

Therefore, the distribution had a mixed group of nationalities, with less frequent travellers (1-3 trips) constituting about 47.5 percent, while more frequent travellers with more than 1 trip per annum (4 and above) making up 52.5 percent. Also, in all the categories there were both leisure and business travellers.

Table 5.14 Descriptive statistics of passengers' flight frequency

Stat Value	**Leisure**	**Business**	**All Passengers**	
Mean	5.1	4.9	5	
Std Deviation	3.99	3.21	3.19	

From Table 5.14 above it can be seen that leisure travellers slightly travel more than business travellers, but the combined passengers mean was five trips per 3 years. This was supported by the value of standard deviation of 3.19 which was less than the mean value.

Therefore, more liberalised policy has a tendency to encourage more flight frequencies and additional airports for departure/landing as evident in the ASA (see section 5.2 above). Hence, this could provide a boost to the needs of business travellers whose concerns were convenient schedules and flight availability.

Also, as other studies have shown, air liberalisation causes a drop in air fares, as is evident in the European market (Moselle, et al., 2002) Also, it is a known fact that leisure travellers are very sensitive to price, hence, the air fare reduction will encourage leisure travellers in the market to travel more and increase the frequency of flights, on the assumption that all things (such as income) remain equal.

5.12 International Traffic

5.12.1 Routes

The journey profile of the passengers randomly selected in the survey indicates the routes, airlines, departure airports, and destination of the passengers. In this regard, only 490 passengers disclosed their journey profile out of a total of 502 passengers.

The traffic routes specify the airline route from Nigeria to the country of first arrival which can be the final destination (for direct traffic) or transit airport (for indirect traffic). At the time of the survey, there were a total of 36 international routes for direct traffic to and from the four international airports in Nigeria.

Table 5.15 Traffic routes

	Frequency	Percent	Valid Percent	Cumulative Percent
N/A	5	1.0	1.0	1.0
Abidjan	3	0.6	0.6	1.6
Accra	33	6.6	6.6	8.2
Addis Ababa	51	11.0	9.8	17.9
Amsterdam	37	7.4	7.4	25.3
Cairo	15	2.8	2.8	28.1
Cameron	35	7.0	7.0	35.1
Congo	4	0.8	0.8	35.7
Cotonou	4	0.8	0.8	36.5
Doha	18	3.6	3.6	40.0
Dubai	44	8.8	8.8	48.8
Frankfurt	18	3.6	3.6	52.4
Gambia	4	0.8	0.8	53.2
Jeddah	26	5.2	5.2	58.6
Lebanon	17	3.4	3.4	62.0
Liberia	1	0.2	0.2	62.2
London	74	14.7	14.7	76.9
Nairobi	76	15.1	15.1	92.0
Paris	3	0.6	0.6	92.6
S/Africa	3	0.6	0.6	93.2
Senegal	3	0.6	0.6	93.8
Spain	2	0.4	0.4	94.2
Togo	3	0.6	0.6	94.8
Turkey	8	1.6	1.6	96.4
USA	18	3.6	3.6	100.0
Total	502	100.0	100.0	

Source: Field survey (2011)

The random selection of passengers from each route is unevenly distributed which nearly reflects the market outlook, although the time of the survey affected the selection of routes because each airline has different schedule times. Hence, the selection of a high number of passengers on the Nairobi route was influenced by a concurrence of survey time and the schedule of the passengers travelling via that route. Meanwhile, other routes such as London, Dubai, Amsterdam, Addis Ababa, Accra and USA used to have a significant proportion of market passengers based on the secondary data for 2010 (NCAA, 2011). The choice of route by passenger is highly influenced by the choice of airline and the final destination.

5.12.2 Direct and Indirect Traffic

The research also found that the passengers were divided into two groups by the nature of their journey: while some passengers travel directly from a Nigerian airport to their final destination airport, other passengers travel via another country’s airport, as transit, before connecting to another flight to their destination.

Table 5.16 provides a summary of the frequency of the number of passengers on direct traffic routes against passengers travelling via transit.

Table 5.16 Direct or Indirect traffic

		Frequency	Percent	Valid Percent	Cumulative Percent
	N/A	6	1.2	1.2	1.2
	Direct	269	53.6	53.6	54.8
	Indirect	227	45.2	45.2	100.0
	Total	502	100.0	100.0	

Source: Field survey (2011)

The Table 5.16 shows the structure of the international market in the country, with 269 passengers representing 53.6 per cent of direct traffic, while 227 passengers, equivalent of 45.2 per cent, were travelling via a connecting flight to another final destination, and six passengers did not provide any information about the nature of the travel.

5.12.3 The Choice of Airline

The patterns of the choice of airline mostly reflect the choice of routes, as shown in Table 5.17 below. This is due to the constraints of some ASAs where foreign airlines departing from Nigeria have to connect to their country first, except in the case of the fifth freedom being allowed in the agreement. Also, even for those carriers with fifth freedom right, the hub and spoke strategy makes them conveniently manage the traffic in this type of pattern (Doganis, 2010).

Table 5.17 Airline used

Airline	Frequency	Percent	Valid Percent	Cumulative Percent
N/A	4	0.8	0.8	0.8
Air France	3	0.6	0.6	1.4
Air Nig	26	5.2	5.2	6.6
Arik	70	13.9	13.9	20.5
Asky	42	8.4	8.4	28.9
BA	6	1.2	1.2	30.1
Delta	17	3.4	3.4	33.5
Egypt	15	3.0	3.0	36.5
Emirate	44	8.8	8.8	45.2
Ethiopia	51	10.2	10.2	55.4
Iberia	2	0.4	0.4	55.8
Kenya Air	76	15.2	15.9	71.7
KLM	37	7.4	7.4	79.1
Lufthansa	18	3.6	3.6	82.7
Max	26	4.8	4.8	87.5
MEA	17	3.4	3.4	90.8
Qatar Air	18	3.6	3.6	94.4
SAA	3	0.6	0.6	95.0
Turkish	8	1.6	1.6	96.6
United A	1	0.2	0.2	96.8
Vig Atlatic	10	2.0	2.0	98.8
Vig Nig	6	1.2	1.2	100.0
Total	502	100.0	100.0	

Source: Field survey (2011)

Table 5.17 shows that from the total of 21 airlines used by the passengers in the survey only four were Nigerian indigenous carriers namely, Arik, Air Nig, Virgin Nig and Max Air with a combine passenger market share of 25.1%. The rest of about 74% of passengers were handled by foreign registered carriers. This shows that foreign carriers dominated the market as found in the secondary source in Table 4.5.

In addition, airline passengers were examined according to the nature of the travel, and it was discovered that many airlines have more transit passengers than direct travellers. According to Table 5.18, Ethiopian Airlines, Kenya Airways, KLM, Lufthansa, Qatar Airways, and Turkish Air have more transit passengers than direct travellers to their hub, which confirms the travel pattern discovered in the secondary data. The traffic demand of these airlines was mostly influenced by the liberal ASAs which permitted them to lift indirect traffic passengers, while other factors such as GDP, trade and cultural links have more influence on the direct traffic. This is further confirmed by the nature of other airlines with a higher number of direct travellers above the transiting travellers such as BA, Delta, Emirates, SAA and Virgin Atlantic. These airlines' home countries have significant traffic demand to/from Nigeria due not only to some form of liberal ASAs but also to the influence of other factors such GDP, trade, and cultural links.

Table 5.18 Airline used against traffic type

		Traffic type			Total
		NA	Direct	Indirect	
Airline used	N/A	4	0	0	4
	Air France	0	2	1	3
	Air Nigeria	0	26	0	26
	Arik	0	68	2	70
	Asky	0	35	7	42
	BA	0	5	1	6
	Delta	0	17	0	17
	Egypt	0	8	7	15
	Emirates	1	25	18	44
	Ethiopia	0	7	44	51
	Iberia	0	2	0	2
	Kenya Air	1	6	73	80
	KLM	0	1	36	37
	Lufthansa	0	4	14	18
	Max	0	24	0	24
	MEA	0	17	0	17
	Qatar Air	0	0	18	18
	SAA	0	3	0	3
	Turkish	0	2	6	8
	United Airlines	0	1	0	1
	Virgin Atlantic	0	10	0	10
	Virgin Nigeria	0	6	0	6
Total		6	269	227	502

Source: Field survey (2011)

Further analysis of the market shows the patronage of the airlines by various nationalities as shown in Table 5.19 below. The nationality of various airline passengers came from different countries as expected, while Nigerian were found among each airline (except in MEA) due to the dominance of the Nigerians in the market. In some cases, the nationality of the passenger has an influence in the choice of home carriers, as found in the MEA and Kenyan Airways passengers. Meanwhile, it is observed that the network carriers have patronage from all other nationals which might be due to accessibility, competition and airline alliance facilitated by liberalisation. For instance, the British nationals travelled with KLM, Arik, Virgin Atlantic and Kenyan Airways.

Table 5.19 Airline used against passengers' nationality

		Passengers nationality											Total
		US	OA	Br	CA	Cr	EA	EU	M E	Nig	SA	WA	
Airline used		0	0	0	0	0	1	0	0	3	0	0	4
	Air France	0	0	0	0	0	0	0	0	3	0	0	3
	Air Nig	0	0	0	0	0	2	0	0	13	0	11	26
	Arik	0	0	4	0	1	0	1	0	62	0	2	70
	Asky	0	0	0	9	0	0	0	0	6	0	27	42
	BA	0	0	0	0	0	0	0	0	5	0	1	6
	Delta	5	0	0	0	0	0	0	0	12	0	0	17
	Egypt	0	1	0	1	0	0	0	1	11	0	1	15
	Emirate	0	5	0	0	0	0	0	0	36	0	3	44
	Ethiopia	0	6	0	1	0	0	0	0	38	0	6	51
	Iberia	0	0	0	0	0	0	0	0	2	0	0	2
	Kenya	0	1	1	1	0	1	1	0	24	34	17	80
	KLM	1	0	4	0	0	0	4	0	28	0	0	37
	Lufthansa	4	0	1	0	0	0	2	0	11	0	0	18
	Max	0	0	0	0	0	0	0	0	4	0	20	24
	MEA	0	0	0	0	0	0	0	10	0	0	7	17
	Qatar Air	0	1	0	0	0	0	0	0	17	0	0	18
	SAA	0	0	0	0	0	0	0	0	3	0	0	3
	Turkish	0	0	0	0	0	0	0	0	8	0	0	8
	United	0	0	0	0	0	0	0	0	1	0	0	1
	Virg Atl	0	0	1	0	0	0	0	0	8	0	1	10
	Virg Nig	0	2	0	0	0	0	0	0	3	0	1	6
Total		10	16	11	12	1	4	8	11	298	34	97	502

Source: Field survey (2011)[US-American; OA-other Asians; Br-British, CA=central African; Cr-Caribbean; EA-East African; EU-other European; ME-Middle East; Nig-Nigerian; SA-South African; WA-West African]

It was also observed that convenience (flight time and cost) may have influenced some nationals in the choice of airline as the case of other Asian that chose mostly Emirate and Ethiopia Airways. Similarly, about 75% of other European nationals flew with KLM and Lufthansa. It also, emerges that all of the American nationals flew by US carriers and European carriers. Therefore, it shows that Nigerian travellers have the opportunity to travel by any international network carriers of their choice due to availability, carriers' network and convenience facilitated by liberalisation policy.

5.12.4 Final Destination of the Passengers

The number of final destinations was recorded as 53 countries from the 24 routes and carried by 21 airlines. The research discovered the final destinations of the passengers which show the following distribution frequency.

Table 5.20 Passengers' final destination

	Frequency	Percent	Valid Percent	Cumulative Percent
N/A	6	1.2	1.2	1.2
Abidjan	3	0.6	0.6	1.8
Addis Ababa	5	1.0	1.0	2.8
Amsterdam	2	0.4	0.4	3.2
Barbados	1	0.2	0.2	3.4
Botswana	25	5.0	5.0	8.4
Burundi	3	0.6	0.6	9.0
Cairo	2	0.4	0.4	9.4
Cameron	29	5.8	5.8	15.1
Canada	2	0.4	0.4	15.5
China	27	5.4	5.4	20.9
Congo	10	2.0	2.0	22.9
Cotonou	3	0.6	0.6	23.5
Denmark	2	0.4	0.4	23.9
Dubai	51	10.2	10.2	34.1
Egypt	5	1.0	1.0	35.1
Frankfurt	4	0.8	0.8	35.9
Gabon	7	1.4	1.4	37.1
Gambia	4	0.8	0.8	37.8
Ghana	33	6.6	6.6	44.6
Guinea	1	0.2	0.2	44.8
Hong Kong	5	1.0	1.0	45.8
India	13	2.6	2.6	48.4
Ireland	1	0.2	0.2	48.6
Italy	4	0.8	0.8	49.4
Kenya	7	1.4	1.4	50.8
Korea	2	0.4	0.4	51.2
Lebanon	18	3.6	3.6	54.8
Liberia	1	0.2	0.2	55.0
London	93	18.5	18.5	73.5
Malaysia	3	0.6	0.6	74.1
Manchester	1	0.2	0.2	74.3
Mozambique	1	0.2	0.2	74.5
Norway	1	0.2	0.2	74.7
Pakistan	2	0.4	0.4	75.1
Paris	2	0.4	0.4	75.5
Poland	1	0.2	0.2	75.7
Russia	1	0.2	0.2	75.9
S/Africa	7	1.4	1.4	77.3
S/Arabia	49	9.8	9.8	87.1
Scotland	3	0.6	0.6	87.6
Senegal	3	0.6	0.6	88.2
Singapore	1	0.2	0.2	88.4
Spain	2	0.4	0.4	88.8
Swiss land	2	0.4	0.4	89.2
Syria	1	0.2	0.2	89.4
Thailand	1	0.2	0.2	89.6
Togo	3	0.6	0.6	90.2
Turkey	3	0.6	0.6	90.8
Uganda	2	0.4	0.4	91.2
Ukraine	3	0.6	0.6	91.8
USA	39	7.8	7.8	99.6
Zambia	1	0.2	0.2	99.8
Zimbabwe	1	0.2	0.2	100.0
Total	502	100.0	100.0	

Source: Field survey (2011)

The final destination of the passengers shows that substantial numbers of them were travelling to other destinations than the designated routes' destination, which suggested that the passengers were in transit.

The routes with a higher number of transit passengers than direct passengers include Nigeria–Qatar, Nigeria–Ethiopia, Nigeria–Kenya, Nigeria–Netherlands, Nigeria–France, Nigeria–Germany and Nigeria–Turkey.

The nature of the distribution of the passengers confirmed the secondary data pattern collected from IATA and the NCAA, which suggests significant passengers travel in transit to countries without direct traffic links to Nigeria such as India, China, Malaysia and others (shown in Tables 5.20 and 5.21)

Meanwhile, with cross-tabulation the research explores the relationship between the airlines, the routes and the final destination as shown in the summary table below, while a full cross-tabulation is shown in the Appendix 8.

Table 5.21 Passengers distributions-routes, airlines, airports and destinations

Route	Depart Airports	Airlines	Passengers	Final Destinations
Nig – UK	ABV, LOS	Arik, BA, Virgin	74	EU, NA
Nig – Netherland	ABV, LOS	KLM	37	EU, NA
Nig – Ghana	LOS	Arik, Air Nig	33	Ghana
Nig – S/Arabia	LOS	Max Air	26	Saudi Arabia
Nig – Germany	ABV, LOS	Lufthansa	18	EU, NA
Nig – UAE	LOS	Emirates	44	ME, ASIA, PC
Nig – Ethiopia	ABV, LOS	Ethiopian Air	51	Africa, ME, Asia
Nig – Congo	LOS	AskyA	3	Africa
Nig – Kenya	LOS	Kenya Air	76	Africa, ME, Asia
Nig – Cameroun	LOS	Air Nigeria	35	Africa
Nig – Qatar	LOS	Qatar airways	18	ME, ASIA, PC
Nig – USA	ABV, LOS	Delta Air	18	NA, SA
Nig – Egypt	LOS	Egypt Air	15	Africa, ME, Asia
Nig – Turkey	LOS	Turkish Airline	8	EU, NA
Nig – France	LOS	Air France	3	EU, NA
Nig – Spain	LOS	Iberia	2	EU, SA
Nig – S/Africa	LOS	SAA, Arik	3	Africa, Asia, Pc
Nig – Côte d'Ivoire	LOS	Arik, Ethiopia	3	W Africa
Nig – Senegal	LOS	Arik	3	W Africa
Nig – Togo	LOS	AskyA	3	W Africa
Nig – Gambia	LOS	Arik	4	W Africa
Nig – Cotonou	LOS	AskyA	4	W Africa
Nig – Liberia	LOS	Air Nigeria	1	W Africa

Source: Field survey (2011); [Key: ABV= Abuja International Airport; LOS= Lagos International Airport; EU= European countries; NA= North American; ME=Middle East countries; ASIA= Indian & Far East Asian countries: SA= South America; PC= Asian pacific; Africa= other African countries]

Table 5.21 shows 23 routes which represent 67 per cent of the total routes in the market at the time of survey. The routes were similar to the 2010 market routes provided by NCAA as in Table 4.5. Therefore, this substantiates the origins and destinations of the traffic route data provided from the secondary source.

Also, the Table 5.21 shows that 74 passengers were selected on the Nigeria–UK route both from Abuja airport and Lagos airport. The passengers were also travelling using all three carriers on the route: Arik Air (58 passengers), Virgin Atlantic Airline (10 passengers) and BA (6 passengers). The final destinations of the route passengers were various cities in Europe (EU) and North America (NA), including cities in Europe where direct traffic from other airlines exists such as Paris. Also, further analysis of passenger's final destination, as depicted in Table 5.21, indicated that the total number of passengers travelling to the UK was greater than the direct route traffic in Table 5.18, which suggests that there were other passengers from indirect traffic airlines such as KLM, Lufthansa and Turkish airlines. Therefore, this corroborates the analysis of secondary data in Chapter Five, which discovered the web of competition by European network carriers in the Nigerian market. Also, another interpretation suggests some characteristics of business travellers concerned about flight availability and reservations in respect of convenience; and furthermore, there was the possibility of leisure travellers' concern about cheap flights in respect of the inconvenience of stopovers.

In addition, the 37 passengers chosen on the Nigeria–Netherlands route from both airports, Abuja and Lagos, used the only carrier on the route, KLM. However, for the final destination of the Netherlands, there were only three passengers staying in the country, which implies that the other 34 passengers were on transit to other European cities including those in the UK, and some of them had destinations in the USA.

Moreover, the routes to Germany, Turkey, France and Spain, with 18, 8, 3, and 2 passengers respectively had a single carrier on each route and operated by their countries' national carrier. These routes had a similarity with the Netherlands route in terms of traffic destination countries in Europe and North America. In addition, Iberia Airlines on the Spain route carried passengers destined for South American countries. Therefore, this also confirms the competition among carriers on the European routes.

Meanwhile, passengers travelling to Middle East (ME), Asian and Pacific (PC) countries from the survey were observed to follow the Dubai route, the Qatar route, the Turkey route and the Kenya and Ethiopia route. That suggests the airlines on these route were also in competition as noticed in section 6.5. Moreover, substantial numbers of passengers on these routes were in transit to other countries such as China, India, Malaysia, Hong Kong, S/Korea and Singapore; for instance, Qatar Airways had 18 passengers, but none of them had Qatar as their final destination.

The survey also discovered the passengers travelling on some of the African carriers, namely Kenya Airways, Ethiopia Airlines, Egypt Air and South African Airways were destined for other African, Asian and Middle East countries. This was evident from 76 Kenya airline passengers where 32 of them were travelling to Botswana, two to the UK and five to Saudi Arabia. Also 51 of the passengers on Ethiopia Airlines were on transit to China, Dubai, India and other African countries.

The survey found that the route to West African countries such as Ghana, Senegal and Côte d'Ivoire had mainly Nigerian carriers, namely Arik and Air Nigeria. Some of the passengers on the route were in transit for connection with other network carriers at Lagos Airport which provides a hub for West African travellers.

5.13 Rationale for Choosing Carrier

Closely related with the pattern of routes is the choice of airlines, where passengers selected airlines based on the availability of the flights on the routes. But, as discovered in the survey, most of the routes had only one carrier operating which suggests market monopoly. However, modern airline business and liberalisation policies facilitated competition on the route networks in respect of direct or indirect traffic by network carriers. As a result, passengers have a choice of carriers for most of their journeys.

The decision by passengers to choose a particular carrier was based on individual priority (in terms of time and cost) as well the quality of airline services offered. However, the research sought the three top passenger priorities from seven identified common rationales needed by travellers, namely: air fare; schedule (airport, timing, frequency, and punctuality); convenience (reservation, capacity, seat availability); safety reputation; frequent flyer programme; promotion/advertisements; comfort (aircraft type, meals, entertainment). The frequency output of passengers' first priority is depicted below in Table 5.22.

Table 5.22 First reason for chosen a carrier

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	225	44.8	44.8	44.8
	Brand name	5	1.0	1.0	45.8
	Convenience	27	5.4	5.4	51.2
	Comfort	4	.8	.8	52.0
	Fare	153	30.5	30.5	82.5
	FFP	10	2.0	2.0	84.5
	Promotion	5	1.0	1.0	85.5
	Safety	18	3.6	3.6	89.0
	Schedule	55	11.0	11.0	100.0
	Total	502	100.0	100.0	

Source: Field Survey (2011)

Table 5.22 shows that 225 passengers did not indicate their first priority for reason known to them, while 153 passengers, representing 30.5 per cent of the sample, agreed with air fare as their main concern in selecting a carrier for the journey. Moreover, 55 passengers indicated airline schedules as their top most priority, and 27 passengers gave convenience as their main interest. Also, 18 passengers chose safety and ten chose frequent flyer programme, while airline promotion and brand name attracted five passengers each, and comfort was first priority for only four passengers.

After the choice of first priority, passengers also made a choice of the second factors influencing patronage of the airline after the first priority, as shown in Table 5.23 below.

Table 5.23 Second reasons for chosen a carrier

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	N/A	271	54.0	54.0	54.0
	Brand name	7	1.4	1.4	55.4
	Convenience	69	13.7	13.7	69.1
	Comfort	12	2.4	2.4	71.5
	Fare	23	4.6	4.6	76.1
	FFP	10	2.0	2.0	78.1
	Promotion	4	0.8	0.8	78.9
	safety	47	9.4	9.4	88.2
	Schedule	59	11.8	11.8	100.0
	Total	502	100.0	100.0	

Source: Field Survey (2011)

Table 5.23 shows that 13.7 per cent of the sample accepted flight convenience as the second priority for selecting a carrier. This was followed by 59 passengers (11.8 per cent) deciding for airline schedule, while safety concern was decided by 47 passengers (9.4 per cent). However, 271 passengers representing 54 per cent did not decide their second priority.

The third priority of the passengers among these factors is shown in Table 5.24.

Table 5.24 Third reason for chosen a carrier

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	290	57.8	57.8	57.8
	Brand name	13	2.6	2.6	60.4
	Convenience	42	8.4	8.4	68.7
	Comfort	47	9.4	9.4	78.1
	Fare	22	4.4	4.4	82.5
	FFP	17	3.4	3.4	85.9
	Promotion	9	1.8	1.8	87.6
	Safety	42	8.4	8.4	96.0
	Schedule	20	4.0	4.0	100.0
	Total	502	100.0	100.0	

Source: Field Survey (2011)

In the selection of third priority for considering a carrier for the journey, comfort came on top with 9.4 per cent, followed by convenience and safety with 8.4 per cent each. However, the number of passengers not having third priority was 57.8 per cent, which is higher than the number without first and second priority. This suggests the possibility that many passengers only consider one or two topmost priorities. Also, the priority for the comfort option as the leading third priority, while the same option is the least considered factor in the first priority suggests an inverse relationship that is difficult to explain for the study. However, other factors such as air fare, schedule, convenience and safety show consistent trends in priority selection by the passengers.

However, in order to evaluate the eight rationales based on the priority order, the research ranked them using three Likert scale decisions where first priority is given 3 points, the second priority is given 2 points and the third priority is scored 1 point. The research compared the tables, aggregated the score for each rationale, and ranked them based on total score as shown in Table 5.25 below.

Table 5.25 Aggregate weights for each rationale

		First priority X (3 score)	2nd priority X (2 score)	3rd Priority X (1 score)	Cumulative Weight
Valid	Brand name	5 (3)	7(2)	13 (1)	42
	Convenience	27(3)	69(2)	42(1)	261
	Comfort	4(3)	12(2)	47(1)	83
	Fare	153(3)	23(2)	22(1)	527
	FFP	10(3)	10(2)	17(1)	67
	Promotion	5(3)	4(2)	9(1)	32
	Safety	18(3)	47(2)	42(1)	190
	Schedule	55(3)	59(2)	20(1)	303

Source: Field survey (2011)

Air fare was rated topmost priority with a total weight score of 527; this was followed by schedule (airport, timing and frequency) with a score of 303, while flight convenience (reservation, capacity, and available seat) came third with 261. The fourth position with a score of 190 was safety, followed by comfort with 83 average score. Also, frequent flyer programme (FFP) of various airlines occupied sixth position with a score of 67, while brand name of the airline was in seventh position with 42 aggregate weight score, and lastly, promotion and advertisement occupied the lowest rated rationale with a score of 57. The result may be due to the high percentage of business travellers in the market, the level of income, and profession of the passengers, as well as airline competition. One interpretation of high priority for air fare is that it is the common need of all passengers. For instance, business travellers will go for the best price deal if there are alternative airline schedules for their trip, which means it is the second criteria for business travellers; while, leisure travellers' priority is the best deal to their destination from the available airline.

Also, the high score for schedule and convenience is justified because it is a very sensitive demand for business travellers that dominate the market. But the average score for safety may not be surprising because airline safety has recently become homogenous and standardized and, as such, travellers regard all airlines in terms of safety with little difference.

However, a low score for comfort, regarded as a need of leisure travellers, was due to the proportion of leisure travellers among the passengers.

Promotion and advertisements could only entice passengers into the market if the airline was to offer unique incentives such as fares different from others. Therefore, a possible interpretation is that there may have been airlines in the market at the time that did not offer any adequate incentives to customers, or even if there were incentives, the message had not reached the potential customers.

The score for FFP in the market may be connected with the reasonable number of frequent travellers in the market, the research having discovered that passengers in the market made an average of five trips in three years, which was enough to qualify them for any airline FFP. However, the low score of FFP may be attributed to lack of commitment or awareness of the programme by the passengers in the market despite the average of 5 trips in three years.

However, a significant proportion of the respondents, at least 225 representing 44% of the sample did not specify any of the priority, may be none of the seven factors listed meet their concern when selecting a carrier.

5.14 Analysis of the Hypotheses

A nonparametric test was conducted to test the null hypothesis using one sample chi square test across all the variables. In this case, all the variables involved are measured and relationships are examined as shown in Table 5.26 below. The probability of obtaining such a relationship if there were no relationship in the population means the null hypothesis would be true.

Table 5.26 Hypothesis testing of the variables

	Null Hypothesis	Test	Sig.	Decision
1	The categories of Passenger nationality occur with equal probabilities	One-Sample, Chi-Square Test	.000	Reject the null hypothesis
2	The categories of Country of Residence occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
3	The categories of Passenger profession occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
4	The categories of Passenger position occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
5	The categories of Departing Airport occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
6	The categories of Final destination country occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
7	The categories of Via occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
8	The categories of Direct or Indirect traffic occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
9	The categories of Airline used occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
10	The categories of Journey purpose occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
11	The categories of First Reason for selecting carrier occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
12	The categories of Second Reason for selection occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
13	The categories of Third Reason occur with equal probabilities	One-Sample Chi-Square Test	.000	Reject the null hypothesis
14	The distribution of Passenger age is normal with mean 3.099 and Standard deviation 0.889.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis
15	The distribution of Passenger annual income is normal with mean 2.077 and standard deviation 1.189.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis
16	The distribution of Frequency of trip in 3 yrs is normal with mean 4.942 and standard deviation 3.273.	One-Sample, Kolmogorov-Smirnov Test	.000	Reject the null hypothesis

Table 5.26 shows that for the hypothesis in the first variable we reject the null hypothesis which assumed that the categories of the passenger's nationality occurred with equal probability at significance value ($p < 0.005$). Similarly, the null hypothesis of the passenger's nationality occurring at equal probability is rejected at significance value ($p<0.005$). Also, the null hypothesis that assumed all the various variables occurred with equal probability at significance value ($p < 0.005$) is rejected.

Table 5.27 Summary of descriptive statistics of the nominal variables

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Passenger age	497	3.10	0.889	0.359	0.110	-.156	0.219
Passenger annual income	247	2.08	1.189	0.993	0.155	.260	0.309
Frequency of trip in 3 yrs	467	4.94	3.273	0.685	0.113	-.684	0.225
Valid N (list wise)	230						

The other three nominal variables were tested with one sample using a Kolmogorov-Smirnov test, which also corroborated skewness and kurtosis values as in Table 5.27 above. In this regard, the distribution of passenger's age is normal with mean value of 3.099 and standard deviation of 0.889 at significance level as depicted by Table 5.27. Hence, there is no evidence to reject the claims that the sample population is normally distributed. Similarly, the distribution of passenger's annual income is normal with a mean value of 2.0777 and standard deviation of 1.189; consequently, the null hypothesis is rejected. Also, the passenger's frequency of travel in three years is normally distributed with mean value of 4.942 and standard deviation of 3.274, thus; as a result, the null hypothesis is rejected.

5.15 Summary of the Chapter

The chapter has presented and analysed the primary data collected for the research, with the aim of determining the socio-economic characteristics of passengers in Nigerian international air transport markets. Also, the primary data validate and complement certain information missing in the secondary data namely; passenger profile, journey purpose, and a rationale for selecting carriers. Accordingly, the chapter analysed the data using descriptive and bivariate analysis.

The analysis of the passenger survey strengthened the findings of the secondary data analysis such as competition among the carriers, routes and destinations. But the key discoveries in the analysis include the ratio of business travellers to that of leisure travellers, found to be 3 to 1, while Nigerian travellers constituted about 63 per cent of the passenger market.

Furthermore, the survey revealed that more than half of the passengers were civil servants and business entrepreneurs of which a substantial number were in top management positions. The average annual income of passengers was evaluated at $31,720, and the mean number of trips by passengers in the market was five trips over three years (2009-11). The survey also found that competition provided the passengers with different options for most of their flights, of which passengers made a choice based on three top priorities: air fare, flight convenience and schedule. The data were validated with appropriate statistical tests at the 95 per cent significance level which suggests that the analysis' conclusion is also valid.

Chapter Six: Analysis of Liberalisation Impacts

6.1 Introduction

This chapter estimates the impact of liberalisation in Nigeria's international air traffic by developing an empirical model that explains the relationship between the dependent variable (traffic demand) and the independent variables including liberalisation, using multiple regression techniques as described in Chapter 3. The chapter analysis is aimed at achieving the fourth and fifth objectives of the research which include determining the impacts of liberalisation on traffic demand and passenger welfare in the market, and evaluating the impacts of further liberalizing market access and carrier ownership.

The impacts of liberalisation will be assessed by forecasting a change in traffic demand; as indicated in the literature review (Chapter 2), ASAs are said to stimulate the performance of traffic demand.

The first section calibrates the model of the research which also involves analysis using descriptive, correlation and ANOVA tests. In addition, all the output parameters of multiple regressions such as the coefficients of the model are interpreted and discussed, while the model undergoes appropriate statistical tests to ascertain its validity.

In the second section of the chapter, the research applies a gravity-type model to forecast future traffic demand and its impact when current regulations are further liberalised in the Nigerian international air market. Estimated future traffic is determined for the top 20 country destinations. Furthermore, as a result of traffic changes in the market, other market variables would be affected. Therefore, the research estimates the likely impact of traffic change on the market average air fare as well as consumer savings or welfare. The expected traffic increases are examined against airport designed capacities so as to avoid imbalance between the demand and supply of critical infrastructure capacity.

6.2 Analysis of results and empirical model development

6.2.1 Calibration of the model

A cross-sectional analysis was carried out as the model is capable of expressing a relationship between traffic, the level of liberalisation and the socio-economic conditions between a country-pair within a specific period of time (InterVISTAS-ga2, 2006). The database of variables comprises: passenger traffic volume, aggregate GDP ($), international trade (export and import values in $), level of liberalisation index, average air fares ($), distance (km), and a dummy variable (as a proxy for common language/cultural relations).

The observations are from a sample of 137 countries representing over 95 per cent of international traffic to/from Nigeria in 2010. In multiple regression analysis, a larger sample enhances reliability especially where it involves several independent variables like this case. In this regard, Hair, Anderson, Tatham, and Black (1998) suggested that sample size ratio to number of independent variables should be at least 10 – 15, while Field (2009) recommended that for five predictor variables there should be at least 109 observations in a sample for reliability. Therefore, in this case the sample size of 137 countries should be reliable for the analysis.

The research employs multiple regressions on Ordinary Least Square (OLS) with the aid of SPSS. The regression procedure used for the analysis is stepwise regression. Stepwise regression is a statistical method for selecting the most significant independent variables from any given set of variables, rejecting or excluding the variables that are not making any significant impact on the dependent variable (Draper & Smith, 1981). However, to verify the findings of stepwise, the analysis also employed the ‘enters’ method which confirms the findings. Enter method unlike stepwise, does not reject or exclude any variable that makes no significant impact, but rather analyse each variable according to its significance contribution.

In order to meet the assumptions of multiple linear regressions the data on passenger traffic, aggregate GDP, and trade had to be transformed to logarithms from their linear values. However, the final analysis excluded air fare as an independent variable from the model. This may not be unconnected to the high correlation between air fare and distance variable as shown in the correlation matrix Table 7.3. As certain theories suggest the two variables are highly correlated, using them together can cause multicollinearity concerns, and sometimes each one serves as a proxy to the others (Piermartini & Rousova 2008; Vasigh, Tacker, & Fleming, 2008). Therefore, it was decided to use a distance variable instead of air fare for the analysis, because it contributes statistically at a significant value as shown in the model parameter in Table 6.6 with a t stat value of –3.741 (p<.005), while air fare did not make a statistically significant contribution with a t value lying between –1.0 and 0.0 (p>.005). This suggests that the traffic demand was inelastic which was confirmed by the field survey. The output of the results is presented as follows:

6.2.2 Descriptive Statistics

The output of Table 6.1 and Table 6.2 indicates that the analysis made used only 112 out of the 137 countries, due to incomplete data for some countries for some of the variables. In this regard, only 112 countries have complete data on all the variables. The output shows the mean and the standard deviation of each variable.

Table 6.1 Descriptive Statistics of Real Values

	N	Minimum	Maximum (Million)	Mean (Million)	Std. Deviation(Million)
PaxTraffic	132	36	0.393	0.013	0.0413
Agg GDP($)	132	$2.0X10^{11}$	100000	656000	1500000
Trade ($)	112	2703	23400	742	24800
Valid N (list wise)	112				

Table 6.1 shows that average passenger traffic volume was 12,650 for each country-pair out of 132 countries used with a standard deviation of 41,255.63 due to the wide range of data from a maximum of 392,528 to a minimum of 36 passengers. Also, the mean and standard deviation of aggregate GDP and Trade ($) have a similar pattern to passenger traffic. However, these three variables were transformed in order to meet the assumption of multiple regressions for valid analysis which gives rise to other descriptive statistics of the variables used in the analysis as depicted in Table 6.2.

Table 6.2 Descriptive Statistics of the variable used

	Mean	Std. Deviation	N
LnPax	7.43102	2.142816	112
LnGDP	26.65531	.868196	112
LnTrade	17.10917	3.533296	112
Air Fare($)	874.37	483.820	112
Distance(KM)	7205.25	3986.131	112
Air Lib Index	4.21	8.898	112
Lang/Culture Link	.31	.464	112

Table 6.2 shows the average number of passengers in log form (LnPax) is 7.43102 with a standard deviation (SD) of 2.142816. Also, the mean aggregate GDP in log form is 26.65531 and Standard deviation is 0.868196. The liberalisation index has an average value of 4.21 with SD of 8.898 from the 112 countries' observations, while the average of Trade in log form is 17.10917 with SD of 3.533296.

6.2.3 Correlations Matrix

Table 6.3 indicates the value of the Pearson correlation coefficient (r) between each pair of variables. This tested the issue of the multicollinearity problem. Almost all the independent variables are not highly correlated, so there is no cause for multicollinearity concern. Field (2001) estimated that r coefficient greater than 0.7 is a concern. From the table, air fare and distance have the highest value of r=0.84 which may likely cause a multicollinearity problem if used together. This confirms the suggestion of many studies where distance was sometimes used as a proxy for air fare. Also, lnGDP and trade has a moderate correlation 0.602, likewise ALI and Distance with r =-.552. These moderate correlations have the potential for multicollinearity concern. Meanwhile, the other independent variables do not have a high value of r that can cause any concern. Most of the correlations are statistically significant ($p<0.05$) for the 112 countries' observations. Therefore, the variables have met one of the conditions of the multiple regressions.

Table 6.3 Correlations matrix

		lnPax	lnGDP	LnTrade	Air Fare($)	Distance(KM)	Air Lib Index	Lang/Culture Link
Pearson Correlation	lnPax	1.000	.552	.638	-.218	-.265	.567	.298
	lnGDP	.552	1.000	.602	.319	.282	.048	.007
	LnTrade	.638	.602	1.000	.067	.069	.180	.101
	Air Fare($)	-.218	.319	.067	1.000	.844	-.461	.029
	Distance(KM)	-.265	.282	.069	.844	1.000	-.552	.067
	Air Lib Index	.567	.048	.180	-.461	-.552	1.000	.162
	Lang/Culture Link	.298	.007	.101	.029	.067	.162	1.000
Sig. (1-tailed)	lnPax	.	.000	.000	.010	.002	.000	.001
	lnGDP	.000	.	.000	.000	.001	.309	.469
	LnTrade	.000	.000	.	.241	.236	.028	.146
	Air Fare($)	.010	.000	.241	.	.000	.000	.381
	Distance(KM)	.002	.001	.236	.000	.	.000	.242
	Air Lib Index	.000	.309	.028	.000	.000	.	.044
	Lang/Culture Link	.001	.469	.146	.381	.242	.044	.
N	lnPax	112	112	112	112	112	112	112
	lnGDP	112	112	112	112	112	112	112
	LnTrade	112	112	112	112	112	112	112
	Air Fare($)	112	112	112	112	112	112	112
	Distance(KM)	112	112	112	112	112	112	112
	Air Lib Index	112	112	112	112	112	112	112
	Lang/Culture Link	112	112	112	112	112	112	112

Table 6.3 shows that airfare and distance variables have a negative correlation with traffic demand while the other variables show a positive correlation with traffic demand as expected. However, the entire predictors variables are reasonably correlated with the dependent variable with Lntrade having the highest correlation (r=0.638) and air fare having the least value r= –0.218. This suggests that the predictors are related to the dependent variables and can be used to predict them with the appropriate model.

6.2.4 Overall Model Summary

The model summary in table 6.4 shows how the model is successful in predicting passenger traffic demand. A stepwise technique is used in formulating the best model.

In this regard, five different models are estimated. The forward stepwise increased the number of variables used in the model until the R^2 coefficient starts decreasing.

Table 6.4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.638[a]	.407	.401	1.66047
2	.793[b]	.629	.622	1.31873
3	.823[c]	.678	.669	1.23476
4	.851[d]	.725	.714	1.14695
5	.885[e]	.783	.772	1.02397

a. Predictors: (Constant), LnTrade
b. Predictors: (Constant), LnTrade, Air Lib Index
c. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP
d. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link
e. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)
f. Dependent Variable: lnPax

The first model selected the liberalisation index only as the predictor variable which was able to explain 63.8 per cent (R) of the model. The second model (2) added LnTrade index to the first model and was able to cause 79.3 per cent of the LnPax. These continue until the fifth model which is considered as the best overall model explaining 88.5 per cent (R) of the relationship after including all the possible predictors variables, with the exception of air fare. The rejection of air fare was automatically made by the stepwise approach which suggested that air fare has no statistical contribution to the dependent variable. This was also confirmed by another method, the entered approach, which gives the value of t-stat of air fare below 1.0 and $p > 0.05$, which justified the exclusion of the variable statistically.

The best model has a corresponding value of R^2 of 78.3 per cent, which measures the variability in the outcome accounted for by the predictors. That means GDP, trade, liberalisation index, air fare, and language/cultural association were able to account for 78.3 per cent of the traffic volume between Nigeria and any other country by air. However, the remaining 21.7 per cent is accounted for by error terms and other random events.

Adjusted R^2 of 0.772 gives the idea of how the model can be generalized. Ideally, the adj-R^2 should be very close or equal to the value of R^2 for a model to qualify for generalization. In this case the difference is 0.783 – 0.772 = 0.011 (1.1 per cent), and is a very small shrinkage, which means if the model were derived from the population rather than a sample it would account for approximately 1 per cent less variance in the outcome. It also proves that cross-validity of the model is very good (Field, 2005).

6.2.5 Analysis of Variance (ANOVA)

The ANOVA indicates that the model is a significant fit of the data overall if the significance value is less than 0.05. Table 6.5 is the ANOVA of the model. The F-ratio represents the ratio of the improvement in the prediction as a result of fitting the model relative to the inaccuracy that still exists in the model.

Table 6.5 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	208.050	1	208.050	75.458	.000[a]
	Residual	303.286	110	2.757		
	Total	511.336	111			
2	Regression	321.779	2	160.890	92.516	.000[b]
	Residual	189.557	109	1.739		
	Total	511.336	111			
3	Regression	346.676	3	115.559	75.795	.000[c]
	Residual	164.660	108	1.525		
	Total	511.336	111			
4	Regression	370.579	4	92.645	70.426	.000[d]
	Residual	140.757	107	1.315		
	Total	511.336	111			
5	Regression	400.194	5	80.039	76.336	.000[e]
	Residual	111.142	106	1.049		
	Total	511.336	111			

a. Predictors: (Constant), LnTrade
b. Predictors: (Constant), LnTrade, Air Lib Index
c. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP
d. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link
e. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)
f. Dependent Variable: lnPax

From the last model in Table 6.5, the F-ratio is 76.336 ($p<0.005$), which is much greater than the critical F (6, 113) value of 2.16 at 0.05 significance from the standard F-table. Therefore, the model has statistically significantly improved the ability to predict the outcome (klienbaum, 1988). It also provides evidence of the existence of a linear relationship between the passenger traffic demand and the five explanatory variables.

6.2.6 Model Parameters

Table 6.6 of the output shows the model parameters for both steps in the hierarchy. The last step is the chosen model. The Beta (B) values designate the relationship between traffic demand and each predictor. If the value is positive or negative, it indicates a relationship. Also, the B value suggests the degree each predictor affects the outcome if all other variables are held constant. Each coefficient has an associated standard error indicating the extent the values would vary across different samples.

Field (2009) suggested that if the t-test associated with a coefficient is less than -2.0 or greater than +2.0, while the p value is less than 0.05, then the predictor is making a significant contribution to the model. Also, the smaller the p value the greater the contribution of the predictor (if t value is large enough). In this case, all the p values are 0.000, LnGDP makes the biggest contribution, followed by air lib index then trade and language/cultural link, while distance make the smallest contribution.

The standardized coefficient values indicate the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor. All the standardized beta values are measured in standard deviation units and so are directly comparable.

Table 6.6 Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1(Constant)	.772	.784		.984	.327					
LnTrade	.389	.045	.638	8.687	.000	.638	.638	.638	1.000	1.000
2(Constant)	1.559	.630		2.474	.015					
LnTrade	.316	.037	.518	8.618	.000	.638	.637	.502	.940	1.064
Air Lib Index	.120	.015	.487	8.098	.000	.614	.613	.472	.940	1.064
3(Constant)	-14.772	4.106		-3.597	.000					
LnTrade	.215	.043	.352	5.031	.000	.638	.436	.275	.610	1.639
Air Lib Index	.121	.014	.491	8.714	.000	.614	.643	.476	.939	1.065
lnGDP	.678	.169	.275	4.019	.000	.552	.361	.219	.638	1.568
4(Constant)	-16.109	3.791		-4.250	.000					
LnTrade	.194	.040	.317	4.898	.000	.638	.428	.246	.602	1.662
Air Lib Index	.115	.013	.467	8.965	.000	.614	.655	.451	.930	1.075
lnGDP	.729	.156	.296	4.686	.000	.552	.413	.236	.634	1.577
Lang/Culture Link	1.050	.232	.231	4.528	.000	.332	.401	.228	.970	1.031
5(Constant)	-21.629	3.583		-6.037	.000					
LnTrade	.184	.036	.301	5.147	.000	.638	.447	.233	.600	1.667
Air Lib Index	.084	.013	.341	6.410	.000	.614	.529	.290	.726	1.378
lnGDP	.985	.149	.400	6.616	.000	.552	.541	.300	.562	1.780
Lang/Culture Link	1.202	.211	.264	5.696	.000	.332	.484	.258	.951	1.052
Distance(KM)	.000	.000	-.275	-5.088	.000	-.265	-.443	-.230	.702	1.425

a. Dependent Variable: lnPax

The unstandardized coefficient in the fifth model represents the estimated values of beta (β) and these values indicate the individual contribution of each predictor to the model. The model is mathematically expressed as;

$$\mathbf{lnPax = -21.629 + 0.184lnTrade + 0.985lnGDP + 0.084ALI - 0.000Dist + 1.202\ Lang/Culture\ Dummy} \qquad \text{-------------------} \quad \mathbf{(6.1)}$$

The coefficients indicate the relationship between passenger traffic demand (Pax) and each other predictor. The constant/intercept value and the distance coefficients show an inverse relationship with passenger traffic, while GDP, trade, air liberalisation index, and dummy coefficients show a positive relationship with passenger traffic demand. The air fare variable is systematically excluded in the model for not contributing statistically to the dependent variable. Though the model recognizes the contribution of the distance variable in the model, the actual coefficient of 0.00014 is very insignificant to be reckoned in the model, unless the distance is below 1000km. Also, the insignificant contribution of air fare and distance validate the high correlation of the two variables (output Table 6.3). All the coefficients show the signs that are predicted based on theory and some previous studies.

6.2.7 Model Coefficients Values

The coefficients' values indicate each predictor's effects on passenger traffic if other predictors are held constant. Further analysis of the impact of each variable in the model is as follows:

6.2.7.1 Intercept/constant

The negative intercept of $\beta_0 = -21.629$ means it is possible in certain situations that there may be zero passenger demand by air between Nigeria and some countries, which is possible in reality.

The t stat value of –6.037 ($p<0.005$) means that it is making a significant contribution to the model.

This implies that –21.629 is the unconditional expected mean of the log of passenger traffic. Therefore, the actual value is expected to be (exponential of –21.629) = 0.4 X 10^{-9}.This is the geometric mean of passengers. The emphasis here is the geometric mean instead of the arithmetic mean. OLS regression of the original variable y is used to estimate the expected arithmetic mean and OLS regression of the log transformed outcome variable is to estimate the expected geometric mean of the original variable.

6.2.7.2 LnTrade

The positive coefficient **(β_1)** value of 0.184 with corresponding t value of 5.147 ($p<0.005$) indicates that trade between Nigeria and any other country has a significant positive impact on traffic demand.

Since, both dependent and independent variable are log transformed, Bruin (2000) describes such a relationship as elastic and interpreted that a 1 percent change in the independent variable will result in (coefficient) percent change in the dependent variable. Hence, 1 percent change in trade volume can result in a change in passenger traffic demand by 0.184 percent in a year.

This positive relation is further confirmed by the partial regression plot of LnPax against Lntrade provided by the model below (Figure 6.1).

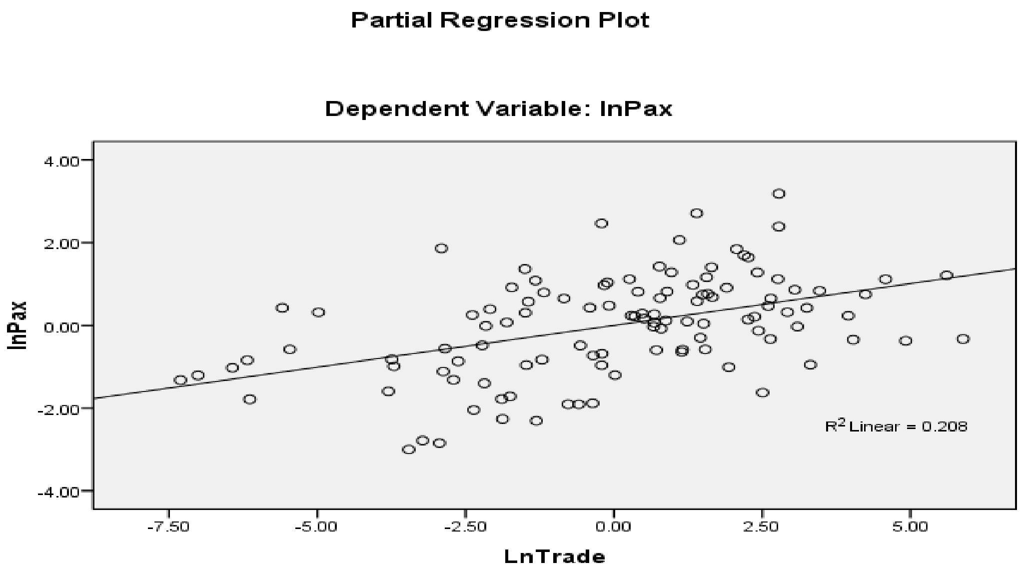

Figure 6.1 Partial regression plot Trade

This also validates the theory that the economic activity level between countries influences traffic demand between them (Vasign et al, 2008). The value is significant enough to influence passenger traffic demand between countries. This could be one of the major reasons why traffic countries such as China, Taiwan, UAE, Thailand, and Malaysia witnessed growth in traffic with Nigeria.

6.2.7.3 Aggregate GDP

This is the aggregate GDP of Nigeria and any other country which represents the income level and population of the market. The model coefficient **β2** for the aggGDP is 0.985, the corresponding t value of 6.616 ($p<0.001$) shows that aggregate GDP is a statistically significant factor as postulated by theory and other empirical studies.

Since both the dependent and independent variables are log transformed, it therefore means that for any increase in aggregate GDP by 1 per cent there is going to be an increase in passenger traffic by 0.985 per cent using the same approach in the above. This value is comparable to the value estimated in the previous chapter where GDP to traffic ratio was found to be 1:1.05 using different data and methods.

The relationship is represented by a partial plot of LnPax against LnGDP below:

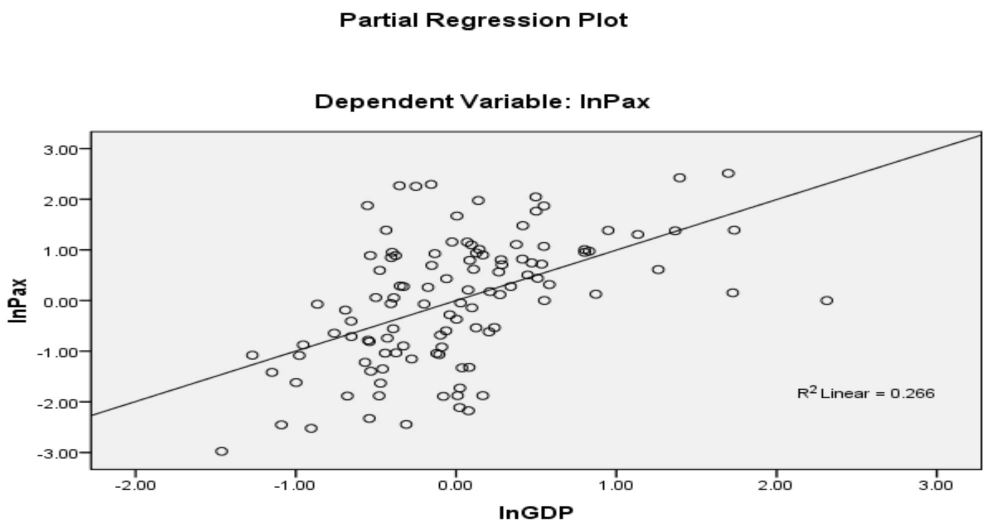

Figure 6.2 Partial regression plot GDP

6.2.7.4 Air Liberalisation Index

The value of the coefficient **(β3)** of air liberalisation index is 0.084 contributing to passenger traffic in log form, which is statistically significant by the corresponding t-value 6.41 ($p<0.001$). Since, the dependent variable is log transformed while ALI variable is its original value, the format for interpretation is that dependent variables changes by 100*(coefficient) percent for a unit increase in the independent variables while other variables in the model are held constant (Bruin, 2006). Therefore, in this model a unit increase of ALI can cause an increase of 8.4 percent in traffic demand.

For instance, an increase of ALI from OSA (26) to YD (32) can generate additional traffic demand by about 50%, (which was liberalisation of carrier's ownership and control). This value is not far from the estimate of the other empirical study value, for example, WTO (2006) estimated impacts of removing ownership and control restrictions on international air traffic could stimulate a 34- 39% traffic increase in some countries.

This corroborates with economic theories and previous studies that deregulated air transport could stimulate traffic demand. The relationship is represented by a partial plot.

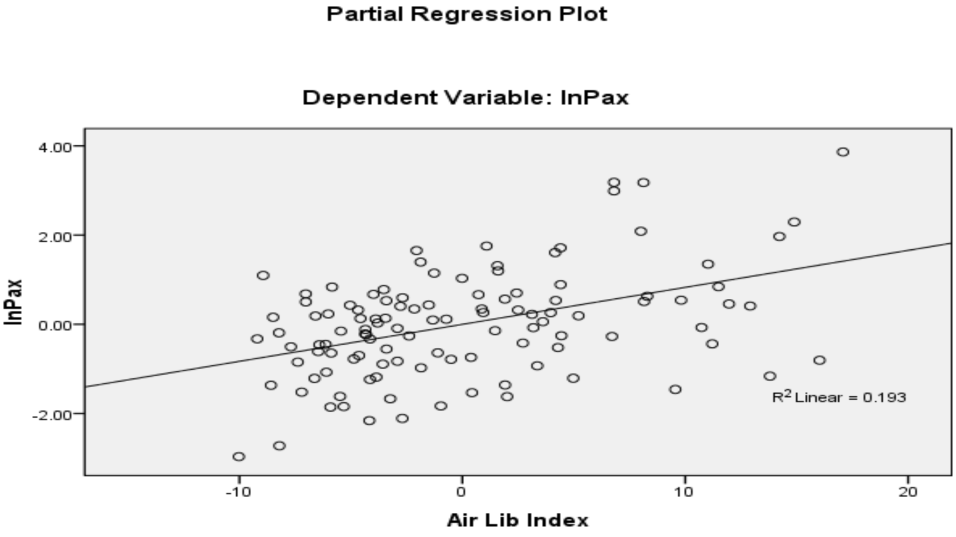

Figure 6.3 Partial regression plot ALI

Therefore, the model has proved that the ALI is significant in affecting air traffic between any country and Nigeria. The actual impact of liberalisation on the various routes will be evaluated in the next section 6.3.

6.2.7.5 Distance

The value of the distance **(β4)** coefficient of -0.00012 and corresponding t value of –5.088 indicates that the relationship between distance and passenger is inverse, meaning the more the distance the less the traffic.

The distance variable is in its original form, while the passenger traffic is in log format, hence the relation is that the dependent variable decrease by 100*(coefficient) for a unit increase of distance. That is 1km distance increase can reduce traffic demand by 0.012 per cent. The relationship of distance with passenger traffic demand in this case, is not like others because distance is a static value that may not change over time. The distance impact could be understood, by comparing two countries with similarities in the other factors but with significance difference in the distance. For instance, the UK and the USA traffic from Nigeria in 2010 and the factors affecting them indicated that USA has more motivating factors but the distance, which is negative factor, was also significantly higher. Hence, traffic from US to Nigeria was affected negatively in comparison with UK -Nigeria traffic.

This suggests that distance is an impediment and can affect travel in any way. Also, because of high correlation with air fare (as shown in table 6.2) of about 0.844, it indicates that the international traffic demand is inelastic – only a high change in price can affect the market demand which portrays a typical traveller. Meanwhile the relationship is represented by the partial regression plot below.

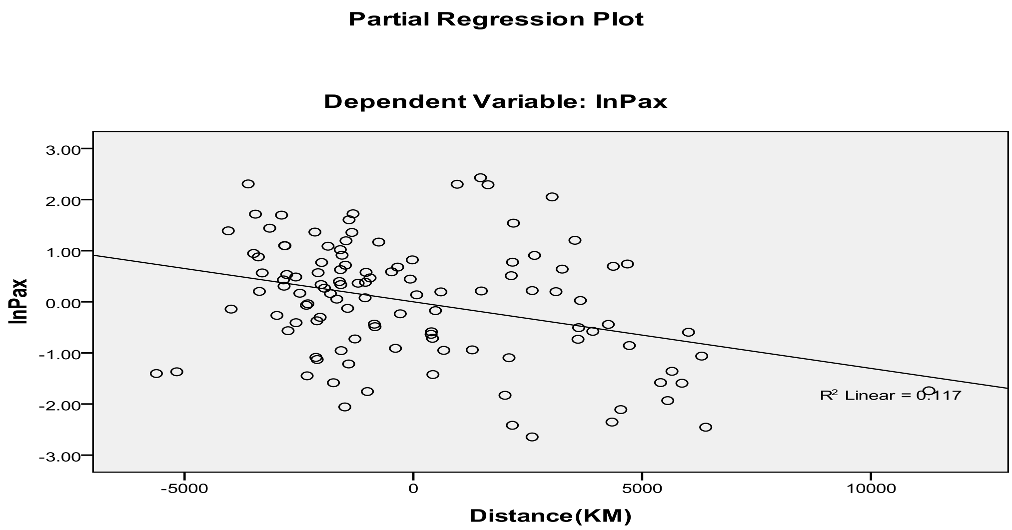

Figure 6.4 Partial regression plot Distance

6.2.7.6 Dummy

The dummy, being a proxy of common language, colonial and cultural link, takes a value of 1 or 0 and has a significant influence on international passenger traffic demand. The coefficient **(β5)** of 1.202 and a t value of –5.696 ($p<0.001$), implies that changing a dummy variable from 1 to 0 can reduce the traffic by about 120.2 percent [100*(coefficient) = 100*1.202], while holding other variables constant.

This proves the theory from other empirical studies that common language and other historical links are very significant factors that influence traffic demand between communities (Piermartini and Rousova, 2008). This may be why the top six countries (UK, UAE, USA, Ghana, South Africa and India) in terms of traffic have a common language with Nigeria.

The relationship is represented by the partial regression plot below.

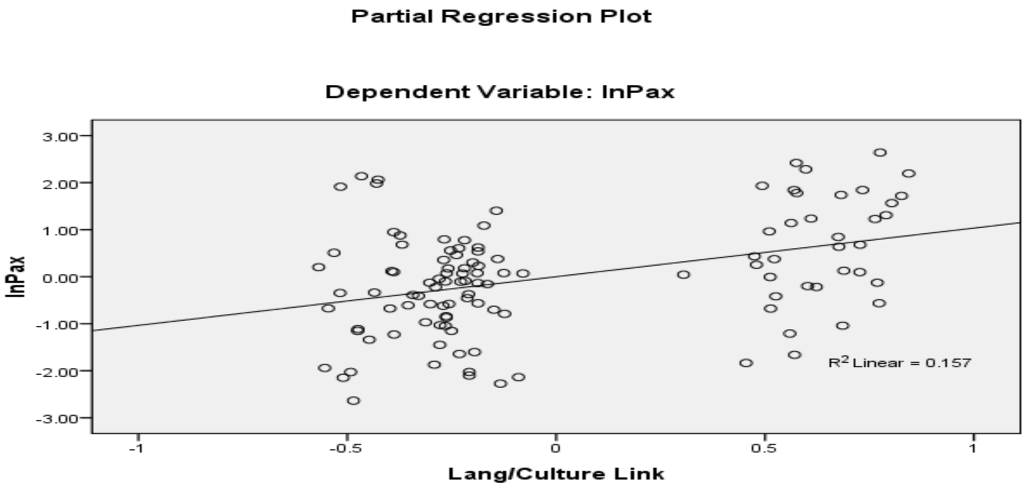

Figure 6.5 Partial regression plot Dummy

6.2.8 Excluded Variable

Table 6.7 shows a summary of excluded variables for the stage of hierarchy that gives the estimate of each predictor's beta values (Coefficient) if entered into the equation at that point with corresponding t value at significant p value.

Table 6.7 Excluded Variables

Model		Beta In	T	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	lnGDP	.264[a]	2.972	.004	.274	.638	1.568	.638
	Air Fare($)	-.262[a]	-3.767	.000	-.339	.996	1.005	.996
	Distance(KM)	-.311[a]	-4.588	.000	-.402	.995	1.005	.995
	Air Lib Index	.467[a]	7.751	.000	.596	.967	1.034	.967
	Lang/Culture Link	.236[a]	3.339	.001	.305	.990	1.010	.990
2	lnGDP	.310[b]	4.533	.000	.400	.634	1.577	.615
	Air Fare($)	-.052[b]	-.771	.442	-.074	.764	1.309	.743
	Distance(KM)	-.069[b]	-.949	.345	-.091	.667	1.500	.648
	Lang/Culture Link	.172[b]	2.955	.004	.274	.969	1.032	.947
3	Air Fare($)	-.176[c]	-2.712	.008	-.254	.666	1.501	.553
	Distance(KM)	-.182[c]	-2.661	.009	-.249	.600	1.665	.571
	Lang/Culture Link	.187[c]	3.536	.001	.323	.966	1.036	.610
4	Air Fare($)	-.211[d]	-3.451	.001	-.318	.654	1.530	.547
	Distance(KM)	-.242[d]	-3.741	.000	-.342	.575	1.740	.563
5	Air Fare($)	-.092[e]	-.983	.328	-.095	.277	3.616	.243

a. Predictors in the Model: (Constant), LnTrade
b. Predictors in the Model: (Constant), LnTrade, Air Lib Index
c. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP
d. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link
e. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)
f. Dependent Variable: lnPax

In the stepwise method the predictor with the highest t stat will be entered and continue until all the predictors are entered except the predictor with t stat value that has a sig p value more than 0.05. As a result of this, air fare is excluded with a very low t stat value of –0.983 and p >0.05 which suggests it is not significant to the model. This suggests that air fare is not a factor in determining traffic demand.

However, using the enter method shows the actual contribution of air fare in the expression, as in Table 6.8 below.

Table 6.8 Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-23.088	3.915		-5.897	.000
LnGDP	1.026	.164	.416	6.268	.000
LnTrade	.198	.038	.325	5.158	.000
Air Fare($)	.000	.000	-.092	-.983	.328
Distance (km)	-9.030E-5	.000	-.167	-1.686	.095
Air Lib Index	.083	.016	.317	5.030	.000
Lang/Culture Link	1.026	.233	.224	4.402	.000

a. Dependent Variable: LnPax

Table 6.8 indicates that the coefficient value of air fare is 0.000 at t value of –0.983 ($p>0.1$), hence it is rejected. However, one would expect the two variables distance (km) and air fare to be transformed into log form for possible contribution, but even after transforming them there was no improvement in their contribution; although the transformed variables met the conditions of normality and linearity tests, the actual values of the variables also met the conditions of normality and linearity tests as shown below. In addition, the two variables in log form reduced the strength of power of the coefficient of determination of the equation R^2 from 74.6 per cent to 71.9 per cent because of high correlations that can cause collinearity problems.

Table 6.9 Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.848[a]	.719	.703	1.16920	1.856

a. Predictors: (Constant), LnDist, LnTrade, Lang/Culture Link, LnGDP, Air Lib Index, LnFare

b. Dependent Variable: LnPax

Table 6.10 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-19.189	3.981		-4.820	.000
	LnGDP	.933	.183	.379	5.099	.000
	LnTrade	.199	.041	.326	4.860	.000
	Air Lib Index	.104	.021	.399	5.044	.000
	Lang/Culture Link	.856	.242	.187	3.542	.001
	LnFare	-.551	.494	-.157	-1.115	.267
	LnDist	.133	.415	.049	.319	.750

a. Dependent Variable: LnPax

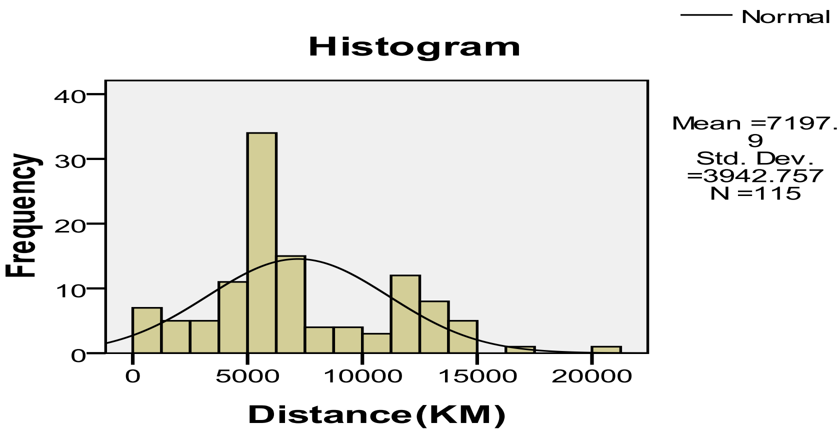

Figure 6.6 Normality of Distance

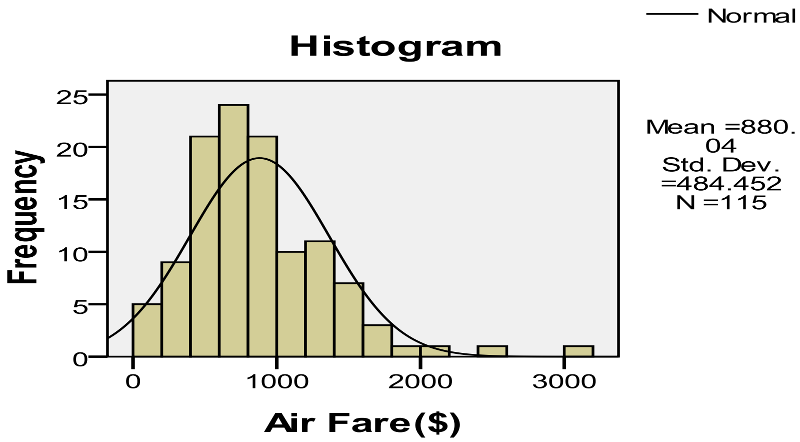

Figure 6.7 Normality of Air fare

After transformation, the normality plots of the two variables turn into these plots below:

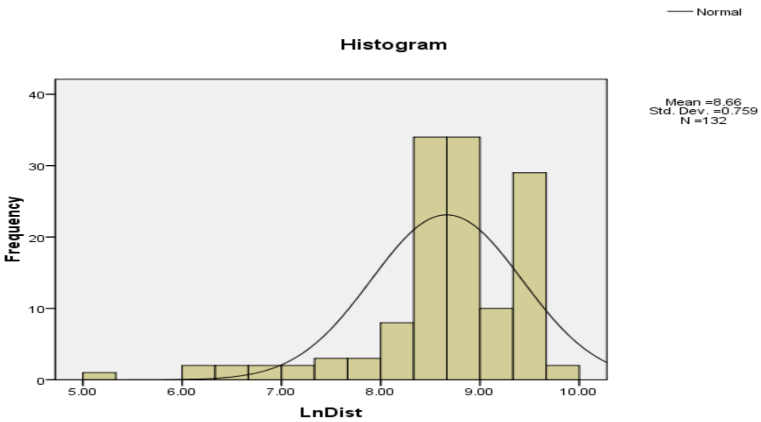

Figure 6.8 Normality of lnDistance

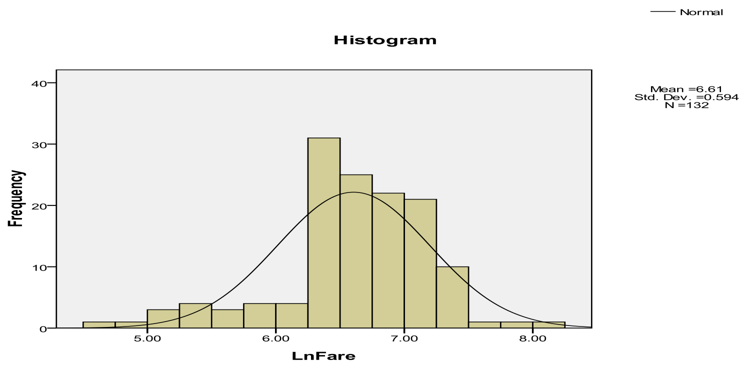

Figure 6.9 Normality of lnfare

Both plots meet the normality test conditions as shown, but the first two show better normal plots. Therefore, if a variable meets the conditions of normality and linearity there is no basis for transformation as in this case (Hair, et al., 1998).

In addition, if the two variables are used in log form, their contributions are still not statistically significant from the t values at 95 per cent confidence level.

6.2.9 Testing Assumptions of Multiple Regression

In order to draw a conclusion about a population from a regression analysis done on a sample, several assumptions must be met, which include the following:

6.2.9.1 Multicollinearity

There should be no high correlation between two or more predictors. Hair et al (1998) suggested correlation higher than 0.8 should be a concern. In this case, all the variables are not highly correlated as shown in the correlation matrix table 6.3.

Another way of testing multicollinearity is in the value of Variance Inflation Factor (VIF) which is an index that measure the variance of an estimated regression coefficient increase due to collinearity, and the value should be around 1.0, and any value up to 10 then multicollinearity exists (Field, 2009). But in this context, all the values lie between 1.0 and 1.8 as shown in the last column in table 6.6. Therefore, there is no multicollinearity concern for this model.

6.2.9.2 Normality and Linearity

All the variables have to be linear and normally distributed; otherwise, the variables have to be transformed to achieve the condition (Hair, et al, 1998). In this regard, the dependent variables, aggGDP, and trade did not meet the conditions and as such, they were transformed to log form. But other variables met the criteria as seen in the normal plot below. The linear p-p plot of variable is in Appendix 11.

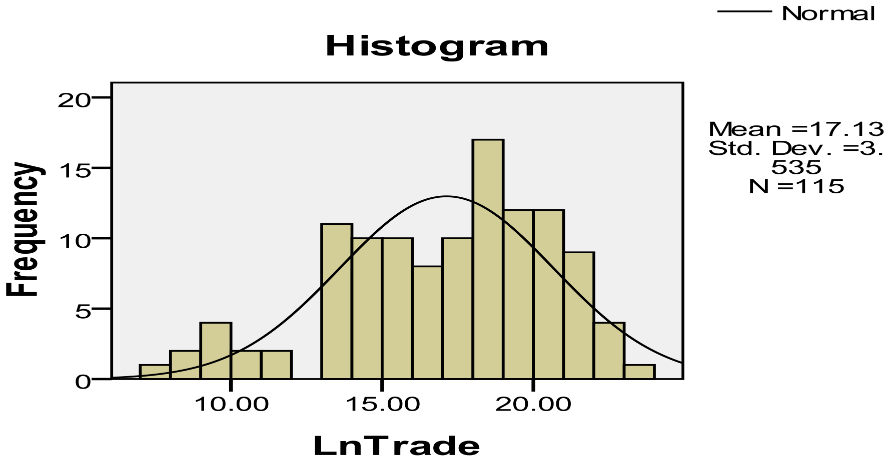

Figure 6.10 Normality plot of LnTrade

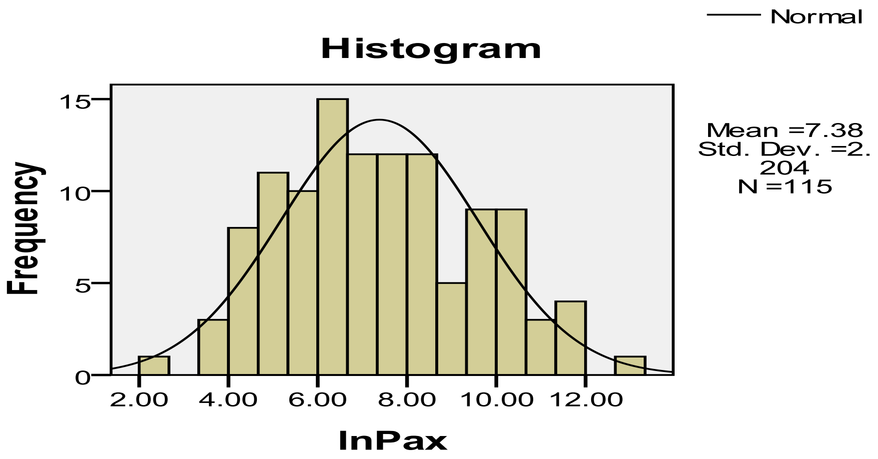

Figure 6.11 Normality of lnPax

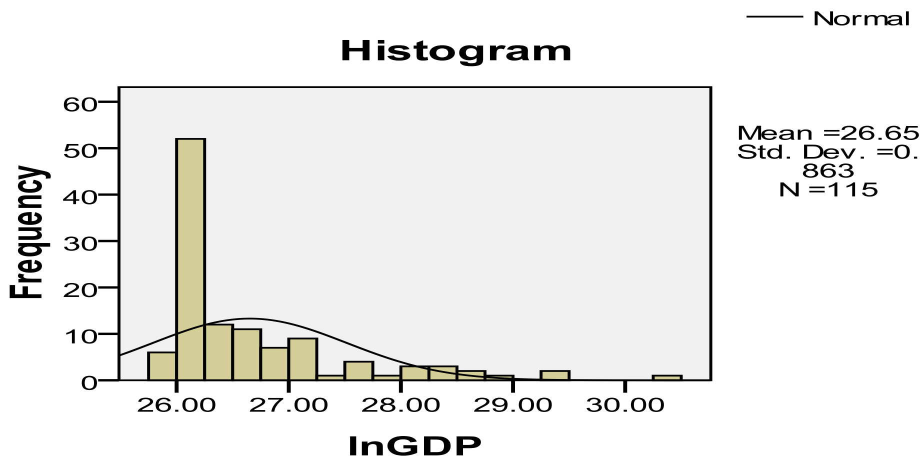

Figure 6.12 Normality plot of lnGDP

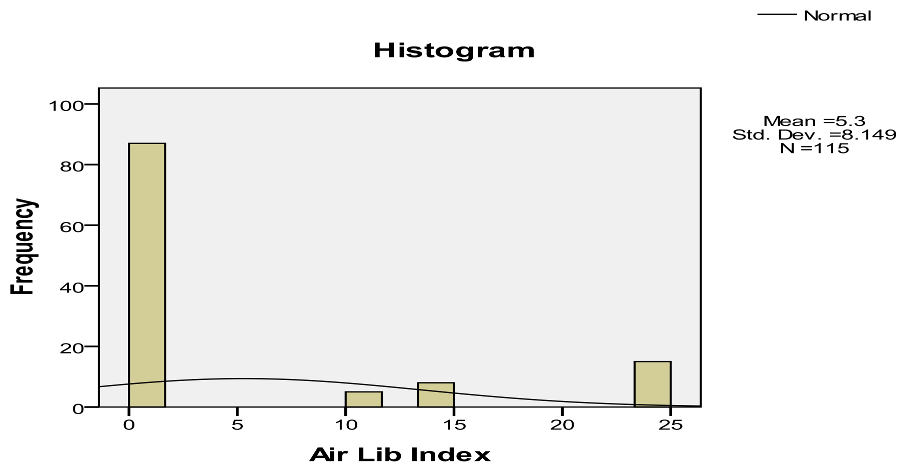

Figure 6.13 Normality plot of ALI

6.2.9.3 Normal Distribution of Errors

It is assumed that residuals in the model are randomly normally distributed with the mean value of zero. This assumption means that the differences between the model and the observed data are most frequently zero or very close to zero, and that differences much greater than zero happen only occasionally as shown in the histogram below. In this case Mean= –2.18 * 10-15, with standard deviation of 0.978 and n=112. The model residual is represented by the dependent variable error term.

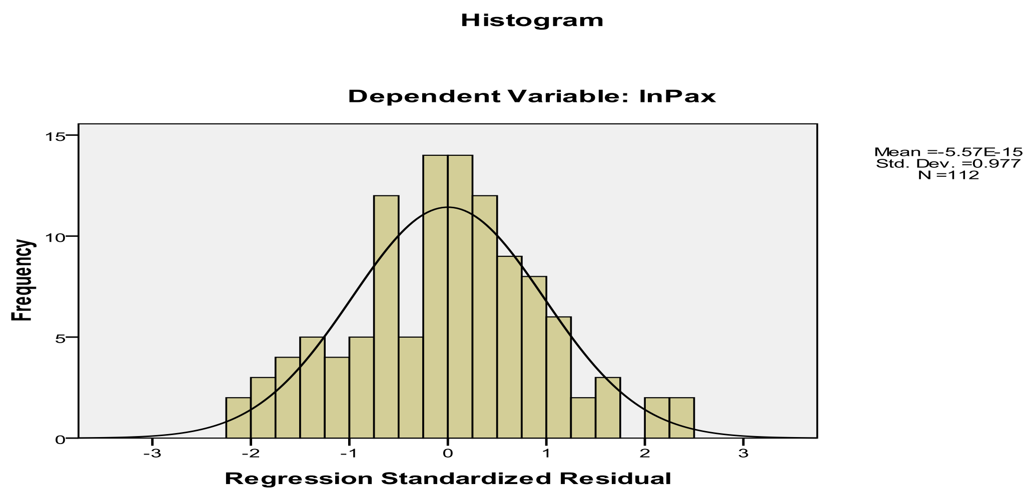

Figure 6.14 Normality distributions of Errors

6.2.9.4 Linearity

The mean values of the outcome variable for each increment of the predictors lie along a straight line suggesting that the model is a linear relationship as shown in the figure below.

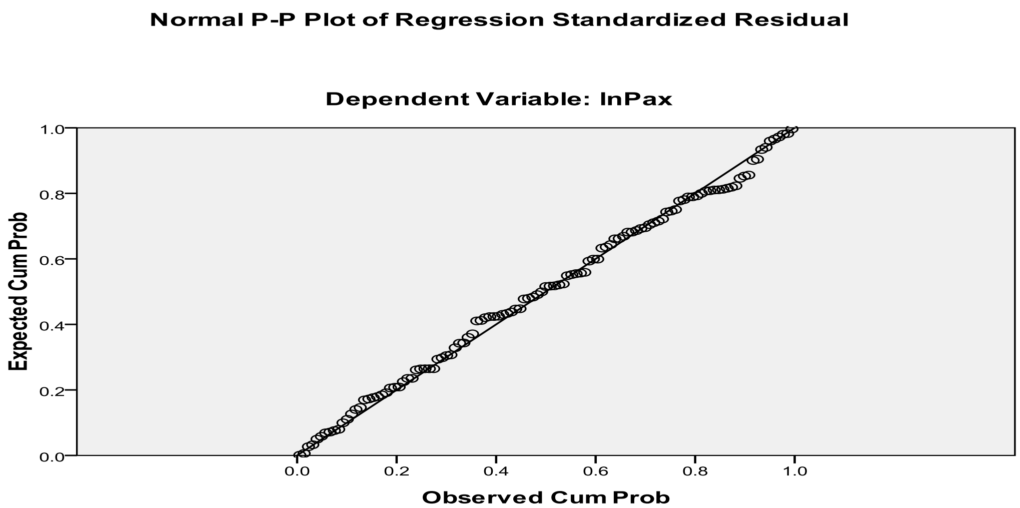

Figure 6.15 Linearity plot of the model

The normal plot of the residuals shows the points close to a diagonal line; this shows linearity of the dependent residual at each increment of the predictor variables. Hence, the assumption is satisfied.

According to Field (2005) if all the above assumptions are met, the model from the sample can be accurately applied to the population. The coefficients and parameters are said to be unbiased.

An unbiased model means that an average of the regression model from the sample is the same as the population model, and although it is possible that a model obtained from another sample may not be the same as the population model, the likelihood of them being the same is increased.

Table 6.11 Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.2603	14.2387	7.4462	1.85367	112
Residual	-2.30580	2.61906	.00000	1.08192	112
Std. Predicted Value	-1.719	3.664	.000	1.000	112
Std. Residual	-2.083	2.366	.000	.977	112

a. Dependent Variable: LnPax

6.2.10 Case-wise diagnosis

This analysis produced a summary of the residual statistics which were examined for extreme cases. Table 6.12 shows the cases that have a standardized residual less than –2 or greater than 2 (since the criterion was ±2) which means ordinarily the sample should expect 95 per cent of the cases to have standardized residual within ±2. Therefore, the sample of 112 countries should have about five cases of observations (5 per cent) to have residuals outside the limit. The samples of 112 countries were selected from the list of 137 countries, due to incomplete data on 25 countries.

Table 6.12 Extreme cases

Case Number	Std. Residual	LnPax	Predicted Value	Residual	Status
39	2.211	10.33	7.8816	2.44793	
67	2.191	10.22	7.7974	2.42528	
97	2.261	10.17	7.6639	2.50303	
125	2.366	11.61	8.9863	2.61906	
127	-2.083	11.93	14.2387	-2.30580	

The case-wise diagnosis of each observation (attached as Appendix 11) indicated that five countries have high residual value from the predicted value of the model as shown in Table 6.12 above. However, the research was able to offer possible reasons for the high disparity from the model estimates, thus:

For observation no. 39 in Appendix 11, this denotes traffic to Ethiopia with a residual excess of 2.4 for log Pax from the predicted value. This may not be unconnected to high passenger traffic, mostly transiting through the country en route to other countries in which some passengers may transit for more than 48 hours. Although liberalisation is high, other factors such as GDP, trade and the dummy are very low in comparison to the traffic level.

Similarly, observation no. 97 with the excess residual of 2.5 for log Pax is the traffic to Qatar, which has the same reason as Ethiopia. The service is provided only by Qatar Airways which aggressively market their service in Nigeria, but most of the passengers were Nigerian travelling on transit to China, India, Asia, and other Middle East Asian countries. This aggressive marketing of Ethiopia and Qatar airlines earned them significantly higher passenger traffic than the prediction of the corresponding factors of GDP, trade, liberalisation index, and historical or common language with Nigeria; this is also a unique case.

However, for observation no. 67 (in Appendix 11), this denotes traffic to Lebanon with a residual excess of 2.4 for log Pax from the predicted value. This is due to high passenger traffic but with low GDP and trade, and absence of any cultural or common language with Nigeria. The high number of passengers is mostly attributed to a large number of Lebanese traders resident in Nigeria and other West African countries; this is confirmed by the field survey which shows the composition of the passengers travelling to Lebanon. The service is solely provided by a single carrier, Middle East Airlines (MEA) from Lebanon. This may be a unique case of traffic due to another factor different from the predictors' variable used in the model.

Observation no. 125 denotes traffic to UAE (Dubai) with a residual excess of 2.6 for log Pax from the predicted value. This is also due to high passenger traffic mainly owing to the influence of trade and leisure as revealed by the field survey. Moreover, substantial numbers of passengers were in transit en route to China, India, and other Asian and Middle East countries. In addition, the ease of getting entry visas to the country by Nigerians may have influenced the level of traffic when compared with other countries. The service was provided only by Emirates with 14 flights per week. Therefore, the excess passengers may be attributed to the level of trade and tourism as well as aggressive marketing of the airline for transit passengers. This makes the case unique since the passenger level is beyond the prediction of the model using the independent variables.

Observation no. 127 denotes traffic to the USA, with a residual shortfall of –2.3 for log Pax from the predicted value. This may be due to the excessively high value of US GDP which makes it look abnormal when compared with other countries. However, the high prediction may be influenced by high GDP value. In addition, there may be other factors that undermine traffic between the two countries such as the challenge of travelling visas, as it was found in the field survey that over 75 per cent of the passengers were Nigerian and complained of the difficulty of getting USA entry visas. This suggests the reason for passenger traffic deficit to/from the country despite high significance of aggregate GDP and trade/investment between the countries. Therefore, traffic to the USA is another unique case where the prediction and the actual traffic differ significantly.

But apart from the above five cases, for about 113 of the other observations, the predictions and the actual passengers agreed with minor differences. Also, as expected, the model prediction should have 95 per cent accuracy within the average standard error of ±2.00, which suggests that 5 per cent of the observations could be outside the normal range of the average standard error. The 5 per cent of 113 countries' observations produced five countries with abnormal prediction value.

6.2.11 Validation of the model

The research summarizes and compares the results from the three samples' analysis, in order to validate and ensure the reliability of the model.

The multiple regressions of the cross-sectional data were evaluated using OLS for three different samples collected from different years 2009, 2010 and combined 2009/10. The results of the analysis are as follows in Table 6.13.

Table 6.13 Multiple regression output of the 3 samples

MR parameters	2009 Samples	2010 Samples	Combined 2009–10
Observations (N)	112	112	225
R	86.8%	88.5%	84.6%
R^2	75.3%	78.3%	74.1%
Adjusted R^2	74.1%	77.2%	71.0%
F value	61.887 (.000)	76.335 (.000)	110.677 (.000)
Coefficients of the Variables			
Constant/intercepts t-stat p-value	-26.598 -6.516 (.000)	-21.629 -6.237 (.000)	-25.282 -9.299 (.000)
LnGDP t-stat p-value	1.125 7.571 (0.000)	0.985 6.616 (.000)	1.173 10.413 (.000)
LnTrade t-stat p-value	0.078 2.221 (.028)	0.184 5.147 (.000)	0.132 4.876 (.000)
ALI t-stat p-value	0.094 6.256 (.000)	0.082 6.910 (.000)	0.045 6.095 (0.000)
Dummy t-stat p-value	0.977 4.424 (.000)	1.202 5.696 (.000)	1.242 7.434 (.000)
Distance t-sat p-value	0.000 -4.242 (.000)	0.000 -5.088 (.000)	0.000 -8.072 (.000)

All coefficients of the explanatory variables and other regression parameters are highly correlated for the three samples. The values also have the expected sign and are significant. The model from the three samples rejected air fare both in actual value and in log form; this implies that air fare has no effect on passenger traffic demand

The results show a positive and significant effect of liberalisation on passenger flows. Overall, the regression model explains an important proportion of the variance of the data, with R^2 value of at least 74.1 per cent from a combined sample.

Therefore, there is enough evidence to suggest the validity and reliability of the model, which explains the country’s international passenger demand as functions of international trade ($), aggregate GDP ($), air liberalisation index, distance and dummy variable. The model is statistically valid since it meets the conditions for multiple regression assumptions, namely: t-test, F-test, normality, linearity, multicollinearity and residual diagnosis (normality and heteroscedasticity). The model arguments were further supported by another sample model from a different year which generates almost the same model coefficient and confirms the variables' relationship.

In view of the validity of the model, the research would apply the model to determine the impact of liberalisation policy in the country by forecasting the future traffic when ASAs change.

6.2.12 Analysis of the model with ALI variable as Dummy

The main concern of the research is the level of liberalisation of ASAs which was split into four categories. Such a grouping can also be represented by a set of dummy variables in the analysis (InterVISTAS-ga2, 2006). In this regard, the research created five independent dummy variables to represent each category of ASA namely, dummyALI1 (BASA restricted), dummyALI2 (BASA commercial), dummyALI3 (OSA), dummyALI4 (YD) and dummyALI0 (for countries without ASA), while the group of countries without ASA serve as baseline for the analysis. The four dummies replaced the ALI variable in the equation 6.2.The summary of the analysis using dummies for various categories of ALI is depicted below in Table 6.14.

Table 6.14 Result of the analysis with ASA as dummy

Variable	Coefficient	T stat	P value
Constant	-24.212	-6.571	P<0.05
LnGDP	1.087	7.145	P<0.05
LnTrade	0.18	5.054	P<0.05
Distance	0.0001	-5.301	P<0.05
DummyLang	1.176	5.572	P<0.05
DummyALI2	1.768	4.04	P<0.05
DummyALI4	2.424	6.068	P<0.05
Rejected variable	**Coefficient**	**T stat**	**P value**
DummyALI1	0.053	1.006	0.317
DummyALI3	-0.037	-0.733	0.465
Air fare	-0.13	-1.527	0.13
N=112			
F = 64.715			P<0.05
R=0.887			
R2= 0.787			
Adj R2=0.775			

Table 6.14 shows the model of the relationship between passenger traffic and the independent variables of LnGDP, LnTrade, distance, DummyLang, DummyALI2, and DummyALI4 at 95% confidence level (P<0.05) and acceptable t stat value. Meanwhile, the model rejected the variables of DummyALI1, DummyALI2, and Air fare, because of p>0.05 and an unacceptable t stat value. The model has an F value of 64.715 (p<0.05), and an R2 of 0.787%, which implies that the independent variables were able to explain 88.7 percent of the dependent variable at a significant value. The detailed results of the analysis can be found in Appendix 12. Hence, the model is mathematical expressed as;

$$\text{LnPax} = -24.212 + 0.18\text{LnTrade} + 1.087\text{LnGDP} + 1.768\ \text{DummyALI}_2 + 2.242\ \text{DummyALI}_4 - 0.000\text{Dist} + 1.176\text{DummyLang} \text{ ----------------------------- } (6.4)$$

The above equation therefore considered Air lib index as a contributing factor only when the ASA is either BASA commercial or YD, while other ASAs are not statistically contributing to the passenger traffic demand.

However, when the model shown in equation 6.4 is compared with model in equation 6.2, a significant correlation was evident in the coefficient values, R2, F stat, and t stat. In addition, both the models are statistically significant and rejected the inclusion of air fare as a variable.

Table 6.15 Comparing the parameters of the two models

	Model with ASA as ALI	Model with ASA as dummy	
Variable	***Coefficient***	***Coefficient***	***Diff***
Constant	-21.629	-24.212	2.583
LnGDP	0.985	1.087	0.102
LnTrade	0.184	0.18	0.004
Distance	0.0001	0.0001	0
DummyLang	1.202	1.176	-0.026
ALI	0.082	NA	
DummyALI2	NA	1.768	
DummyALI4	NA	2.424	
Rejected variable Coefficient			**P value**
DummyALI1	NA	0.053	
DummyALI3	NA	-0.037	
Air fare	-0.092	-0.13	0.038
N	112	112	0
F	75.334	64.715	-10.619
R	0.885	0.887	0.002
R2	0.783	0.787	0.004
Adj R2	0.772	0.775	0.003
DW	1.345	1.364	0.019

Table 6.15 indicated an insignificant difference in the parameters of the two models, which suggested a very significant correlation between the models. The major difference is that the model with ALI considers ASA as an index value based on a WTO scale, while the second model considers various categories as dummy variables. In the first model, each category of ASA makes a contribution to the demand of the traffic based on the aggregate weight of various components of ASA, while the second model rejected the contribution of 2 categories of ASA (BASA restricted and OSA) statistically insignificant in the model due to their coefficients' t stat value and p>0.05. Therefore, the research found that the second model that uses dummy as a proxy for ASA instead of a liberalisation index has a major weakness of not recognising all the categories of ASA specifically restricted BASA and Open skies agreements. This may not be unconnected with the issue of multi-collinearity in the

use of dummy as variables describing ASAs. Piermatini & Rousova (2008) argued that the liberalisation index developed by WTO was aimed at addressing the shortcomings of using dummy variables as discovered in previous research studies, such as InterVISTAS-ga2 (2006). Hence, this research considered the first model that uses the ALI, because of its advantage over the second model.

6.3 Forecasted Impacts of Further Liberalisation

6.3.1 Model Applications

The model developed in section 6.2 expressed the relationship between traffic demand and other independent variables including ALI. The research applied the model to estimate future traffic demand scenarios if some of the components of ALI in the ASA are changed.

$$\mathbf{LnPax = -21.629 + 0.184LnTrade + 0.985LnGDP + 0.084ALI - 0.000Dist + 1.202Dummy} \quad \text{------------------------------ } \mathbf{(6.2)}$$

In the model, as explained earlier, LnPax (in logarithmic form) stands for passenger traffic demand between Nigeria and any other country as a function of generative variables; volume of international trade between the two countries (in log form), aggregate countries GDP (in log form), nature of ALI (proxy of ASA), and dummy variable (which represents common language or cultural link between the countries). Also, distance between the countries is an impedance variable with statistical significance influence, but the contribution is very insignificant to the overall model with coefficient (0.000). The relation has a constant negative value of –21.629 as Beta zero in a multiple regression model.

The research applied the equations to the top 25 countries with high passenger traffic demand to/from Nigeria, which represents about 95 per cent of their international traffic and includes seven countries without direct traffic. However, it is assumed that the ceteris paribus rule holds that when ASAs change other independent variables remain constant. Also, it is assumed that the maximum liberalisation the Nigerian government could offer to any country in the world is the YD model because that was the most liberal ASA permitted by the Nigerian Civil Aviation policy as at 2010. There are other policy options that are more liberal than YD but Nigeria, like many countries of the world, still believes in some form regulation in the industry for the purpose of national interest.

The impacts of liberalisation were evaluated by specifying the change in current ASA. As previously highlighted in Chapter 4 (section 4.2), the research classified the four different types of ASA in the country based on the level of liberalisation, namely: restricted BASA, BASA with commercial agreements, Open Skies Agreement, and the Yamoussoukro Declaration (YD) model.

According to the WTO scale (Table 4.3), BASA restricted has the lowest liberalisation index of 10 which allows for free pricing and set capacity based on the Bermuda type agreement. This was followed by BASA with commercial agreements that added commercial agreement to the provision of BASA restricted. Airlines can enter into negotiation with the government for additional flight frequency or airport of arrival which increases ALI value to 14.

The third level of ASA was the Open skies Agreement (OSA) model with ALI value of 26 which permitted the fifth freedom, free determination of capacity and free pricing, and allowed multiple designations.

The last group was the YD agreement, regarded as the most liberal with the same provisions as OSA, and added the permission of community carrier principles under the withholding of the carrier, which makes ALI to be 32.

The impact of liberalizing market access was evaluated when a country's ASA was changed to an OSA agreement, while the impact of liberalizing ownership and control was evaluated when a country's ASA was changed from OSA to YD, which liberalises ownership and control to a community carrier.

The results of the top countries with traffic excluded some African countries with fully liberalised ASA such as Ethiopia, Egypt, Kenya, Cameroon and Ghana, because these countries' ASA (YD) is used as a benchmark and assumed to be the maximum the country policy could allow.

The results of impact assessment on 19 other countries that were not liberalised as YD were evaluated and tabulated as depicted in Table 6.16 below.

Table 6.16 Estimate of Traffic under Different ASA in Log Form

Country	Actual ALI	Actual LnPax	Estimate LnPax2	Diff.	LnT(ALI0)	lnT(ALI1)	lnT(ALI2)	lnT(ALI3)	lnT (ALI4)
UK	14	12.880	12.790	0.09	NA	NA	12.88	13.557	13.893
UAE	16	11.610	11.200	0.41	NA	NA	11.61	12.280	12.616
USA	26	11.930	14.433	-2.50	NA	NA	NA	11.940	12.276
S/Africa	14	11.580	11.080	0.50	NA	11.58	12.08	12.750	13.060
Germany	16	10.580	11.820	-1.24	NA	NA	10.58	11.270	11.587
Netherl'd	16	10.480	10.830	-0.35	NA	NA	10.480	11.150	11.486
France	16	10.450	11.923	-1.47	NA	NA	10.45	11.120	11.456
Lebanon	16	10.220	8.710	1.51	NA	NA	10.22	10.890	11.226
Qatar	16	10.170	8.736	1.43	NA	NA	10.170	10.840	11.176
Italy	10	10.670	11.199	-0.53	NA	10.67	11.17	11.840	12.176
S/Arabia	10	9.880	10.456	0.58	NA	10.456	10.956	11.626	11.962
Turkey	10	9.420	9.852	-0.43	NA	9.420	9.920	10.590	10.926
Spain	10	9.380	10.696	-1.32	NA	9.380	9.880	10.550	10.886
India	-	10.850	10.360	0.49	10.850	11.692	12.190	12.860	13.196
China	-	10.810	11.440	-0.63	10.810	11.650	12.150	12.820	13.156
Ireland	-	10.170	9.288	0.88	10.170	11.010	11.510	12.180	12.514
Malaysia	-	9.790	9.630	0.16	9.790	10.630	11.130	11.800	12.136
Switzerl'd	-	9.290	8.743	0.55	9.290	10.130	10.630	11.300	11.636
Canada	-	9.730	10.200	-0.47	9.730	10.570	11.070	11.740	12.076

Source: Author's computation

Table 6.16 shows an estimated traffic change for the top 19 countries that were not liberalised as YD. The research assumed that fully liberalised countries should have an ALI of 32, as is the case of some African countries. However, as indicated in the current ALI of the USA, the highest value of 26 derives from the open skies agreement, but this could not achieve YD liberalisation because of the restriction on ownership control of the carrier. The 'Actual LnPax' column indicated the actual traffic in log form between the partner country and Nigeria in 2010, while 'Estimate LnPax2' indicated the predicted traffic from the model. As expected, there is some difference between the predicted value and the actual value since the model is an estimate with standard error of ±2.00 ($p < 0.05$). Each observation error is represented by the Diff. column in the table.

Table 6.16 shows countries' passenger traffic in log form in the various stages of ALI and the forecasted future traffic if the ASA is further liberalised. 'LnT(ALI0)' signifies the log of traffic of countries without a direct service, which include India, China, Ireland, Malaysia, Switzerland and Canada; but other countries with direct traffic from Nigeria do not have data at this stage.

The next stage is 'LnT(ALI1)', when there was a direct air traffic service regulated by a restricted BASA with an ALI of 10. The values represent the logarithms of annual traffic of such countries, namely, Italy, Spain, Saudi Arabia and Turkey. Also, it projected the value of traffic for the countries without direct service in case the countries could have direct traffic to be regulated by a restricted BASA; meanwhile countries with a higher value of ALI indicated no available data at this stage.

The third stage is 'LnT(ALI2)' which indicates traffic governed by a fairly liberal ASA that permits multiple designations or more flight frequency, which adds to the provision of restricted BASA with ALI value of 16. Such countries include the UK, South Africa, UAE, the Netherlands, Germany, France and Qatar. Also, future traffic is estimated for the countries with restricted BASA and countries with indirect air service in case their ASAs are upgraded to BASA with commercial right.

The fourth stage of 'LnT(ALI3)' is the Open Skies Agreement (USA model) which is very liberal and permits unlimited market access including the fifth freedom with ALI value of 26. However, only the USA has such agreement with Nigeria; the other countries were forecasted values in case such countries' ASAs are upgraded to the Open Skies Agreements model.

The last stage, 'LnT(ALI4)' is regarded as the YD model that liberalised ownership and control of the designated carriers in addition to the provisions of OSA. The model is the most liberal agreement in the country with 32 as the ALI value. All the values were projected traffic in logarithmic form in case the countries' ASAs were upgraded to the YD model.

The values of the current and projected traffic in Table 6.16 are in logarithmic form. Therefore, to estimate actual impacts in terms of change in passenger traffic percentage, the research converted the log values in the table to the actual passenger volume, and also evaluated the percentage increase of each stage of the ASA. The conversion led to the formation of Table 6.17 which is the reflection of Table 6.16.

Table 6.17 Estimated Traffic Volume Change under Different ASAs

Country	Pax (ALI0)	Pax (ALI1)	Pax (ALI2)	Pax (ALI3)	Pax (ALI4)	%chg 0	%chg1	%chg2	%chg3
UK	NA	NA	392,528	**772,201**	**1,080,571**	**NA**	NA	65.20	33.29
UAE	NA	NA	109,680	**215,346**	**301,342**	**NA**	NA	65.02	33.29
USA	NA	NA	NA	**153,289**	**214,486**	**NA**	**NA**	NA	33.28
S/Africa	NA	NA	176,310	**344,552**	**469,771**	**NA**	NA	66.30	30.75
Germany	NA	NA	39,376	**78,433**	**107,689**	**NA**	NA	64.31	31.44
Netherl'd	NA	NA	35,734	**69,564**	**97,343**	**NA**	NA	64.26	33.29
France	NA	NA	34,566	**67,508**	**94,466**	**NA**	NA	64.55	33.29
Lebanon	NA	NA	27,519	**53,637**	**75,057**	**NA**	NA	64.37	33.29
Qatar	NA	NA	26,029	**51,021**	**71,396**	**NA**	NA	64.87	33.29
Italy	NA	43,078	**70,969**	**138,690**	**194,075**	**NA**	48.91	64.60	33.29
S/Arabia	NA	34,752	**57,297**	**111,972**	**156,686**	**NA**	48.98	64.60	33.29
Turkey	NA	12,333	**20,333**	**39,735**	**55,603**	**NA**	48.98	64.60	33.29
Spain	NA	11,849	**19,536**	**38,177**	**53,423**	**NA**	48.98	64.60	33.29
India	51,377	**119,611**	**19,6811**	**384,616**	**538,208**	**79.81**	48.80	64.60	33.29
China	49,424	**114,691**	**189,094**	**369,535**	**517,104**	**79.54**	48.98	64.60	33.29
Ireland	26,237	**60,476**	**99,708**	**194,853**	**272,120**	**78.97**	48.98	64.60	33.09
Malaysia	17,854	**41,357**	**68,186**	**133,252**	**186,465**	**79.39**	48.98	64.60	33.29
Swissl'd	10,853	**25,084**	**41,357**	**80,822**	**113,097**	**79.20**	48.98	64.60	33.29
Canada	16,824	**38,949**	**64,216**	**125,492**	**175,606**	**79.34**	48.98	64.60	33.29

Source: Authors computation [Key: chg-change]

Table 6.17 shows the traffic volume of various countries in 2010 under different ASA rules, while the bold values indicate traffic projection of the countries when ASA level is deregulated to the next ASA level. The '% change' denotes the equivalent percentage change in traffic from the previous value. For instance, countries without direct traffic from Nigeria like India, China, Ireland and others can expect an increase in traffic by 79% if direct traffic commenced under restricted BASA. Also, countries' traffic governed by restricted BASA could have a 48% increase in passengers if ASA is deregulated to BASA commercial, while further deregulation to OSA model could attract an additional 64% of traffic demand. Further liberalisation could generate additional traffic demand by 33%. The values of percentage increase appeared to be uniform due to linearity of the model developed by OLS, but the actual traffic demand for each country is distinctive.

6.3.2 Impact on Traffic: Liberalizing Market Access

The forecasted increase in international passenger traffic to and from Nigeria due to liberalisation is depicted in Table 6.17, which shows the actual passenger volume traffic for the countries at various stages of ALI. The second column of Pax(ALI0) suggests passenger traffic volume when ALI was 0 which implies no direct traffic between Nigeria and the country. The countries without direct traffic but with reasonable passenger volumes were India, China, Ireland, Malaysia, Switzerland, and Canada. However, the model simulated and forecasted these countries traffic with restricted BASA (ALI=10) which generate additional passenger volume, as indicated in the corresponding value of Pax(ALI1). These passenger volume increases are evaluated to be about 79% as denoted in column 7 of Table 6.17. This suggests that countries with reasonable passenger demand with Nigeria but without direct traffic could witness an upsurge in passenger traffic demand by about 79% if direct air flight service is started under regulation of restricted BASA. However, the research could not determine the reasonable period to observe the growth, but InterVISTAS-EU Consulting (2009; UKCAA, 2006) suggested a period of 1 to 2 years is enough to witness some of the impacts of traffic growth as witnessed between the UK and India. But in some cases, the effects spread across many years as was the case in Europe and US.

Also, under Pax(ALI1), there were countries with current traffic governed by the restricted BASA, namely Italy, Spain, S/Arabia, and Turkey. The traffic of the countries governed by restricted BASA if simulated with BASA commercial (ALI =16) could generate a corresponding increase in passenger traffic demand as shown in Pax(ALI2), which was estimated to be about a 49% increase in all the countries traffic as shown under %change1. Therefore, the research concludes that changing the regulation from restricted BASA to BASA (commercial) could instigate a 49% increase in traffic demand. Similarly, the five countries without direct traffic are simulated to have 49% increases in traffic from the simulated traffic regulated by BASA restricted.

Already, countries like Germany, France, Netherlands, Qatar, UAE, and Lebanon have their traffic regulated by BASA (commercial). In most cases, it was the airline of these countries that will request, through separate MOU, additional frequency of flights or airport of arrival/departure from the restricted BASA signed by their country's government. Hence, the airlines enjoyed greater market access than other countries' airlines ruled by restricted BASA. This is evident in the volume of passengers carried by airlines as shown in Table 4.5, while Table 6.17 indicated the final destination of the passengers. Also, UK and S/African traffic were governed by restricted BASA which allowed multiple designations. As such, the ALI was enhanced to a value of 14, with the corresponding traffic value under Pax(ALI2). The research also forecasted the traffic scenario for these countries when regulation is relaxed to an open skies agreement (US model) where unlimited fifth freedom and multiple designation are granted, capacity is freely determined for any airline wishing to increase its flight frequencies or point of entry as permission for airlines entering commercial agreement with another country is not required. As a result, the model forecasted about a 65% increase in passenger traffic for the countries, as indicated in the Table 6.15 under ''%change2'' column.

The increase in traffic volume is comparable with other empirical evidence obtained in developed countries. For instance, UKCAA (2006) estimated in 2 years after liberalizing the UK–India route in 2004-2006, annual traffic grew from 87,000 to 181,000 passengers (108% increase). Also, Brattle Group (2002) projected additional transatlantic passengers between 4.1 million and 11.0 million from EU–US liberalisation policy.

However, there is no standard passenger traffic increase from the liberalisation policy with universal application as it depends on the routes. Accordingly, InterVISTAS-ga2(2006) claimed that the US open skies agreements with other countries stimulated traffic growth ranging from 21.1% to 174% in the first full calendar year after the traffic commenced.

6.3.3 Impact of liberalising carrier ownership

The last stage of ASA is the most liberal which lowers the regulation on carrier ownership and control to a more liberal provision of principal place of business for any carrier. The YD model incorporates all OSA provisions plus the liberalisation of carrier ownership that sum up the ALI to be 32. This was the type of agreement the country signed with some African countries, for example, Ghana, Egypt, Ethiopia, Kenya, Senegal, Benin, Sierra Leone, and Libya. Therefore, the research assumed that this will be the maximum liberal policy the country can accept, as such other countries' ASAs could be further liberalised to the country benchmark. As noted the only difference between YD and OSA is the carrier's ownership provision, which suggests that changing from OSA to YD will determine the impacts of liberalising carrier ownership and control. For this reason, the research simulated all the countries traffic to be regulated by YD, which is indicated by Pax(ALI4) in Table 6.17. The outcome shows that the traffic volume for each country was found to increase by about 33% (%change3). Therefore, the research concludes that liberalisation of carriers ownership in any Nigerian international traffic route could stimulate passenger traffic growth by about 33% in 1- 2 years. This value is almost similar to the other empirical study value, for example, WTO (2006) estimated impacts of removing ownership and control restrictions on international air traffic could stimulate a 34- 39% traffic increase in some countries.

6.3.4 Impact of liberalising combined market access and Carrier ownership

The research simulated the model to predict the impacts on traffic when all these countries ASA are changed to YD, which means liberalising market access and carriers ownership at the same time from each country regulation. The estimated traffic outcome is shown in Table 6.18.

Table 6.18 Traffic Increases due to full liberalisation

Country	LnPax	LnPax2	Pax1	Pax2	% Change
UK	12.797	14.141	361,132	1,384,708	117.26
USA	11.940	12.276	153,277	214,486	33.29
UAE	11.260	12.436	77,668	251,702	105.68
S/Africa	11.312	12.656	81,797	313,640	117.26
Germany	11.896	13.072	146,679	475,442	105.69
Netherland	10.893	12.069	53798	174,381	105.69
France	11.991	13.167	161,297	522,824	105.69
Lebanon	8.749	9.925	6,304	20,435	105.69
Qatar	8.773	9.949	6,458	20,931	105.69
Italy	11.253	12.933	77,142	413,743	137.14
S/Arabia	10.855	12.535	51,792	277,895	137.16
Turkey	10.037	11.717	22,857	122,639	137.16
Spain	10.840	12.525	51,021	275,130	137.43
India	11.623	14.141	111,636	1,384,708	170.16
China	10.527	13.047	37,309	463,703	170.21
Ireland	8.790	11.31	6,568	81,634	170.21
Malaysia	9.696	12.216	16,252	201,995	170.21
Switzerland	8.743	11.263	6,267	77,886	170.21
Canada	10.269	12.785	28,825	356,825	170.10

Source: Author computation

The results show that the level of growth of traffic in the market depends on the current ASA. For instance, UK and South African traffic could change by 117%, because the two countries have similar ASAs with Nigeria (ALI value of 14) as shown in Table 6.14. This implies that varying ALI from 14 to 32 could stimulate passenger demand by 117% from Nigeria to UK and South Africa. This is determined by the percentage increase of Pax2 over Pax1.

$$\%\ Change = (\frac{Pax2 - Pax1}{Pax1 + Pax2})100 \quad \text{---------------------------} \ (6.3)$$

Meanwhile, the current USA agreement had liberalised market access as such only carrier ownership liberalisation can make up the difference. Therefore, liberalising the withholding regulation can stimulate traffic growth by about 33%, as demonstrated by USA projected passenger traffic.

Moreover, countries whose traffic were regulated by BASA commercial like UAE, Qatar, Germany, France, Netherlands, and Lebanon could have a traffic growth of about 105% when market access and carrier ownership are liberalised together. The combined percentage increase differs with the percentage increase due to market access and withholding liberalisation separately, as seen in Table 6.2. This is due to the nonlinear relationship between ASA variable and the real value of traffic demand that led to transforming the traffic into logarithmic form in the model.

Similarly, countries whose traffic was administered by restricted BASA when ALI is 10, the model forecasted the traffic growth by about 137%, if market access and airline ownership regulation are liberalised at the same time. The countries that can have such increase include Italy, Spain, Turkey, and Saudi Arabia.

However, countries without direct traffic from Nigeria, but with reasonable and potential passenger traffic have the greatest impact with a 170% increase if direct schedule passenger traffic is initiated with the liberalisation of market access and carrier ownership. These countries include India, China, Malaysia, Ireland, Switzerland, and Canada. The research discovered that these countries had BASA with Nigeria, but were not effective. For instance, China Eastern Airlines was operating the route from 2005 to 2007; also, Swiss Air had been in the market for a long period up to 2002 when the airline collapsed.

In summary, the overall impact of liberalisation on traffic of passengers could be schematically represented by the diagram in Figure 6.16 below.

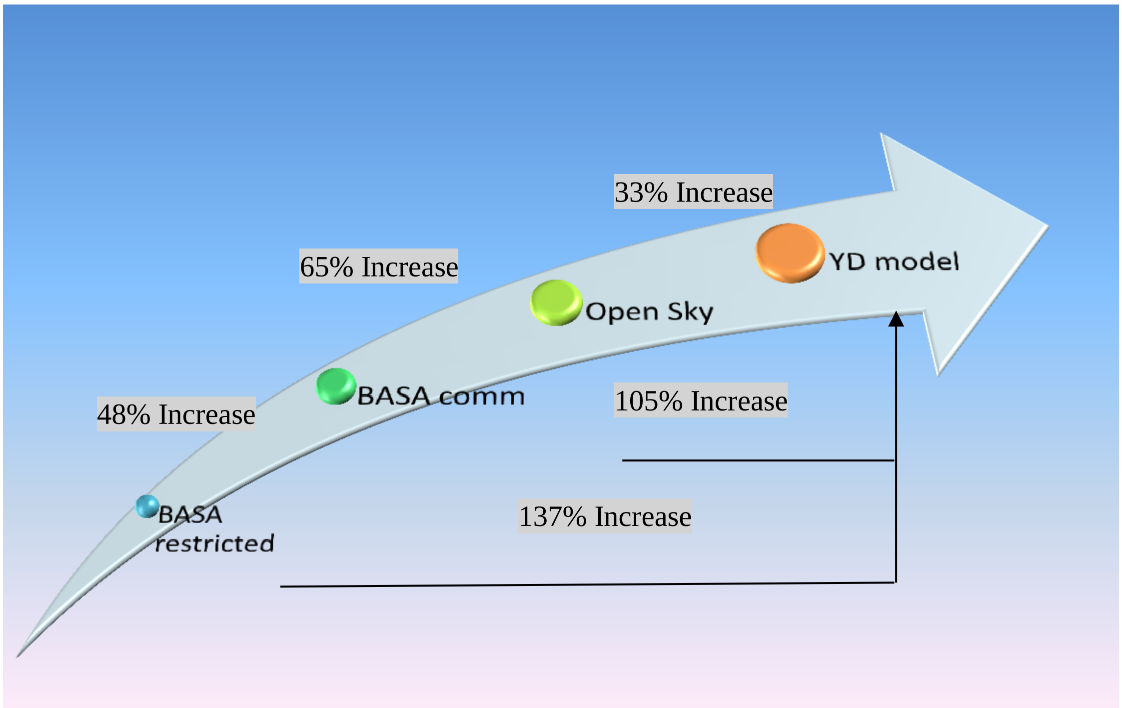

Figure 6.16 Liberalisation Impacts on Passenger Traffic on Different ASAs

Figure 6.16 shows the level of liberalisation at each point of ASA, indicating that the thicker the arrow the more liberal. Also, it shows the impact on traffic growth when the ASA is changed to another ASA level.

Traffic regulated by BASA (restricted) if deregulated to BASA commercial could generate a 48% traffic increase, also further deregulation to Open Skies can increase the traffic by 65%, while enhancing the liberalisation level to YD model from Open skies could cause additional traffic demand of 33%. The arrow also suggested that liberalising BASA restricted to YD directly could cause traffic increase by 137%, while direct liberalisation BASA commercial to YD model can cause traffic increase by 105%.

6.4 Impacts on Air Fare and Passengers welfare

The research has now established that liberalisation could stimulate traffic growth at various levels depending on the original ASA as was predicted by accepted theories and empirical studies. However, the resultant increase in traffic has a multiplier effect on the market and the airports. For instance according to demand elasticity theory, change in passenger traffic could generate a corresponding change in price in the opposite direction. Thus, mathematically;

$$\boldsymbol{Price\ Elasticity} = \frac{\%\ \boldsymbol{Traffic\ Change}}{\%\ \boldsymbol{Air\ fare\ Change}} \quad \text{------------------------} \quad \textbf{(6.4)}$$

This implies that; $\%\ \boldsymbol{Air\ Fare\ reduction} = \frac{\%\ \boldsymbol{Increase\ In\ Traffic}}{\boldsymbol{Elasticity}}$ ------------------ **(6.5)**

Meanwhile, according to InterVISTAS-ga2 (2006) country pairs without a direct service should have;

$$\%\ \text{Fare Reduction}_{\text{AB}} = \frac{2/3 \text{ x } \%\ \text{Traffic Increase}_{\text{AB}}}{\text{Fare Elasticity}_{\text{AB}}} \quad \text{------------------------}$$

(6.6)

It therefore means that the increase in traffic due to liberalisation will likely create a reduction in air fare assuming that other factors affecting air fares remain the same. In this regard, the research uses the theory to estimate the likely resultant change in air fare. However, the reduction in air fare has an impact on passengers by increasing their expenditure saving giving rise to consumer welfare or consumer surplus which refers to the difference between what consumers are willing to pay and what they actually pay (OECD, 1993).

Furthermore, InterVISTAS-ga2 (2006) suggested that consumer welfare in air transport due to liberalisation is a product of average fare saving and the number of existing passengers, added to the product of half average fare saving and the number of new passengers. Thus;

$$\boldsymbol{Consumerwelfare} = (\boldsymbol{FareSavingXNoofPassengers}) + \frac{\mathbf{1}}{\mathbf{2}}(\boldsymbol{faresavingXNo.ofnewpassngers}) \text{-- } \textbf{(6.7)}$$

In addition, fare reduction estimation assumes that for country-pairs with a direct air service prior to liberalisation, traffic stimulation was attributable to fare reductions; while for country-pairs that did not previously have a direct service, two-thirds of the traffic increase was attributable to fare reductions and one-third was attributable to improved service levels – direct service, frequency increase (InterVISTAS-EU Consulting, 2009).

The total consumer welfare is the average savings of the existing passengers in the market due to fare reduction, plus half of the savings of additional passengers able to access air transport due to liberalisation (see section 3.12.3 for details).

With the use of the above theories of elasticity and consumer welfare, the research computed all the countries expected air fare reduction and consumer surplus from the stimulated traffic. The outcome is provided in Tables 6.17, 6.18 and 6.19.

Table 6.19 Estimation of Elasticity of demand

Country	Av Fare (09)	Av Fare(10)	Traffic(09)	Traffic(10)	%Chg F	%Chg T	Elasticity
USA	1,194	1,028	96,599	152,188	-14.87	59.35	-3.99
France	1,109	944	35,109	34,566	-16.13	-1.56	0.09
Germany	521	477	39,964	39,376	-8.83	-1.48	0.17
Italy	598	561	44,843	43,078	-6.31	-4.01	0.64
Neth'lands	918	880	47,423	35,734	-4.24	-28.11	6.63
Spain	597	581	11,377	11,796	-2.68	3.62	-1.35
Switzerland	1,182	1,151	11,660	10,853	-2.72	-7.18	2.64
UK	677	621	338,576	392,528	-8.55	14.76	-1.73
S/ Africa	596	557	72,058	107,266	-6.84	39.27	-5.74
Lebanon	595	602	27,108	27,519	1.23	1.50	1.23
Qatar	595	573	14,009	26,029	-3.79	60.04	-15.84
S/Arabia	512	549	16,400	19,530	6.98	17.42	2.49
UAE	621	603	113,816	109,680	-2.83	-3.70	1.31
Turkey	522	506	11,803	12,276	-3.06	3.93	-1.28
China	730	675	42,735	49,424	-7.87	14.51	-1.84
Malaysia	894	776	12,139	17,855	-14.21	38.11	-2.68
Ireland	353	323	30,136	26,237	-9.07	-13.83	1.52
India	578	578	34,833	51,377	-0.15	38.38	-245.71
Canada	835	853	16,977	16,824	2.12	-0.91	-0.43
Total	13,629	12,838	1,017,565	1,184,136	-5.97	15.13	-2.53

Source: IATA PaxIs, Authors computation

Table 6.19 shows the original passenger traffic volume and the average air fare for the year 2009 and 2010 on the routes given by IATA PaxIs in column 2 and 3 respectively. From the two years' traffic, the research determines the elasticity of each country's traffic and the average for all the routes using equation 6.4. However, since elasticity differs significantly on each route per year, because of the difference of life cycle for each route, while some routes were just at a developing stage like Qatar, and USA. As such there is the are possibility of rapid change in a year which cannot represent another year as a longer period of results is preferable, but in the absence of longer period data, the research uses the average elasticity of the market across all the routes, so as to reduce mismatch.

Table 6.19 shows the average price elasticity estimates for the Nigeria air travel market to be -2.53, which falls outside the standard air travel elasticity globally estimated in some previous studies. For instance, Gillen, Morrison and Stewart (2003) ied price elasticity in air transport for different length and purpose of journey globally, and developed a standard chart of price elasticity which ranges from -0.26 to -1.7. This is the most widely cited value of price elasticity of demand for air travel. But in 2007, IATA developed another elasticity charts table for all international regional countries which addresses the major shortcoming of the earlier figures for 2003. In these new elasticity charts, countries are grouped according to their geographical location. The table shows that elasticity ranges from 0.36 to 1.96. The study identified Sub Saharan Africa and the Transpacific region as having the lowest elasticity while the European market has the highest elasticity.

The research found the elasticity estimates of -2.5, which was the average for all the routes in the market, may have been influenced by specific routes regarded as outliers in the market trend. As shown in Table 6.19, some notable extreme cases like Qatar, India, Netherlands, S/Africa, USA and France routes could be outliers in this market trend. Therefore, the research estimated another value of market elasticity from the average of the routes without the outliers and was found to be -0.6 which implies that the market was inelastic as the proportional change in quantity demanded is less than the proportional change in price, and in some cases the demand is independent from price changes (Vasign, et al, 2008).

This estimated value of -0.6 falls within the accepted standard value of elasticity, but applying this value to the change of traffic demand forecasted in Table 6.18 in evaluating the likely change in air fare based on theory of elasticity may lead to an unrealistic significant drop. For instance, change in passenger traffic due to change in liberalisation level as shown in Table 6.18 could cause a reduction in air fare of between 365% and 1182 % on various routes, which the research considered a flawed assumption. Hence, the research assumed that the market was highly inelastic and has little influence on air fare. This also suggested that passengers are likely to not benefit from consumer welfare.

Using the average market elasticity of -2.5 and applying it to the routes reveals the predicted percentage change in air fares as well as reductions in air fare (regarded as passengers air fare savings) and these are detailed in Table 6.20 below.

Table 6.20 Estimation of Air fare saving

Country	% Change Traffic	%chg fare	Orig fare ($)	Fare saving ($)	Current traffic
UK	117	-46.29	621	-287.61	392,528
USA	33	-13.14	1028	-135.16	152,188
UAE	106	-41.72	603	-251.64	109,680
S/ Africa	117	-46.29	557	-257.73	107,266
Germany	106	-41.73	477	-199.10	39,376
Netherland	106	-41.73	880	-367.18	43,078
France	106	-41.73	944	-393.79	34,566
Lebanon	106	-41.73	602	-251.17	27,519
Qatar	106	-41.73	573	-239.06	26,029
Italy	137	-54.14	561	-304.00	43,078
S Arabia	137	-54.15	549	-297.29	19,530
Turkey	137	-54.15	506	-274.20	12,276
Spain	137	-54.26	581	-315.39	11,796
India	170	-44.79	578	-258.65	51,377
China	170	-44.80	675	-302.32	49,424
Ireland	170	-44.80	323	-144.52	26,237
Malaysia	170	-44.80	776	-347.57	17,855
Swiss	170	-44.80	1151	-515.46	10,853
Canada	170	-44.77	853	-381.96	16,824

Source: Authors computation

Table 6.20 indicated that for each country, traffic growth due to full liberalisation to YD model represented by % change Traffic (extracted from Table 6.15), there is an expected change in air fare (assuming all other variables remain the same) given as % change fare. This percentage change of the original air fare (Orig fare) produced the average reduction in air fare (fare saving) using equation 6.5 for countries with direct traffic, and equation 6.6 for countries without direct traffic.

As shown, the highest fare reduction came from routes whose countries had a restricted BASA that could enjoy up to 54%, while USA traffic has the lowest price reduction of 13%. This implies that the greater the preceding liberalisation level the lower the price reductions for passengers when full liberalisation is achieved. But countries without direct traffic ideally should have benefits because these country-pair liberalisations led to the highest traffic growth (by 170%). However, this might not be the case because according to InterVISTAS-EU Consulting (2009) the countries without prior direct traffic can only enjoy fare reductions of two thirds of the countries with direct traffic. In this regard, the six countries' travellers benefitted from a 44% fare discount, if direct traffic under full liberalisation could be put into effect. Therefore, the amount of savings accruing to each passenger (in US $) as derived from the original air fare is computed as "Fare" saving. This is regarded as a benefit to passengers when the countries' traffic are governed by full liberalisation policy on the assumption that other variables like GDP, trade, inflation and other socio-economic factors remain constant as they were before full liberalisation. Also, it is assumed after full liberalisation both countries' airlines are capable of meeting the additional traffic demand.

Furthermore, from the air fare saving of each passenger and number of passengers both initial and projected, one can deduct the consumer welfare for the industry using equation (6.7). The research establishes consumer welfare from the total fare savings of the existing passengers and the total savings of additional passengers. The value shows that consumer welfare depends on the route, passenger volume, current price, and individual saving (Table 6.21).

Table 6.21 Estimation of consumer welfare

Country	Actual traffic	Projected Traffic	Savings for Pax ($)	Savings for New Pax ($)	Consumer Welfare ($)
UK	392,528	1,080,571	112,896,164	98,945,023	211,841,186
USA	152,188	214,486	20,570,150	4,210,189	24,780,339
UAE	109,680	301,342	27,600,229	24,115,179	51,715,408
S/Africa	107,266	469,771	27,646,123	46,714,936	74,361,059
Germany	39,376	107,689	7,839,719	6,800,493	14,640,212
Nethel'd	43,078	97,343	15,817,260	9,962,505	25,779,765
France	34,566	94,466	13,611,903	11,794,236	25,406,139
Lebanon	27,519	75,057	6,911,883	5,969,974	12,881,857
Qatar	26,029	71,396	6,222,444	5,422,699	11,645,143
Italy	43,078	194,075	13,095,609	22,951,365	36,046,974
S/Arabia	19,530	156,686	5,806,101	20,387,675	26,193,776
Turkey	12,276	55,603	3,366,034	5,940,109	9,306,143
Spain	11,796	53,423	3,720,296	6,564,320	10,284,616
India	51,377	538,208	13,288,917	62,960,601	76,249,517
China	49,424	517,104	14,941,967	70,695,068	85,637,035
Ireland	26,237	272,120	3,791,640	17,766,923	21,558,563
Malaysia	17,855	186,465	6,205,891	29,302,062	35,507,952
Switzerl'd	10,853	113,097	5,594,288	26,351,315	31,945,603
Canada	16,824	175,606	6,426,031	30,323,947	36,749,978
Total	1,191,480	4,774,510	315,352,648	507,178,619	822,531,267

Source: Authors Computation

Table 6.21 provided the estimates of the consumer welfare of various country routes for both the existing passengers and the projected passenger increase due to liberalisation using equation 6.7 in the above. For instance, consumer welfare on UK route traffic is estimated as:

Current Passenger savings = Fare Savings (as in table 6.18) X Current no. of Pax ------ (6.8)

= (287.61)*(392528)

= $112,896,163

New Pax savings = ½(Fare savings)*(additional Pax) ----------------------- (6.9)

= ½(287.61) (Projected traffic – original traffic)

= ½(287.61) (1080571-392528)

= $98,945,023

Consumer welfare = fare savings of current passengers + New Pax Savings ----------- (6.10)

= $112,896,163.57 + $98,945,023

= $ 211,841,186

Table 6.19 provided all the expected consumer welfare to be derived from full liberalisation of all the 19 routes. From the outcome, UK travellers have the highest total consumer welfare due to high traffic volume to /from Nigeria and high impact on traffic change which if further deregulated could generate additional traffic demand by 117%. As shown in Table 6.16, high welfare impacts on India and China is a result of expected high traffic demand change from anticipated direct traffic between Nigeria and these countries to be deregulated to full liberalisation (YD model). However, countries with an expected low level of consumer welfare benefits like Ireland, despite the anticipated high traffic increase by as much as 170%, may be due to low value of average air fare between Nigeria and Ireland. But Turkey's low value of consumer welfare is as a result of anticipated low traffic demand increase between Nigeria and Turkey even after full liberalisation, may be due to the absence of any significant socio-economic relationship between the two countries as suggested by the current trade volume.

However, the total consumer welfare to be enjoyed by the travellers in the market if the country will liberalise its ASA with the top 19 traffic destination countries is estimated to be **US$822 Million.** This is made up of current passenger savings of **US$315 Million** and expected additional passengers savings of **US$507Millions.** This is to say the current international passengers in country could enjoy an average saving of US$264.67 per person if full liberalisation was enforced.

Therefore, the research has proved that full liberalisation of ASA in Nigeria could stimulate total annual traffic growth by about 120% which in turn lowers air fare due to competition from new entrants and additional flight frequency from the existing airlines, or the airlines could operate the route with larger aircraft. The lower fare could make the existing passengers have some savings of about US$264.67 per passenger in a year.

6.5 Traffic growth and Airport capacity

In order not to create an imbalance between traffic demand and infrastructural capacity management, the research evaluated the possible capacity challenges from the significant traffic increase as a result of liberalisation of the industry. This view is supported by Yahaya (2006) who reasoned that as traffic demand approaches capacity, system congestion and delays increase sharply, a situation that alerts the authority to initiate actions to remedy the situation in the intermediate and long term.

In view of this concern, the research assesses the capacity of the four Nigerian International airports based on the three key components, terminals capacity, apron capacity, and the runway. In this regard, FAAN (2009) provided the following as the designed peak capacity of its airport infrastructure.

Table 6.22 Nigeria International Airports designed capacity

Airport	Critical A/C	TBDC (Pax/H)	Apron Capacity	Runway
Lagos (MMIA)	B747 Concord	3,675	Tier1- B737-747 (X14) Tier2-B737-747 (X 6)	2
Abuja (Int'l)	B747	1,645	B737(X8)	1
Kano	B747	520	B747(X11)	1
Port Harcourt	B747	350	B747(X10)	1

Source: FAAN (2009)

Table 6.22 shows that each of the four airports has the capacity to accommodate up to B747 aircraft type which used to be the biggest commercial aircraft commonly used. In addition, Lagos international airport can accommodate Concorde aircraft type. However, in terms of the passenger terminal capacity depicted by Terminal Building Design Capacity (TBDC), each of the airports has one terminal with different capacity size, Lagos being the largest can accommodate a maximum of 3,675 passengers per hour from its D and E pier. This is followed by Abuja international airport that can take on 1,645 passengers in Peak hour from C pier. But Kano and Port Harcourt Airports can only conveniently handle a maximum of 520 and 350 passengers per hour respectively as per the designed TBDC. On the apron capacity, Lagos Int'l airport is capable of holding a maximum of 20 aircrafts per hour which can comprise fourteen aircraft of B737-B747 type on Tier1 and six of B707 type on Tier2. Also, Abuja Airport has the designed capacity to take four of B747 type and eight of B737 as a maximum limit per hour, while Kano and Port Harcourt Int'l Airports as designed could accommodate a maximum number of eleven and ten B747 aircraft per hour respectively.

In view of the above limitation of airport capacity in the country, the research assessed the requirements of the projected passenger traffic in order to determine if they can be accommodated by the designed capacity of the airport infrastructures in the country.

To evaluate the capability of airport terminal capacity, the research employs the standardized 'Typical Peak Hour Passengers' recommended by the US Federal Aviation Administration (FAA) as measure of assessing capacity demand. A typical peak hour passenger (TPHP) is defined as the peak hour of the average peak day of the peak month in a year (Ashford, et al., 1997). To compute the TPHP from annual passenger traffic demand, the FAA recommended the relationship as in the Table 6.23 below.

Table 6.23 FAA recommended TPHP as % of annual traffic

Total Annual Passenger	**TPHP as % of annual traffic**
30 million and Above	0.035
20Million - 29.99Million	0.04
10Million - 19.99Million	0.045
01Million - 9.99 Million	0.05
0.5Million- 0.999Million	0.08
0.1Million- 0.499Million	0.13
Under 0.1 Million	0.2

Source: Ashford, et al., (1997)

From the above FAA recommendation, the projected annual traffic of 4,774,510 passengers should have TPHP of 0.05% of annual total, which is approximated to be 2,387 passengers. Therefore, the projected traffic is to have TPHP value of 2387, which is less than the main airport designed maximum capacity of 3675 passenger per hour alone. This implies that the expected traffic increase will be conveniently accommodated by the current capacity of the main country airport alone (Lagos International Airport). However, with additional support capacity from the other three airports, it means the country maximum TPHP is 6190 passengers (3675 + 1645 +520+ 350) and as such, there is no concern for infrastructure challenges. This evidence suggested that the current airport capacity can accommodate the anticipated increase of passenger traffic if full liberalisation of ASA is decided without system congestions or delays.

Also, from the THPH of 2387 passengers which laterally means an estimate of about 12 medium size aircrafts capacity of about 220 seats (B737 or A320). Therefore, the 12 medium size aircrafts are the maximum projected airlines required at the peak hour for the conveyance of 2387 passengers. In this case, also the apron capacity of 20 aircrafts per hour at Lagos International Airport can conveniently accommodate the aircraft.

Therefore, there is strong evidence to suggest that the terminal and holding apron are capable for accommodating additional increases of passenger traffic due to full liberalisation.

6.6 Summary of the Chapters findings

This chapter analysed the origins and destinations of international traffic from Nigeria to other countries of the world using 137 traffic values as the number of observations in the sample which represent over 95% of Nigerian annual international traffic. The model was developed using multiple regressions on cross sectional data of 112 country pairs with Nigeria in the year 2010. The analysis shows that a relationship between international traffic, the liberalisation level of Air Service Agreement (ALI), and socio-economic circumstances affect every route, and as a result, each country exhibits distinctive traffic demand. From the database a collection of international passenger volumes (Pax), aggregate GDP of country pairs with Nigeria (GDP), trade between the two countries (Trade), distance between the countries (Dist), level of ASA (ALI), and a dummy variable, the research calibrated the following model with the aid of the SPSS package;

$$\mathbf{lnPax = -21.629 + 0.184lnTrade + 0.985lnGDP + 0.084ALI - 0.000Dist + 1.202Dummy} \quad \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \mathbf{(6.11)}$$

The model was found to be statistically significant and explained 88.5% of the variation of traffic (R^2=0.785). Also other statistical parameters that prove the validity of the model include Adjusted R^2 of 77% and F test of 76.333 ($p< 0.000$). Also, other test values like normality, linearity, multi-collinearity and residual diagnosis (normality, heteroscedasticity, autocorrelation) have validated the assumptions of the multiple regressions. The model's arguments were further supported by another sample model from 2009 data, which generated almost the same model coefficients and confirms the relationship between variables.

By simulating the model, the research established the impacts of liberalisation of market access, and carrier's ownership separately.

The chapter concluded that liberalisation of market access could increase the traffic by 65%, while liberalisation of carrier ownership could spur traffic by 33%. But in total, full liberalisation of ASAs in Nigeria could stimulate total annual traffic growth by about 120%. As a result passenger welfare is increased from the expected saving by a reduction in air fare as suggested by the theory of elasticity. In this regard, there were two possibilities of elasticity in the market. The first elasticity value of -0.6 may lead to unrealistic reduction in price, while the second elasticity value of -2.5 could realized some reasonable consumer welfare to the travellers in the market if Nigeria liberalises its ASAs with the top 19 traffic destination countries.

The chapter discovered that the increase in traffic could demand a maximum of 2387 Typical Peak Hour Passengers (TPHP) in a year as recommended by US FAA, while the current airport capacity can handle up to 6190 TPHP which suggested that there may not be any alarm regarding capacity or inadequacy from anticipated increases due to full liberalisation.

Chapter Seven: Findings, Conclusion and Recommendation

7.1 Introduction

This chapter summarizes the discoveries of the research from the analysis and discussion of the last two chapters, which shape the findings of the research based on empirical evidences. The chapter reviews the extent to which the research objectives have been achieved, and also provides answers to the research questions from the findings.

In addition, with a comprehensive grasp of the liberalisation impact on Nigerian international aviation markets, the research has made some contribution to policy, theory and practice in the form of recommendations. Furthermore, this chapter discusses certain limitations of the research and also identifies opportunities for further research in the area of liberalisation in Nigeria.

7.2 Research findings

The research found that the reform policy that ushered in some aspect of liberalisation started in 1997 where YD was rectified, but serious commitment commenced in 2000 with the restructuring of the ministry and formulation of the National Aviation policy of 2001 which incorporates some of the liberalisation policy.

The research also observed that, even before full deregulation, the national carrier was struggling to meet its financial obligations, but immediately after deregulation, the government had no better option than to liquidate it due to the insolvency of the carrier. Therefore, the research concludes that deregulation aided the collapse of the already comatose national carrier.

The research found that the collapse of the Nigerian national carrier created a vacuum, with no robust carriers to be designated by the Nigerian government in most of the ASAs. Instead, the government entered into a commercial agreement with foreign airlines to increase flight frequencies, which attracted royalties for the additional flights. As a result, the government generated huge revenue from the royalties, while the airlines realized additional incomes, and the passengers experienced additional service frequency.

The research ascertained from the ministry the nature of the ASAs that Nigeria signed with over 50 countries throughout the world, of which some countries' routes have direct traffic services, while others routes lack direct traffic due to inadequate airline capacities of either one party or both, as in the case of India. However, for the active routes, in most cases the foreign carriers provided services where the Nigerian carriers were not able to provide services on 26 active international routes. For instance, in 2010, Nigerian carriers were only able to lift 17.86 per cent of the total international passengers in the country's market. This therefore suggests the dominance of foreign carriers that lifted 82.14 per cent of the market passengers as evident in Table 4.5.

The research reviewed the current Nigerian ASAs where the various levels of liberalisation under the main provision of traffic right exchange, airline designation, capacity control, tariff regulation, withholding condition on the designated airline, and provisions for commercial agreement in each agreement were evaluated. The research further discovered that most countries' ASAs were not fully liberalised but had some degree of liberalisation (ALI from 10–32). For a country to attain market access liberalisation in Nigeria market, the ASA should grant fifth freedom, free pricing, multiple designations, free determination of capacity and frequency. For a country to attain full liberalisation carrier ownership, they should have additional permission to allow principle place of business of carriers instead of flag carriers.

The findings show that some countries' provisions were similar and could be categorized into four different types thus: restricted BASA, BASA with commercial agreements, YD model, and open skies agreements. The YD signed as a multilateral agreement with African countries was the most liberalised ASA that deregulated market access and ownership control, and had an air liberalisation index value of 32, while restricted BASA was the least liberal with index value of 10.

The research discovered strong evidence that linked ASA and flight frequency of the designated carriers in the agreement, which showed that the more liberal the ASA, the higher the frequency of flights.

The research also discovered that the international traffic trend generated by the designated airlines from the four international airports in Nigeria had an average growth rate of 8.3 per cent per annum over ten years with a total record of 20.3 million scheduled passengers. This was higher than the global average growth rate of

5.5 per cent provided by ATAG in 2010. However, the market appeared to be both cyclical and strongly influenced by external factors, mostly social and economic in nature. For instance, it was discovered that an increase in the country's GDP by 1.34 per cent caused a corresponding increase in international passenger traffic by 1.0 per cent from 2001-10.

The analysis also found that the origin and destination of the country's market indicated direct traffic to 26 countries with mostly the partner countries' carriers as the major operators in the market, while the Nigerian carriers operated only on four countries' routes due to inadequate aircraft resources. Consequently, traffic was lopsided to the advantage of foreign carriers. For instance in 2010, foreign carriers airlifted about 86 per cent of the international passengers, while Nigerian carriers airlifted only about 14 percent, which make the country an importer of airline services that caused capital flight. For instance, CBN puts ticket sales' revenue repatriated in 2011 by foreign carriers at about $1.23 billion. This suggests that the country was losing a lot of foreign exchange in the importation of airline services.

The research discovered that about 85 per cent of total passenger traffic comes from the top ten destination countries while the remaining 15 per cent is from the other 15 countries. For instance, the UK had the highest direct route and even final destination of passengers with about 20 per cent of the country's total annual passengers in 2010.

Furthermore, an in-depth analysis of the top ten destination countries exposed some aspects of liberalisation impacts such as traffic growth, competition, expansion to other airports, and frequency of services in most of the routes, which was attributed to the various levels of liberalisation in ASAs.

It is widely acknowledged both in theory and empirical studies that liberalisation policy brings about competition in the market; in this regard the research observed that only the UK and Ghana routes were found to be competitive, with at least three carriers on each route competing for passengers, while the rest of the routes had a monopoly situation with the exception of the US and South African routes where a duopoly market existed. Hence, the liberalisation promoted competition on only a few routes. Notwithstanding, a new paradigm of continental routes traffic competition were opened.

In addition, the research discovered strong evidence of another level of competition in the market by network carriers in respect of the route and traffic type (direct or indirect). This competition exists in two segments: east- and north-bound traffic segments, which suggested that almost all the routes had alternative operators that could be indirect traffic. This suggested Nigeria ASAs have allowed indirect services to foreign carriers to any destination.

The east-bound segment was found to comprise traffic to Asian, Middle East and Pacific countries, where passengers have the option to select the airlines whose hubs fall on the routes. There were eight carriers in competition for about 30 per cent of the country's market share, including Ethiopia Airlines, Emirates, Qatar Airways, EgyptAir and MEA. The segment competition-level entropy value was 0.749, suggesting a very high competition level among the carriers which positively affected the quality of services, air fares, accessibility and convenience for passengers in Nigeria market.

The second market segment – north-bound traffic – comprises European and North American bound routes where passengers choose from the options of airlines whose hubs fall within Europe and the USA, namely: BA, Air France, KLM, Lufthansa, Iberia, Alitalia, Delta Airlines, Virgin Atlantic and Arik Air. The nine airlines compete for about 50 per cent of the annual market traffic with an entropy value of about 0.87 as the competition level. The competition among the airlines for east-bound and north-bound traffic was confirmed by the field survey findings.

The research also found from the survey of 568 passengers that about 75 per cent of them were business travellers, while 25 per cent were leisure and VFR travellers which suggests that the majority of the market passengers were price insensitive and concerned more with schedule, convenience and accessibility. These findings corroborate the analysis of secondary data and the model of traffic demand that shows price was not a significant factor in determining passengers demand.

Also discovered from the research survey, was that 63 per cent of international passengers in the market were Nigerian, while other West African nationals on transit for intercontinental traffic constituted 13 per cent, and African and European nationals comprised about 13.3 per cent and 5 per cent, respectively.

Furthermore, the research revealed that about 60 per cent of passengers were civil servants and business entrepreneurs – most of them in top management positions. Also, it was discovered that the average annual income of international passengers was $31,720.00, while the average age of the passengers was estimated to be about 40 years, and the mean number of trips by passengers in three years was five.

The research also discovered from the passenger survey that, due to the level of segment competition in the market, passengers had choice for most of their flights; as such, passengers selected their airline based on three top priorities, namely: air fare, flight convenience and schedule.

The analysis of passenger journey profiles in the survey was found to have strengthened the observations of the secondary data analysis on segment competition, routes and destinations of the carriers.

The research found that the causative factors for international traffic demand between Nigeria and other countries include: international trade, aggregate GDP, ALI (a proxy of ASA) and historical/cultural link or common language (represented by dummy). This is evident from the research model developed by a multiple regression technique.

The research also discovered that distance between Nigeria and any other country affects traffic demand in a negative manner as evident in the model. But the effect is relatively insignificant with coefficient value of 0.0001 as it can only have relative impacts if the distance is about 1,000 km or more.

The research discovered from the 112 countries' international traffic to/from Nigeria, that the relationship between international traffic, the level of air service agreement (ALI) and socio-economic circumstances affects every route, and as a result each country exhibits a distinctive traffic demand. Thus, an average country's traffic is represented by the model:

$$\ln\mathrm{Pax} = -21.629 + 0.184\ln\mathrm{Trade} + 0.985\ln\mathrm{GDP} + 0.084\mathrm{ALI} - 0.000\mathrm{Dist} + 1.202\mathrm{Dummy} \quad \text{---} \ (7.1)$$

The overall model for the relationships explains 78.4 per cent (R^2) of the relationship after including all the possible predictor variables with the exception of air fare.

The coefficients indicate the relationship between passenger traffic demand (Pax) and each other predictor, with all the coefficient t-stat values falling within acceptable limits of below –2.00 or above +2.00 at $p<0.005$, which suggests all coefficients were statistically significant. The model met all the assumptions of multiple regressions that validate it.

The research discovered that liberalisation of international air service is indeed a significant factor in the country's international traffic demand as evident in the model, with a positive coefficient value 0.084 (t-stat of 6.410 at $p<0.005$). This suggested that liberalisation is a driver for the demand of traffic which proves the hypothesis that the liberalisation of international air transport could stimulate traffic demand.

Also the research found that air fare is not statistically significant in determining the traffic demand in the country's international market. This is evident by the exclusion of air fare in the model with t-stat value of –0.983 at $p>0.1$, which suggests a typical dominance of business travellers in the market. To buttress this argument, the analysis of the international passenger survey by the research observed the dominance of business travellers against leisure travellers by 70 per cent to 30 per cent. Therefore, the field survey had substantiated the assumptions of the secondary data analysis. Even though air fare plays a significant role in the choice of airline for the traffic when compared with other factors as found in the survey.

The research discovered that the group of countries where traffic was regulated under BASA restricted would, when fully liberalised, have an estimated 137 percentage increase in traffic as the impact.

Also observed, countries where traffic was regulated by BASA (commercial) would, when fully liberalised, have an estimated increase in traffic of about 105 per cent.

Furthermore, it was found that a country with fully liberalised market access such as the USA, when carrier ownership was liberalised would have an estimated 33 per cent traffic increase.

The research concluded that liberalisation of market access could increase traffic by 65 per cent, while liberalisation of carrier ownership could spur traffic by 33 per cent.

Also, it was found that full liberalisation of the ASA in Nigeria could stimulate total annual traffic growth by about 120 per cent which, in turn, would lower air fares due to competition from new airline entrants and additional flight frequency from the existing airlines.

It is believed that lower air fares could increase passenger welfare from the saving of the expected reduction in air fare, as suggested by the theory of elasticity. In this context, the research realized that total consumer welfare to be enjoyed by travellers in the market if the country were to liberalise its ASA with the top 19 traffic destination countries is estimated to be **US$822 Million.** This is made up of current passenger savings of **US$315 Million,** and expected additional passenger savings of **US$507Million.** That is to say the current international passengers in the country could enjoy an average saving of US$ 264.67 per person if full liberalisation was enforced.

Moreover, the forecasted traffic increase is found to be incapable of creating an imbalance between demand and airport infrastructure capacity that could create delays and congestion, since the current designed capacity of the airport terminal of a maximum 6,190 typical peak hour passengers (TPHP) could effectively accommodate the projected demand of 2,387 TPHP in a year, based on FAA recommendations.

7.3 Derivative Findings

From the research analysis and findings, it is logical to use the following derivatives of reasoning as additional observations:

The country's abundant air transport infrastructure is grossly underutilized. This is evident from the total designed capacity of the terminal buildings of the four international airports that can handle 6,190 TPHP, while currently capacity for only 1,375 TPHP is being utilized. This suggests that about 77 per cent of the capacity is underutilized.

Liberalisation policy could be a strategy for enhancing the country's international traffic as found in the study; full liberalisation of the top ten routes could enhance annual passenger traffic by about 120 per cent, which would generate more revenue for the government and airports for sustainable development through passenger taxes, airport charges, landing and parking fees and fuel surcharges.

Liberalisation policy could lower air fares to be competitive enough that can attract more West African nationals to use Lagos Airport for intercontinental travels, which is one of the cardinal policies of Nigerian aviation policy. As at 2011, evidence has shown that neighbouring Ghana International Airport was providing lower air fares for UK travellers; therefore, there may be a tendency in the near future for Ghana's international airport to attract other West African nationals that currently constitute about 13 per cent of the Nigerian market travellers.

The research also observed that the growing traffic demand on the UK–Nigeria route could be frustrated by inadequate slots at Heathrow Airport. This is evident from the cancellation of all Arik flights from Abuja to London due to inadequate airport slots at Heathrow, despite the traffic right granted in the ASA. This suggests that lack of slots is a constraint to some countries' liberalisation development.

It is observed that difficulty in obtaining travel visas to Europe and the US by Nigerian citizens, especially for leisure purposes, is affecting the traffic demand to such countries; this is evident from the complaints of passengers in the survey, and also from the growing number of travellers to UAE, where visas are processed easily by the UAE national carrier.

In addition, the research found that sometimes there are delays in the issuing of visas to the prospective travellers and, as such, this affects the choice of carriers. However, from the composition of the travellers in the market, it is obvious such a situation would be a regular occurrence, because, according to research findings, over 90 per cent of the passengers were businessmen, civil servants, and other professionals on business trips, which most of the time are planned at short notice.

Despite the prospect of liberalisation found in the study, some of the negative impacts suffered by the market cannot be overlooked. For instance, the policy was not able to protect the national carrier which, together with other numerous challenges, led to its collapse in 2002. Also, huge revenue realized from international passenger traffic by the airlines ended up being repatriated by foreign carriers making the country suffered from capital flight.

7.4 Review of Research hypothesis, Aim and objectives

The null hypothesis argument of this research as stated in chapter one is that "*The liberalisation of market access and carrier ownership/control may not bring any meaningful increase in passenger traffic in Nigerian international air transport markets*".

The aim of the research is to study the impact of liberalisation of some aspects of international air transport services, specifically the issue of market access and carriers ownership/control on traffic demand in the Nigerian market.

Accordingly, the research outlines the following key objectives of the research;

- To review the country's ASAs in determining the level of liberalisation with the aid of the WTO index of liberalisation.
- To study how ASA changes affected international air traffic demand in the Nigerian market.
- To determine the socio-economic characteristics of international travellers in the market with a view to understanding the market implications of changing the liberalisation level.
- To determine the impacts of liberalisation on traffic demand, passenger welfare and airport capacity in the market.
- To evaluate the impacts of further liberalising market access and carrier ownership.

7.4.1 Testing the hypothesis

Regarding the hypothesis test detailed in section 1.3 the findings rejected the null hypothesis based on the following reasons:

- The correlation between passenger traffic represented by lnpax and liberalisation represented by ALI has a moderately positive value of 0.56 ($p<0.05$) as shown in Table 6.3.
- The ALI coefficient in the model has a t-stat value of 6.41, which is also statistically significant at the 95 percent confidence level ($\beta=0.084$; $t = 6.41$; $p<0.05$). The coefficient value of 0.084 in this model implies that a unit increase of ALI can cause an increase in traffic demand by 8.4 percent in Nigerian international air transport market.
- Also the model application proved that liberalisation of market access induced additional passenger traffic by at least 65 percent, while carrier ownership liberalisation can trigger passenger demand by 33 percent in Nigerian country-pair market.

7.4.2 Level of Achievement of Research Objectives

Objective 1: In evaluating the level of achievement of the first objective, which was to review the country's ASA and determine the liberalisation level using the WTO index, the research was able to collect documents from the Federal Ministry of Aviation (FMOA) in Abuja on each country's ASA, although the information came in lengthy agreements between two countries. The research was able to summarize some of the fundamental provisions of the agreements on traffic right exchange, airline designation, capacity control, tariff regulation, withholding condition on the designated airline, and commercial agreement. However, to ascertain the validity of the information supplied by FMOA, the research contacted some countries for validation.

The research was able to review all countries' agreements, but focused more on the countries with active agreements or high traffic demand. The analysis and findings are discussed in detail under section 4.2 and 4.3 of the research work.

Therefore, it is believed the research objective have been achieved completely.

Objective 2: To study how ASA changes affected international air traffic demand in the Nigerian market. Since the research scope was passenger traffic, the research collected data on the international passenger traffic volume transported by the designated carriers from 2001 to 2010 in the market. The data were only for direct traffic from Nigerian airports and provided by NCAA and FAAN. The data were analysed using descriptive statistics, tabulation, charts and entropy. The analysis towards achievement of objective 2 led to some research findings such as total market traffic trend, rate of traffic growth, traffic in relation to the country's GDP, top 25 countries' destinations, route competition, and segment competition by network carriers, major airline operators' market share, and final destination of each route's traffic. The detailed discussion of the analysis is under section 4.4 and 4.5. However, there were some limitations for evaluating the impacts; therefore, research objective number 2 is achieved within the scope.

Objective 3: To determine the socio-economic characteristics of international travellers in the market with a view to understanding the market implications of changing the liberalisation level. This led the research to conduct a field survey where international passengers on departure were administered a questionnaire that sought relevant information on the demographic and journey profiles of the passengers. The analyses of the data in this case include: descriptive, cross-tabulation and charts (see chapter 5). The main findings here reinforced some assumptions of the secondary data, as well as the demographic profiles of the passengers. It is therefore observed that research objective 3 has been completely achieved.

Objective 4: This determines the impacts of liberalisation on traffic demand and passenger welfare in the market. Due to the shortcomings of the NCAA data, which could not identify final country of destination of recent traffic, the research had to collect other data on the origin and destinations of all countries to/from Nigeria from IATA PaxIS for 2009 and 2010. In addition, data on the other variables such as aggregate GDP, international trade, distance, air fare and historical link with other countries were collected, together with the air liberalisation index developed for objective 1, the research developed a cross-sectional multiple regression model of the country's international traffic demand for passengers in relation to the independent variables. The standard model evaluated the impacts of each of the independent variables, including the ALI; however, the impacts of liberalisation known from the model suggest that an increase in liberalisation index could spur traffic growth. Therefore, using elasticity theory, the research estimated that a drop in price could lead to consumer welfare. The details of the analysis are discussed in section 6.2 and 6.3. Thus, the chapter achieves objective number 4 completely within the research scope.

Objective 5: Evaluating further impacts of the liberalisation of market access and carrier ownership. In this situation, the research simulated the model and forecasted the likely scenario for traffic when market access is liberalised and also when carrier ownership is liberalised. This was achieved with application of the model as estimated and explained in section 6.3 and 6.4. Hence, objective 5 is completely achieved.

In general, within the scope and limitation of the research, the aim and objectives are completely achieved. However, the impacts of liberalisation are a very wide and complex issue.

7.5 Research Recommendations

In view of the above research findings, the research deems it necessary to offer some useful suggestions in the form of recommendations to policy makers, industry players (airlines and airports, as well as academics).

Going by the findings of the study, it suggests that liberalisation has a significant economic impact on the air transport market and passenger welfare, which if the country market is fully liberalised could increase traffic demand by about 120 per cent, and augment consumer welfare by up to $822 Million annually, while the major cost implication is the potential loss of revenue to home carriers. However, in order to maximize this opportunity and mitigate the cost of capital flight, the Nigerian government could liaise with multinational investors and the private sector to jointly set up a new national carrier that can compete effectively in the market. Such a national carrier should be managed independently from the control of government so as to avoid a repeat of the collapse of the former national carrier in 2002.

Alternatively, with the full liberalisation of carrier ownership, the Nigerian government should encourage one of the major global network carriers to collaborate with private airlines for investment and ownership in the country in the form of airline consolidation or equity investment, but with the principle place of business being in Nigeria, so as to qualify it as a designated carrier in the ASA. However, care should be made to avoid the repeat of Virgin Nigeria's catastrophic ending.

The benefits to be derived from ownership/control liberalisation include: access to international funding from other countries of the world; technical and managerial expatriates could be involved in management of the airlines; and cost efficiency and network synergy that could lower air fares (InterVISTAS-EU Consulting, 2009).

For future ASAs, the Nigerian government should critically examine the air transportation system of the other countries, so as to identify some contemporary issues that can be of concern to the implementation of the agreement; such concerns should be addressed at the beginning, otherwise they could create problems caused by international traffic generated by the ASA. For instance, carbon emission charges and slot allocation issues applicable to European countries are indeed obstacles to achieving the intended outcome of more open ASAs. As noted earlier, a lack of airport slots at Heathrow Airport led to the cancellation of traffic by the Nigeria designated carrier (Arik Air) from Abuja–London despite the right granted by the ASA.

There should be a regular periodic review of the ASA for each country every four years so as to incorporate new developments and unforeseen challenges arising from the implementation of the agreements. Some of the agreements were long overdue for a review.

To strengthen the competition in the industry against possible price collusion by carriers most especially where duopoly exist as in some routes in the market, the Nigerian government should establish an antitrust law that could regulate the competition practice in the country's market. Otherwise, the case of BA and Virgin Atlantic in 2006 where the UK and USA governments penalized the two carriers for colluding in fixing the air fares on UK–US routes could be replicated.

The research findings from the passenger survey that showed that business travellers comprised about 75 per cent and 25 per cent were travelling for leisure/VFR purposes should be a matter of concern to the government. This suggests a low level of tourism activity; either the country is not a tourism centre or the industry is not attracting a reasonable number of international tourists.

The average rate of growth of international traffic from 2001 to 2010 was discovered to be about 8.3 per cent per annum, though volatile. Policy action needs to be taken to meet the growing demand that can ensure an increase in the supply of international air services. Otherwise, the benefits of liberalisation could be a delusion. This could be achieved in several ways: (1) the idea of establishing a new national carrier as suggested earlier; (2) liberalisation of the country's market access where the current designated carriers can have the opportunity to increase their supply when the demand rises in the market; (3) liberalisation of both market access and ownership where foreign carriers can have the opportunity to expand their operation or even establish a subsidiary in the country.

In order to appreciate a more significant impact of liberalisation on air fare (significant drop) as in other parts of the world, a low-cost carrier model for business has to be involved in the country's market. The government should encourage other country parties with such capability to designate such a carrier in future agreements or reviews.

7.6 Contribution of the Research to the Theory, Policy and Practice

The research findings could be an immense contribution to policy makers, academic theory and industry operators; in this regard, the researcher believes that the following need to be considered.

7.6.1 Policy makers

The research findings could provide a guide to Nigerian policy makers in air service agreements with other countries considering air liberalisation policy. They inform the policy makers of the actual impacts of liberalisation on the country's market and suggest some ways of mitigating the negative impression about liberalisation policy. Also, they provide a template for estimation of traffic change when the country's BASA is changed from one stage of ASA to another.

It may not be necessary to say the research findings should inform the decision but they may be of help to instigate further research or for comparison with an existing research outcome on a similar issue.

7.6.2 Air transport industry

The research findings may benefit major players of the industry such as airlines, airports, airspace agency and handling companies. Both national and international carriers should be concerned about possible or predicted market situations in the country as this will guide them on future investment decisions and prepare them for possible liberalisation.

Also, potential entrants to international service may benefit in getting an in-depth study of the Nigerian market, most especially the level of competition among the international carriers.

The airport authority and the handling company can use the travel forecast (in case liberalisation policy is further implemented) in determining the demand for their services for the purpose of investment planning.

7.6.3 Academics

This research may be useful to academic communities in these areas:

The research will reinforce the worldwide pool of knowledge on air transport liberalisation impacts and contribute to the argument on the country where such impacts are relatively unknown, more especially a country that exhibits a unique case, having more business travellers than leisure travellers with significant market potential and absence of a robust national carrier.

The discovery of the relationship between Nigerian international traffic and the historical link in terms of common language or culture is a new concept, although it is generally believed that such factors are highly correlated; however, the research further determines the actual value of the relationship.

In addition, the research added a new concept of using volume of trade between country-pairs as an exogenous variable in determining the traffic demand between the countries; it explained the quantifiable relationship between international trade and traffic demand between Nigeria and other countries.

The research developed a model that can evaluate the international traffic demand to/from Nigeria to any country based on GDP, International trade, ALI, and Distance between the 2 countries.

The research also constructed Air liberalisation index of the Nigeria ASA using WTO format, which might be helpful to policy makers and academia.

Finally, the research contributes towards the health of the academic discipline through reference material and citations.

7.7 Limitations of the Study

Traditionally, most research studies have some constraints and limitations, this thesis is no exception. The limitations of this thesis include the following:

Determination of liberalisation impacts on longitudinal modelling: this would enable the isolation of the exact time for the liberalisation to manifest. This was due to absence of data for a longer period, especially the data on O-D traffic to the final destination. Also, liberalisation policy is still relatively too new for actual long-term impacts to be assessed.

However, in view of the limitation of the study scope, the research was not able to determine the impacts of liberalisation to the wider economy, which include: the contribution to GDP; revenue generated by the market; direct and indirect employment provided; established links with tourism; and airline cost efficiency.

The construction of ALI based on WTO format is an estimation from a group of experts that assigned various weighted indices to some of the features of ASA. This could be contested by another group.

Also, the research could not establish the official views of airlines in the study. This has to do with ethical issues where such airlines regard as confidential information that can only be divulged by approval of their headquarters.

Moreover, the research findings could not be generalised beyond Nigeria case is another limitation.

7.8 Further Research

The research concludes by suggesting areas for further research on the liberalisation impacts in the countries similar to this study, thus:

Further research on liberalisation could be extended in determining the impacts of the policy to the wider economy of the country which this research was not able to achieve due to limitation of the scope. It would be interesting to evaluate the policy motivation for the nation's economy especially GDP, direct and indirect employment generation, and effects on tourism development, because many empirical studies believe that liberalisation affects the general economy of the country. For instance, InterVISTAS-EU Consulting, (2009) claimed that the policy led to the increment of Indian GDP (PPP) by $26,598 Million and created 241,200 employment opportunities in the Indian Aviation Industry.

Also, research on how air transport could be enhanced from tourism development in the country. The research discovered the ratio of business travellers to leisure travellers is 3:1, suggesting the possibility of a low level of tourism activity; either the country is not a tourism centre or the industry is not attracting a reasonable number of international tourists. Warnock-Smith & Morrell (2008) argued of the existence of implied interdependence between tourism and air transport. This suggests that tourism depends on transportation to bring visitors, while the transportation industry depends on tourism to generate demand for its services.

Also, another area for further research is the assessment of the impacts of international liberalisation on the domestic traffic in Nigeria. Such research would determine how the growth of international traffic provided by mostly foreign carriers due to liberalisation has affected the domestic traffic provided by local carriers. However, there is the possibility that, because of decentralization of international traffic, domestic traffic would probably be affected negatively, but otherwise it is generally believed that once international traffic increased, domestic traffic would follow suit.

Another area for research is to determine how liberalisation could reduce air fare disparity in West African sub regional traffic. It is a noticeable fact that traffic from West African cities to the same destination such as Accra–London, and Lagos–London has a significant fare disparity even by the same carrier. This was an issue of discussion in the aviation committee of the Nigerian parliament sometime in 2012.

Another possibility for a research area is the impact assessment of centralization of international traffic in Nigeria. The present arrangement of multiple designations of airports as point of entry and departure has some benefits and demerits, so also the centralization of an international hub which some countries practice. However, considering the country's situation of low passenger volume for international traffic (about three million passengers per annum), four international airports, and international traffic handled mostly by foreign carriers while domestic traffic is handled by indigenous carriers, further research is required that could advise the government on the best option.

Also, a study on the impact of implementation of the YD on African Airlines' business could be another research area of interest, since one of the goals of the agreement among the African countries is for the development of an African aviation business. Already, the programme has gradually been implemented since 1998. Therefore, there is a need to examine its impact on the airline business, because many believe that within the period more airlines collapsed than those established. But, according to some quarters, some airlines that are part of the YD community (such as

Ethiopian and Kenya Airways) have success stories which are good examples to be appreciated.

Also, another area for further research on the issue is by changing the methodological approach, as this research relied heavily on secondary data which was analysed quantitatively. An alternative approach could be adopted by relying on primary data through a questionnaire or interview with the industry practitioners, especially airlines, airports, civil aviation authority and other stakeholders. The opinion of these professionals on the impact of liberalisation could be scientifically analysed as another research pathway.

7.9 Summary of the Conclusion

The research set out to explore the impact of further liberalisation on international air transport in Nigeria and identified the level of liberalisation in the country's current ASAs, resulting international traffic performance, and liberalisation effects on traffic demand and market welfare among others. The general theoretical literature on the issue and other empirical studies provided an inconclusive discourse on the Nigerian liberalisation case, but offered useful directions for the research.

The research employed both secondary and primary data that were analysed using traditional methods of liberalisation analysis which include descriptive, entropy, and econometric modelling.

The empirical findings were able to achieve the objectives of the research within the scope. One of the salient research discoveries was that full liberalisation of market access and carrier ownership could spur traffic demand by about 120 per cent. The impact of the traffic increase could trigger a change in air fare that could increase consumer welfare. The expected massive traffic increase could also be conveniently accommodated by the current airport infrastructure.

In spite of the research findings about the impacts there are still some concerns, for which the research made some suggestions in the form of recommendations. In addition, areas for further research on the liberalisation issue were also suggested.

In general, this research is believed to have made a contribution to knowledge, both in theory and practice, which academicians, policy makers and industry practitioners could utilise.

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Appendices

Appendix 1: Freedoms of the Air (Traffic Rights)

The freedoms of the air were first established at the Chicago Conference in 1944 in order to provide a standardised basis for negotiation of bilateral air service agreements. In 1944 only the first five freedoms were identified, however, since that time another four definitions have been added. The nine freedoms of the air are:

First Freedom

The right to fly and carry traffic over the territory of another country without landing

Second Freedom

The right to land in another country for technical reasons, such as refuelling or maintenance without boarding or deplaning of passengers or cargo.

Third Freedom

The right of a carrier from one country to carry passengers or cargo from its home country to another country

Fourth Freedom

The right of an airline from one country to land in a different country, and board passengers travelling to the airline's own country

Fifth Freedom

The right of an airline from one country to land in a second country, to then pick up passengers and fly on to a third country where the passengers then deplane

Sixth Freedom

The right to carry traffic from one country through the home country to a third country

Seventh Freedom

The right to carry traffic from one country to another state without going through the home country

Eighth Freedom

The right to carry traffic between two points within a foreign country (i.e. domestic traffic) as an extension of a service starting or ending in the airline's own country (also known as tag-on or fill up cabotage).

Ninth Freedom

The right to carry traffic between two points within a foreign country with no requirement to start or end the service in the airline's own country (also known as pure cabotage).

Appendix 2: Summary of Literature review on Air Transport liberalisation

S/n	Author/year	objectives	Approaches	Methodology	variables	Findings	Reference
1	David Gillen, et al. (2001)	The impact of international liberalisation to 2nd tier airports open for international traffic on traffic, economy. -Evaluate impacts of changes in ASA	Ex poste analysis. Questionnaires Simulation.	Air Liberalisation Model. - Demand /supply elasticity model. - I/O model. Aggregate model	-Nature of ASA. Passenger volume. Revenue. Airport Employees	-International traffic level increases. -Decrease in local traffic within Europe. -Increase in LF, revenue, employment. -Boost tourism	The impact of Liberalising international bilateral (Case study of Northern German region) Book
2	Martin Grancay (Munich personnel Re PEC, archive) July 2009	To compare changes in demand caused changes in fare	Survey and Previous study	Econometric model, I/O analysis. Elasticity of demand	Income. Air fare. Travel demand	Enhance trade /tourism. Increase competition. Save cost. Enhance GDP. Job creation	Economic impact of Air Liberalisation. Research paper
3	Massino G Grosso and Ben Shephard. (Oct. 2009)	Examine a link between a more liberal air cargo and increase in bilateral trade in APEC	Secondary data analysis from WTO	Gravity model, Air liberalisation Model,	Export/import expenditure -production Transport cost. Bilateral tariff	More liberal air services are positively associated with high bilateral trade between countries	Liberalising Air cargo services in Asia pacific Region. (working paper)
4	Kenneth Button 2001	Assessment of European Air transport market	Historical data analysis	Comparative data analysis of pre and post liberalisation	Fare, Traffic volume, Consolidation of airlines	Lower fare. Structural change. More services. Efficient management	Deregulation & liberalisation of European Air transport market (Journal of sci. Research.)
5	Intervistas –ga & IATA 2008/09	Examine the impact of liberalisation ASA on traffic level, employment, economic growth, passengers, tourism, & airlines	Secondary data from IATA PaxIS, WTO	Regression Model, Gravitational Model	ASA,GDP, Air fares, O-D, service trade	Passenger traffic increase. Fare reduction. Increase in consumer surplus, employment, increase in GDP, weaken domestic carriers	The impact of international air service liberalisation on Brazil, Peru, S'pore and others. Report of Intervista consultants to IATA
6	Jin-Ru Yen, et, al. Sept. 2008	Assess the impact of domestic deregulation after period of implementation	Secondary data and field survey	-Market structure measurement, (HHI). No. of	Routes Traffic vol. Carriers market	-More competitive environment. Available alternative	The change in structure of Taiwan's domestic air

				Effective competitors. Concentration ratio. Regression method	share.	flight to consumer. Lower airfare	transport market in deregulation Journal paper, Taiwan university
7	Sotiriola Liasidou Americanos college, Nicosia, Cyprus. 2004	Air transport liberalisation impact on economy and the tourism	Triangular combination of qualitative and quantitative	Field survey. Expert interview. Secondary data	Traffic vol. No of airlines	-Competition and new entrants. -lower fare -improve services -accessible market -increase in revenue -Boost in tourism	Air transport Liberalisation and its impact on aviation and tourism. (case Cyprus) Paper presentation
8	David Warnock-smith (2008)	Evaluate the socio economic impact of Air transport liberalisation in the Caricon region	-Fixed effect regression. -Time series -Air liberalisation Index -Correlation analysis	-secondary data -field survey	O/D traffic GDP	Increase in traffic Increase in GDP Increase in passenger volumes Increase in overall welfare	Socio economics Impact of air transport: Evaluation of liberalisation gains for the Caricon region
9	Boaz Moselle, et al. (2002)	To analyse the effect of complete EU-US liberalisation by removing all commercial restrictions.	Elasticity of price/demand -comparative analysis of pre & post liberalisation. -Regression to forecast	Historical data review	-Airline operational cost. -Passenger traffics	-More efficiency in airlines. -Pricing synergy. -Output expansion -consumer surplus -Cost saving -Cross boarder flows of capital/labour	Economics impact of US-EU Open Aviation Area. By BRATTLE GROUP Inc. Commissioned by European Union
10	Rauf Gonenc, and Giuseppe Nicolette (OECD, 2001)	The effect of Regulation and market structure on the performance of Air transportation	Secondary data Measurement of Air transport efficiency	HHI Multivariate model. Regression. Data Envelop Analysis (DEA)	-No. of carriers -Market share of carriers -Carriers HHI -Domestic regulation -Govt control	-Productive efficiency increase with relax regulation -LF improves with competition -fare decline with competition -Cost efficiency -Network optimisation	Regulation, market structure and performance in passenger air transportation. (Economic study)
11	Nabuaki Edo Japan (2007)	Examine the impact of bilateral aviation framework on passenger air services imports focussing on US - Japan	Historical data. Comparative data analysis; pre and Post open sky era.	Gravitational model. OLS t-statistics	-Import of passengers. - Export of passengers. - BASA -GDP -Per capita	Traffic vol. Increases -Economics size has a larger impact on export than on import -US import more services from Japan. -The policy was	International trade in air transport services: penetration of foreign airlines in to Japan under US-Japan BASA

					income - Distance	negative to US export promotion. -Language has effect on travel between 2 countries pair.	Journal of Air trpt Mngt (elservier.com)
12	Frederic Dobruszkes (2009)	To analyse both the level and geography of air competition in order to highlight where passengers stand to benefit the most from the increase the no of airlines simultaneously operating on the same market.	-Survey of traveller's market competition. -Data for Pre and post liberalisation. - Uses OAG data base	Entropy instead of HHI	-Fares -yield -No of carriers -Routes -Level of competitors	-Development of new routes -Competition benefits passengers in cities and peripheral region. -Competition increase only on lucrative routes, and appears geographically limited concerning few routes	Does Liberalisation of Air transport imply increasing competition? Lessons from European cases Journal of transport policy
13	Vicente, Belen Re, Ana Rodrigues-Alverez, Pablo-millan (Spain universities) 2005	Compare the economic and technical efficiency of international air transport companies within liberalisation framework (1996-2000)	Math prog technique(DEA) -Econometric techniques 20 Airlines	Stochastic frontier for cost and production function	Input/output -LF -KM-Pax -KM-tonnes - Employee -Fuel used	Asian companies are more economically more efficient. -European and American firm low efficiency index. -Technical efficiency put Asian airline on top.	Liberalisation and efficiency in international air transport (Journal trpt) Elsevier.com
14	Youdi Schipper, Piet Rietveld, Peter Nijkamp Free University Amsterdam 2006	Competitive equilibria are compared with a regulated equilibrium to determine welfare implication of European liberalisation	Numerical solution using data for 21 airports in 1990	Comparative statics analysis	Departure frequency -Prices -Cost/profit -route structure -LF -Pax/route	-Consumer welfare significantly increase - Frequency increases - Fare decreases -Profit decreases -Environmental costs increases	Frequency, competition and environmental cost; Application to European Air transport liberalisation

15	Ian Thompson Glasgow University 2002	To examine the prospect of 3rd level airport in France from the liberalisation policy	Situational analysis	Theories and expert opinion analysis	-No of airports -Traffic vol. in the airports. -passengers	-Challengers carriers collapsed, high labour/fuel cost, subsidy cancelled, -3rd level airports future is ambiguous.	Air transport liberalisation and the development of 3rd level airports in France (Journal of Trpt) Elsevier.com
16	David Gillen, Richards Harris, Tae Hoon Oum (2002)	Measure the equilibrium changes and welfare consequences of liberalising air fare, entry and service levels of a bilateral air transport agreement.	Simulation of situation by varying the policy to forecast future output.	Trade policy analysis Demand/supply analysis Demand/ cost analysis Cost/benefit analysis	-Price/fare -Cost -frequency -OD market - Demand -Pax. Volume - no of carriers	-Removing entry restriction without pricing freedom will not have effect on consumer welfare and provide limited benefits to carriers. -Aggregate welfare gain is greater with price competition.	Measuring the economic effect of bilateral liberalisation in air transport (Journal of Trpt) Elsevier.com

Appendix 3: Air Liberalisation Indexing

According WTO (2006) ALI can be constructed from the

Grant of rights *defines the rights to provide air services between the two countries. In particular, the WTO study focuses on the fifth freedom, seventh freedom and cabotage. Fifth freedom is the freedom to carry freight/passengers between two countries by an airline of a third country on a route with origin or destination in its home country (6 weights). Seventh freedom allows carrying freight/passengers between two countries by an airline of a third country on a route with no connection with its home country (6 weights).Cabotage is the freedom to carry freight/passengers within a country by an airline of another country on a route with origin/destination in its home country (6 weights) (see Appendix 1, Table A1 for a graphical representation of these freedoms);*

Capacity clause *identifies the regime to determine the capacity of an agreed service. The capacity regime refers to the volume of traffic, frequency of service and/or aircraft types. Three commonly used capacity clauses are: predetermination, Bermuda I and free determination. Predetermination requires that capacity is agreed prior to the service commencement (0 weight); Bermuda I regime gives limited right to the airlines to set their capacities without a prior governmental approval (4 weight) and free determination finally leaves the capacity determination out of regulatory control (8 weight);*

Tariff approval *refers to the regime to price air services. The most restrictive regime is that of dual approval, whereby both parties have to approve the tariff before this can be applied (0 weight). The most liberal regime is free pricing, when prices are not subject to approval by any party (8 weights). The semi-liberal regimes are country of origin disapproval (where tariffs may be disapproved only by the country of origin (3 weights). Dual disapproval (where both countries have to disapprove the tariffs in order to make them ineffective (6 weights). Zone pricing (where parties agree to approve prices falling within a specific range and meeting certain characteristics, while outside the zone one or a combination of the other regimes may apply (4 or 7 weights);*

Withholding *defines the conditions required for the designated airline of the foreign country to operate in the home country. Restrictive conditions require substantial ownership and effective control, meaning that the designated airline is the "flag carrier" of the foreign country (0 weights). More liberal regimes are community of interests (4 weights) and principal place of business (6 weights) regimes, when a foreign airline can be also designated by the foreign country. Community of interests regime still requires a vested substantial ownership and effective control of the airline in one or more countries that are defined in the agreement, but principal place of business regime removes the substantial ownership requirement and is thus more liberal;*

Designation *governs the right to designate one (single designation, 0 weights) or more than one (multiple designation, 4 weights) airline to operate a service between two countries;*

Cooperative arrangements *define the right for the designated airlines to enter into cooperative marketing agreements (such as code sharing and alliances). This right is considered as a liberal feature because it provides a means to rationalize networks, much in the same way as the liberalisation of the ownership clause (3weights).*

Appendix 4: Nigeria – UK Air Service Agreement

According UK CAA (2011) the BASA was signed in 1988, and has been amended by Memoranda of Understandings that contains the following provisions:

Designation: *The Agreement allows each country to designate up to three airlines (for the UK this is currently BA, bmi and Virgin), for Nigeria it is currently Arik Air, Air Nigeria and Kabo Airline (a designation exists for Bellview, but this airline has long ceased operating).*

Traffic rights*: UK airlines can operate scheduled services on the following route:*
Points in the UK - (intermediate points) Abidjan, Accra - Kano, Lagos and Abuja - (points beyond) Abidjan, Accra, Douala, Harare, Lusaka, Libreville

Nigerian designated airlines have the following route available to them:
Points in Nigeria - (intermediate points) Rome, Paris, Zurich, Frankfurt - London and Manchester - (points beyond) Amsterdam, Copenhagen, Moscow

Fifth freedom traffic rights*: Nigerian airlines may exercise fifth freedom traffic rights between Rome and the UK on three services per week. There are no fifth freedom traffic rights currently available for UK airlines.*

Capacity: *UK designated airlines may operate up to 21 services per week between the UK and named points in Nigeria (Abuja, Kano, Lagos), in total.*

Nigerian designated airlines up to 21 per week from Nigeria to London Heathrow or any other London airport, in total.

(With regard to destinations in Nigeria other than Kano, Abuja, Lagos, airlines might be subject to having to pay royalties or subject to commercial agreements under Nigerian guidelines. Frequencies to such destinations would be outside the bilateral ASA.)

Tariff*s: Airlines are allowed to set tariffs freely and independently (nb the original provisions of the bilateral Agreement included ones where tariffs had to be agreed between airlines). Fares should be submitted to authorities at least thirty days prior their proposed effect and authorities have fifteen days in which to disapprove.*

With regard to corporate or commercial agreements, it is common in Nigeria for airlines to be required to enter in to such arrangements, or be subject to demands for 'royalties'. However, the UK/Nigeria Air Services Agreement is silent on such topics.

APPENDIX 5

Appendix 5: International passenger traffic to/from Nigeria (Direct) and designated airlines

Country	Airline/Airport	2001			2002			2003			2004			2005		
		Arrival	Depart	Total	Arrival	Depart	Total	Arrival	Depart	Total	Arrival	Depart	Total	Arrival	Depart	Total
UK	**BA (LOS)**	116713	123543	240256	188509	199181	387690	92866	103189	196055	94745	106327	201072		102407	
	BA(ABV)	24111	22999	47110	28694	25813	54507	36173	30790	66963	41439	40161	81600	49952	46617	
	Virgin Atl	32307	29583	61890				84700	84672	169372	91014	91880	182894		71810	
	Virgin (PHC)	0	0	0				0	0	0	14336	17164	31500	17316	18729	
	Nig. Airways	1763	2149	3912				0	0	0	0	0	0	0	0	
	Virgin Nig	0	0	0	0	0	0	0	0	0	0	0	0		9194	
	Bellview	25	117	142				0	0	0	0	0	0		4248	
	Arik	0	0	0				0	0	0	0	0	0		0	
	Total	174919	178391	353310	217203	224994	442197	213739	218651	432390	241534	255532	497066		253005	506010
Netherland	**KLM (Los)**	70392	74315	144707	82820	89838	172658	82752	92126	174878	87234	98753	185987		78537	
	KLM (ABV)	0	0	0	0	0	0	0	0	0	16629	3087	19716	16515	12486	
	KLM (KNO)	19625	0	19625				5920	9111	15031	0	16882	16882		16882	
	Total	90017	74315	164332	82820	89838	172658	88672	101237	189909	103863	118722	222585		107905	215810
France	**Air France(Los)**	80192	82909	163101	74236	78942	153178	62470	70297	132767	63175	71024	134199		63168	
	Air France(PHC)	13214	13482	26696				15945	15594	31539	18762	19880	38642	28065	28668	
	Total	93406	96391	189797	74236	78942	153178	78415	85891	164306	81937	90904	172841		91836	183672
Germany	**Lufthansa(Los)**	34210	34837	69047	57635	61906	119541	69697	73895	143592	69523	75206	144729		37001	

APPENDIX 5

	Lufthansa(ABV)	0	0	0	0	0	0	0	0	0	0	0	0	790	113	
	Total	34210	34837	69047	57635	61906	119541	69697	73895	143592	69523	75206	144729		37114	74228
Swiss	**Swiss Air(Los)**	39799	40998	80797	40857	41956	82813	33084	35943	69027	0	0	0		0	
Italy	**Alitalia (Los)**	22144	576	22720	31309	852	32161	30832	1061	31893	37591	1188	38779		19833	39666
Spain	**Iberia Air (Los)**	139	101	240	2914	2631	5545	0	0	0		0	0		13478	26956
Turkey	**Turkey (Los)**	0	0	0	0	0	0	0	0	0	0	0	0		0	
UAE	**Emirates(Los)**	0	0		0	0	0	0	0	0	44352	45717	90069		39420	
	Nig. Airways	1287	1127	2414	837	574	1411	16727	19586	36313	0	0	0		0	
	Total	1287	1127	2414	837	574	1411	16727	19586	36313	44352	45717	90069		39420	78840
Lebanon	**MEA (Los)**	13466	13586	27052	18935	18621	37556	18927	18618	37545	16861	17828	34689		7945	
	MEA (KNO)	7517	8015	15532				8275	7608	15883	9978	10489	20467		11456	
	Total	20983	21601	42584	18935	18621	37556	27202	26226	53428	26839	28317	55156		19401	38802
S/Arabia	**Saudi Air(KNO)**	7687	4888	12575	6127	5067	11194	15641	8497	24138	19134	8910	28044		14344	
	Nig. Airways	8568	1602	10170				9571	6864	16435	0	0	0		0	
	Total	16255	6490	22745				25212	15361	40573	19134	8910	28044		14344	28688
Ghana	**Ghana Airways**	27044	27557	54601				13602	12749	26351	10095	9648	19743		374	
	Bellview	0	0	0				9176	8999	18175	20899	24080	44979		15691	
	Ethiopia	20804	22202	43006				1441	11162	12603	5771	9010	14781		565	
	Aero contractor	0	0	0				0	0	0	422	342	764		0	
	Virgin Nig	0	0	0				0	0	0	0	0			16779	
	Arik	0	0	0				0	0	0	0	0			0	

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	Total	47848	49759	97607	90751	118598	209349	24219	32910	57129	37187	43080	80267	33409	66818
S/Africa	**SAA**	34166	35287	69453	28771	31004	59775	33281	33719	67000	39638	41836	81474	42213	
	Virgin Nig	0	0	0	0	0	0	0	0	0	0	0	0	2332	
	Arik	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	34166	35287	69453	28771	31004	59775	33281	33719	67000	39638	41836	81474	44545	89090
Ethiopia	**Ethiopia Airline**	47481	46534	94015	60961	59765	120726	69659	66037	135696	74004	64874	138878	58335	116670
Kenya	**Kenya Airways**	32957	31733	64690	35096	33591	68687	39369	37609	76978	29490	28092	57582	32313	64626
Egypt	**Egypt Air(Los)**	8441	10096	18537	9330	9535	18865	8962	7813	16775	11925	14804	26729	11588	
	Egypt Air (Abv)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Egypt(KNO)	8347	9094	17441							6588	1403	7991	17845	
	Total			35978										29433	58866
Cote D'Ivoire	**Bellview**	0	0	0				6732	6890	13622	6832	7066	13898	5398	
	Ethiopia Airline	0	0					7279	6417	13696	10480	10121	20601	3875	
	Cameroun Air	17651	16270	33921				18406	16795	35201	9193	8402	17595	904	
	Air Gabon	13931	14063	27994				12668	4886	17554	8622	8602	17224	0	
	Air Afrique	5066	7064	12130				0	0	0	0	0	0	0	
	Total	36648	37397	74045	54061	54760	108821	45085	34988	80073	35127	34191	69318	10177	20354
Cameroun	**Cameroun Air**	18130	21056	39186				22224	23422	45646	11763	12842	24605	8121	
	Nig. Airways	2286	2164	4450				112	1539	1651	0	0	0	0	
	Bellview	0	0	0				0	0	0	2458	2149	4607	4339	
	Air Nigeria/Virgin	0	0	0				0	0	0	0	0	0	1472	

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	N														
	Total	20416	23220	43636	60961	59765	120726	22336	24961	47297	49348	49182	98530	13932	27864
Sudan	**Sudan Air (Los)**	1180	1400	2580	531	41	572	651	3606	4257	257	2755	3012	660	
	Sudan Air (Kno)	5109	13761	18870				8808	19362	28170	5132	12608	17740	6543	
	Total	6289	15161	21450				9459	22968	32427	5389	15363	20752	7203	14606
Senegal	**Air Gabon**	1602	2256	3858				1492	6723	8215	801	918	1719	646	
	Cameroun Air													2553	
	Bellview													4400	
	Total	1602	2256	3858	6259	6712	12971	1492	6723	8215	801	918	1719	7599	15198
S/Leone	**Bellview**	5492	6412	11904	9772	9381	19153	7082	6953	14035	9053	7501	16554	4894	
	Others													425	
	Total	8179	8724	16903	9772	9381	19153	8863	9740	18603	9053	7501	16554	5319	10638
Gabon	**Air Gabon**	18443	12838	31281				14241	15773	30014	14102	13664	27766	1649	
	Nig. Airways	3282	2694	5976				2335	2335	4670	0	0	0	0	
	Bellview	0	0	0	0	0	0	0	0	0	0	0	0	1769	
	Total	21725	15532	37257	16792	14003	30795	16576	18108	34684	14102	13664	27766	3418	6836
Libya	**Afrique Air**	0	0	0	0	0	0	0	0	0	334	439	773	8007	16014
USA	**North America air**	0	0	0	0	0	0	0	0	0	207	65	272	0	
	Arik	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Delta (Los)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Delta (Abv)	0	0	0	0	0	0	0	0	0	0	0	0	0	

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	Total	0	0	0	0	0	0	0	0	0	207	65	272		0	157255 2

2006- 10 International Passenger Air Traffic

country	Airline/airport	2006			2007			2008			2009			2010		
UK		ARR	DEP	Total	ARR	DEP	Total	ARR	DEP	Total	ARR	DEP	Total	ARR	DEP	Total
	ARIK(LOS)	0	0	0	NIL	NIL	0	0	0	0	46200	47120	93320	42147	41841	83988
	ARIK(ABV)	0	0	0	NIL	NIL	0	0	0	0	0	0	0	9820	10152	19972
	BELVIEW (LOS)	303	351	654	16173	18258	34431	21159	25468	46627	15968	15104	31072	0	0	0
	BA(ABV)	54233	52011	106244	67175	59045	126220	60288	59692	119980	57710	59334	117044	54222	55936	110158
	BA(LOS)	71606	74689	146295	84656	94747	179403	87599	101394	188993	92201	89618	181819	86338	85744	172082
	VIRG ATL (LOS)	49570	42681	92251	81421	80779	162200	96308	78546	174854	93882	90817	184699	92325	95551	187876
	VIRG NIG (ABV)	34891	33590	68481	58482	58915	117397	54413	51478	105891	NIL	NIL	0	NIL	NIL	0
	Total	210603	203322	413925	307907	311744	619651	319767	316578	633345	305961	301993	607954	284852	289224	574077
FRANCE	AIR FRANCE(LOS)	49789	47327	97116	72367	75958	148325	68324	60444	128768	62711	69090	131801	66456	67583	134039
	AIR FR (PHC	22558	23501	46059	0	0	0	5074	5779	10853	15213	15398	26066	19936	21406	41342
	Total	72347	70828	143175	72367	75958	148325	73398	66223	139621	77924	84488	162412	86392	88989	175381
ITALY	ALITALIA	30299	27974	58273	33544	37695	71239	23633	21736	45369	10056	12007	22063	12875	13833	26708
USA	ARIK (LOS)		NIL	0	NIL	NIL	0	NIL	NIL	0	321	371	692	7004	7815	14819
	DELTA (ABV)	NIL	NIL	0	NIL	NIL	0	NIL	NIL	0	2905	3454	6359	8660	9519	18179
	DELTA(LOS)	NIL	NIL	0	5471	3000	8471	52468	60178	112646	51126	50057	101183	49289	53372	102661
	NORTH AMERIC	5578	3989	9567	22475	25196	47671	5772	6324	12096	NIL	NIL	0	NIL	NIL	0

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	Total	5578	3989	9567	27946	28196	56142	58240	66502	124742	54352	53882	108234	64953	70706	135659
GERMANY	LUFTH(ABV)	7676	5101	12777	16954	18534	35488	19913	19974	39887	20211	19797	40008	31301	32479	63780
	LUFTH(LOS)	45734	44662	90396	68425	71191	139616	74704	87635	162339	89330	82990	172320	57128	58297	115425
	LUFTH(PHC)	18818	15069	33887	NIL	NIL	0	NIL	NIL		723	1353		16455	16578	33033
	Total	72228	64832	137060	85379	89725	175104	94617	107609	202226	110264	104140	214404	104884	107354	212238
LEBANON	MEA(LOS)	4563	5239	9802	1455	939	2394	8992	9259	18251	4204	4178	8382	4941	5205	10146
	MEA(KNO)	3672	9727	13399	17975	18279	36254	14886	13892	28778	13312	12262	25574	8444	8866	17310
		8235	14966	23201	19430	19218	38648	23878	23151	47029	17516	16440	33956	13385	14071	27456
NETHERLAND	KLM(ABV)	21996	25250	47246	27609	28336	55945	29774	31297	61071	30372	29914	60286	29512	27898	57410
	KLM(LOS)	53849	53207	107056	85546	91553	177099	69078	94526	163604	90507	82990	173497	83623	82113	165736
	Total	75845	78457	154302	113155	119889	233044	98852	125823	224675	120879	112904	233783	113135	110011	223146
UAE	EMIRATE	60609	49844	110453	106261	105077	211338	124289	101608	225897	141146	139828	280974	156348	153700	310048
SPAIN	IBERIA	8338	9924	18262	13676	13182	26858	15601	14966	30567	11924	12787	24711	13446	12706	26152
QATAR	QATAR AIR	NIL	NIL		24107	24101	48208	49598	40887	90485	59907	58236	118143	63391	65077	128468
S/ARABIA	SAUDI AIR	16668	9840	26508	13434	3566	17000	9876	10014	19890	12353	13936	26289	8914	9403	18317
TURKEY	TURKISH (LOS)	2509	1981	4490	12302	16849	29151	19334	19962	39296	23205	21244	44449	19996	20930	40926
SOUTH AFRICA	ARIK	NIL	NIL	0	NIL	NIL		NIL	NIL		12528	13111	25639	24988	24528	49516
	BELVIEW	NIL	NIL	0	NIL	NIL		88	95		2507	2038	4545	NIL	NIL	0
	SA(LOS)	25885	24851	50736	35852	36987	72839	31389	35917	67306	57627	54311	111938	63258	62856	126114
	VIRGIN NIG	12723	11932	24655	18985	20666	39651	20208	19199	39407	NIL	NIL	0	NIL	NIL	0
	total	38608	36783	75391	54837	57653	112490	51685	55211	106896	72662	69460	142122	88246	87384	96980
ETHIOPIA	ETHIOPIA(ABV)	0	0	0	NIL	NIL	0	4361	4323	8684	13969	13361	27330	19145	17034	36179
	ETHIOPIA(LOS)	37767	39522	77289	71338	76970	148308	75564	76153	151717	61001	62556	123557	50220	52130	102350

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	Total	37767	39522	77289	71338	76970	148308	79925	80476	160401	74970	75917	150887	69365	69164	138529
KENYA	KENYA A(LOS)	23015	21866	44881	29698	30394	60092	28323	29141	57464	32096	33097	65193	31154	32524	63678
EGYPT	EGYPT(LOS)	7182	8585	15767	2970	2008	4978	16995	18209	35204	19508	17628	37136	34482	35327	69809
	EGYPT(ABV/KNO)	9509	9170	18679	13120	16634	29754	16984	14869	31853	19182	18437	37619	17996	17907	35903
	Total	16691	17755	34446	16090	18642	34732	33979	33078	67057	38690	36065	74755	52478	53234	105712
CAMEROUN	BELVIEW	4520	4819	9339	13699	14541	28240	8001	8663	16664	1088	1266	2354	NIL	NIL	
	CAMERON AIR	6803	6918	13721	5797	5868	11665	NIL	NIL		NIL	NIL		NIL	NIL	
	VIRGIN	2062	1900	3962	9742	9668	19410	14966	9985	24951	17066	18852	35918		19656	
	Total	13385	13637	27022	29238	30077	59315	22967	18648	41615	18154	20118	38272			
LIBYA	AFRIQUE(LOS)	9265	7709	16974	12012	13313	25325	13466	10600	24066	12789	13964	26753	15004	14217	29221
SUDAN	SUDAN AIR(KNO)	8718	4561	13279	5237	319	5556	NIL	NIL	0	NIL	NIL	0	9258	5496	14754
GHANA	AERO(LOS)	4610	3760	8370	8398	9936	18334	17816	15542	33358	21322	20810	42132	29968	33041	63009
	ADC(LOS)	304	359	663	NIL	NIL	0	NIL	NIL	0	NIL	NIL	0	NIL	NIL	0
	ARIK(LOS)	NIL	NIL	0	232	NIL	0	20688	21860	42548	29923	30056	59979	29693	28796	58489
	ARIK(ABV)	NIL	NIL	0	NIL	NIL	0	NIL	NIL	0	NIL	NIL	0	8258	7780	16038
	BELLVIEW(LOS)	13477	14810	28287	15090	16989	32079	6010	6783	12793	1507	1609	3116	NIL	NIL	0
	VIRGIN NIG (LOS)	28668	25555	54223	50935	50038	100973	56241	50584	106825	14685	42313	56998	36248	37846	74094
	Total	47059	44484	91543	74655	76963	151618	100755	94769	195524	67437	94788	162225	104167	107463	211630
SIERRA LEONE	ARIK	NIL	NIL		NIL	NIL		NIL	NIL		5992	6203	12195	10222	11756	21978
	BELVIEW	9358	9696	19054	9733	10314	20047	8707	9040	17747	4102	4716	8818	NIL	NIL	0
	Total	9358	9696	19054	9733	10314		8707	9040		10094	10919	21013	10222	11756	21978
COTE D'IVORE	ETHIOPIA	NIL	NIL		NIL	NIL		NIL	NIL		NIL	NIL		1025	1388	2413
	BELVIEW	4001	5013	9014	6090	6193	12283	4978	5125	10103	1910	1837	3747	NIL	NIL	

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	VIRGIN	NIL	NIL		NIL	NIL		NIL	NIL		NIL	NIL		2963	2890	5853
	Total	4001	5013	9014	6090	6193	12283	4978	5125	10103	1910	1837	3747	3988	4278	8266
SENEGAL	ARIK	NIL	NIL		NIL	NIL		NIL	NIL		NIL	NIL		1621	1750	3371
	VIRGIN	3440	3107	6547	10193	9763	19956	8071	6310	14381	10202	18228	28430	18258	19971	38229
	Total	3440	3107	6547	10193	9763	19956	8071	6310	14381	10202	18228	28430	19879	21721	41600
BENIN	VIRGIN	NIL	NIL	0	NIL	NIL	0	4611	5221	9832	5005	5976	10981	7558	7676	15234
MORROCCO	ROYAL AIR M	NIL	NIL	0	NIL	NIL	0	886	1337	0	9772	8177	17949	8098	8898	16996

Source: NCAA (2011)

Appendix 6: Passenger Questionnaire

University of
HUDDERSFIELD

Dear Sir/Madam,

Please kindly spare a little bit of your time to help in completing the questionnaire for some doctorate research on Air transport liberalisation at the University of Huddersfield, UK.
The questionnaire is aimed at finding out the socio –economic characteristics of air travellers to and from Nigeria with a view to determining the impact of liberalisation on passengers.
Please feel free to provide your view and feedback about the questions, and we assure you that your information will only be used for research purpose.

Thank you for your assistance.

SOCIO ECONOMIC CHARACTERISTICS OF AIR PASSENGERS

Please complete the blank space or tick the appropriate answers for the questions

A) Passenger profile

1 *Nationality*____

2 *Country of residence*________________________________

3 *Age group:*

1 - 15 years ( ); 16 - 30 years ( ); 31- 45 years ( )
46 - 60 years ( ); 61 - 75 years ( ); Above 75 ( )

4 *Occupation:*

Civil servant ( ) Business/entrepreneur ( )
Diplomat ( ) Retiree ( )
student ( ) others ( )

5 *Current positions (Designation/cadre), if Q4 apply*:

Top Management ( ) Snr/middle cadre management ( )
senior officer ( ) junior cadre ( )
Other ( )

6 *Income level per annum*;

0 – $15,000(0- N2.3m) ( )
$16,000 - $30,000(N2.4m- N4.5m) ( )
$31,000- $50,000(N4.6m – N7.5m) ( )
$51,000 - $100,000(N7.6 – N15m) ( )
Above $100,000(N15m) ( )

B) Journey profile

1) *Route* (E.g. London – Abuja) ____________________________Airline________________

2) *Trip origin* ________________ *Trip final destination* ________________

3) *What is the Purpose of the Journey*?

Business/official/education/religion ( ); Vacation/visiting relation ( );

4) *How frequently have you travelled abroad by air in the last 3 years?*

1 - 3 times ( ); 4 - 6 times ( ); 7 - 9 times ( ); Ten and above ( ),

5) *Select the top three rationales(reasons) for choosing the airline used for your trip by ranking 1,2,& 3 in order of preference (i.e. 1 top most priority, 2 being 2^{nd} priority, and 3^{rd} next priority). Just tick the top 3 only and leave others.*

- Air fare (ticket price); (1) or (2) or (3)
- Schedule (airport, timing, frequency, Punctuality); (1) or (2) or (3)
- Convenience (reservation, capacity, seat available); (1) or (2) or (3)
- Safety reputation; (1) or (2) or (3)
- Frequent Flyer programme; (1) or (2) or (3)
- Brand name; (1) or (2) or (3)
- Promotion& advertisement; (1) or (2) or (3)
- Comfort (aircraft type, meals, entertainment); (1) or (2) or (3)

6) Any other comments/ suggestions

____

____

____

____

____

____

Thank you and enjoy your trip.

Appendix 7: Field Survey Data Summary

Nationality	Resd country	Age Group	Occupation	Position	Income level	Airport	Destination	Route	Traffic	Airline	Journey Purpose	Trip frequency	Rational 1	Rational 2	Rational 3
Nig	Nig	4	CS	Top mng	2	Abuja	USA	Amsterdam	Indirect	KLM	Leisure	5	FFP	C'vnce	Fare
Nig	Nig	3	BE	Top mng	1	Lagos	Dubai	Dubai	Direct	Emirate	Busines	10			
Nig	Nig	3	CS	Mdl mng	1	Lagos	Liberia	Liberia	Direct	Vig Nig	Busines	10			
Nig	Nig	3	BE	Mdl mng		Lagos	Dubai	Adis Ababa	Indirect	Ethiopia	Leisure	8	C'vnce	Comfort	
Middle East	Lebanon	2	BE	Mdl mng		Lagos	Lebanon	Cairo	Indirect	Egypt	Leisure	2			
Nig	Nig	3	others	Top mng	4	Lagos	Guinea	Cotonou	Indirect	Asky	Busines	10			
Nig	Nig	2	stdt	other	1	Lagos	Malaysia	Cairo	Indirect	Egypt	Busines	2			
W/African	W/African	3	BE	Mdl mng		Lagos	Syria	Cairo	Indirect	Egypt	Leisure	2	Fare	Schedule	C'vnce
Nig	W/African	3	BE			Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	10			
S/African	Ss/African	2	others	Snr offcer		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	5			
S/African	Ss/African	4	CS	other		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2		ffp	
S/African	Ss/African	4	CS	Snr offcer		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			
Indian	India	3	others	other		Lagos	India	Adis Ababa	Indirect	Ethiopia	Busines	2			
Nig	Nig	3	BE	Mdl mng		Lagos	China	Adis Ababa	Indirect	Ethiopia	Busines	8			
S/African	Ss/African	3	others	Snr offcer		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	Nig	3	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Busines	10			
Nig	Canada	4	others	Top mng	5	Lagos	China	Dubai	Indirect	Emirate	Busines	10	Fare	C'vnce	comfort
Nig	Nig	2	stdt	other	1	Lagos	Russia	Dubai	Indirect	Emirate	Busines	2	Schedule	Fare	C'vnce
S/African	Ss/African	2	CS	Mdl mng	2	Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2	Fare	Schedule	safety

Nig	Nig	3	BE	Top mng	1	Lagos	Dubai	Nairobi	Indirect	Kenya Air	Busines	8	fare	C'vnce	safety
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	2	stdt	other		Lagos	Egypt	Cairo	Direct	Egypt	Busines	2			
W/African	W/African	3	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines				
W/African	W/African	4	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	10			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	3	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
Nig	Nig	3	BE	other		Lagos	Dubai	Cairo	Indirect	Egypt	Busines	2			
Nig	china	3	BE	Mdl mng		Lagos	China	Dubai	Indirect	Emirate	Busines	10			
W/African	W/African	5	Rtre	jnr		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines				
Nig	Korea	3	BE	Snr offcer	2	Lagos	Korea	Nairobi	Indirect	Kenya Air	Busines				
Nig	Nig	3	CS	Snr offcer	1	Lagos	Korea	Nairobi	Indirect	Kenya Air	Busines	5		fare	schedule
W/African	W/African	5	Rtre	jnr		Lagos	S/Arabia	Jeddah	Direct	Max	Busines				
W/African	W/African	6	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	3	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	3	BE			Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	10			
Nig	Nig	2	BE	Mdl mng		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	5			
Nig	Nig	3	BE	Mdl mng		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	5			
Nig	Nig	2	BE	jnr		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	2			
Nig	Nig		others	other		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	5			
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
W/African	W/African	5	BE	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
S/African	Ss/Africran	2	stdt	jnr		Lagos	Burundi	Nairobi	Indirect	Kenya	Busines				

										Air					
W/African	UK	4	others	other	4	Lagos	Ghana	Accra	Direct	Arik	Leisure	10			
Nig	USA	2	stdt	other		Lagos	USA	Doha	Indirect	Qatar Air	Busines	10			
Nig	Nig	2	BE	Mdl mng		Lagos	China	Adis Ababa	Indirect	Ethiopia	Busines	2			
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
W/African	W/African	3	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	10			
W/African	W/African	2	others	other		Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
Nig	Nig	2	BE	other	1	Lagos	China	Nairobi	Indirect	Kenya Air	Busines				
Nig	Nig	4	CS	Snr offcer		Lagos	Ghana	Accra	Direct	Vig Nig	Busines				
Lebanese	Nig	1	stdt	other		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	8			
W/African	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	4	others	Top mng	3	Lagos	Ghana	Accra	Direct	Arik	Busines	10	Fare	C'vnce	
Nig	Nig	3	BE	Mdl mng		Lagos	S.Africa	S.Africa	Direct	SAA	Leisure	2	Fare	C'vnce	
Pakistani	Pakistan	4	others	Snr offcer	1	Lagos	Pakistan	Dubai	Indirect	Emirate	Busines	5	Schedule	C'vnce	safety
Nig	Nig	4	others	Top mng	1	Lagos	Ghana	Accra	Direct	Air Nig	Busines	2	Fare	C'vnce	
Nig	Nig	4	others	Top mng	1	Lagos	Ghana	Accra	Direct	Air Nig	Busines	2	Fare	C'vnce	
W/African	W/African	2	BE	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	3	BE	Top mng		Lagos	Ghana	Accra	Direct	Vig Nig	Busines	10	Fare	C'vnce	
Nig	Nig	3	CS	jnr	3	Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines	2			
kenyan	Kenya	2	BE	Mdl mng	1	Lagos	Ghana	Accra	Direct	Air Nig	Busines	2	Fare	Schedule	C'vnce
kenyan	Kenya	2	BE	Mdl mng	1	Lagos	Ghana	Accra	Direct	Air Nig	Busines	2	Fare	Schedule	ffp
Nig	Nig	3	CS	Snr offcer		Lagos	S.Africa	Nairobi	Indirect	Kenya Air	Leisure	2	Fare	Schedule	ffp
Nig	Nig	3	BE	Top mng	1	Lagos	China	Nairobi	Indirect	Kenya Air	Busines	5	Fare	C'vnce	safety
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			

W/African	W/African	4	BE	Top mng		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
S/African	Ss/African	2	BE	Snr offcer	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	safety	Comfort	C'vnce
Nig	Nig	3	others	other		Lagos	Ghana	Accra	Direct	Arik	Busines	5	C'vnce	Schedul e	Fare
Lebanese	Lebanon	4	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Busines	5			
Lebanese	Lebanon	3	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	8			
Lebanese	Nig	3	CS	Snr offcer		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	5			
Lebanese	Lebanon	4	BE	other		Lagos	Lebanon	Lebanon	Direct	MEA	Busines	10			
Nig	Nig	3	others	Mdl mng		Lagos	Ghana	Accra	Direct	Air Nig	Busines	10	Fare		
W/African	Portugal	4	others	Top mng		Lagos	Ghana	Accra	Direct	Air Nig	Busines	10			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines	2			
W/African	W/African		CS	jnr		Lagos	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines				
W/African	W/African	3	BE	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Lebanese	Nig	4	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	8			
W/African	W/African	4	BE	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	4	CS	Snr offcer	5	Lagos	Ghana	Accra	Direct	Air Nig	Busines	5	Fare	Schedul e	C'vnce
W/African	W/African	6	Rtre	Snr offcer		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
Lebanese	Lebanon	3	CS	Snr offcer		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	5			
Burundise	Burundi	4	others	other		Lagos	Burundi	Nairobi	Indirect	Kenya Air	Busines				
W/African	W/African	3	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
Zimbabwe	Zimbabwe	2	others	other	3	Lagos	Zimbabwe	Nairobi	Indirect	Kenya Air	Leisure	8	C'vnce	Fare	ffp
Nig	Nig	3	others	Top mng		Lagos	Ghana	Accra	Direct	Air Nig	Busines	10	Fare	C'vnce	
Nig	W/African	3	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	10	Fare	C'vnce	comfort
W/African	Nig	2	others			Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	5			

Nig	W/African	3	BE	Top mng	2	Lagos	Ghana	Accra	Direct	Arik	Leisure	10			
W/African	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	Nig	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	8			
W/African	W/African	3	BE	Mdl mng		Lagos	S/Arabia	Jeddah	Indirect	Kenya Air	Busines	2			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Jeddah	Indirect	Kenya Air	Busines				
Nig	Nig	5	BE	Mdl mng	4	Lagos	Dubai	Dubai	Direct	Emirate	Busines	2	Schedule	C'vnce	ffp
Nig	Nig	3	BE	Top mng	2	Lagos	Adis Ababa	Adis Ababa	Direct	Ethiopia	Busines	8			
Nig	Nig	4	BE	Top mng	1	Lagos	China	Adis Ababa	Indirect	Ethiopia	Busines	5	C'vnce	safety	ffp
C/African	C/African	3	others	Top mng		Lagos	Congo	Cameron	Indirect	Asky	Busines	2			
C/African	C/African	3	others			Lagos	Congo	Cameron	Indirect	Asky	Busines	2			
C/African	C/African	2	others			Lagos	Congo	Cameron	Indirect	Asky	Busines	2			
C/African	C/African	3	others			Lagos	Congo	Cameron	Indirect	Asky	Busines	2			
C/African	C/African	2	others			Lagos	Congo	Cameron	Indirect	Asky	Busines	2			
Nig	Nig	2	BE	other	3	Lagos	Abidjan	Abidjan	Direct	Air Nig	Busines	10	Schedule		
Nig	Nig	3	BE			Lagos	Dubai	Nairobi	Indirect	Kenya Air	Busines	2			
Nig	Nig	3	CS	Snr offcer	2	Lagos		Dubai		Emirate	Busines	2	Fare	C'vnce	safety
Nig	UK	2	others	other	1	Abuja	London	London	Direct	Arik	Leisure	3	Fare	p&p	comfort
W/African	W/African	4	BE	Top mng		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	5	others	Top mng		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/Afircan	3	CS	Snr offcer	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	Schedule	safety	comfort
S/African	Ss/Afircan	3	others	other		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/Afircan	3	BE	jnr	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	Fare	Comfort	
C/African	C/African	3	others			Lagos	Congo	Cameron	Indirect	Asky	Busines	2			

C/African	C/African	4	CS	Snr offcer	1	Lagos	Congo	Nairobi	Indirect	Kenya Air	Leisure	5	Fare	ffp	C'vnce
Nig	Nig	2	BE	other		Lagos				Kenya Air					
Nig	Nig	2	stdt			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
Nig	Nig	2	stdt			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
W/African	W/African	3	others			Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	3	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	10			
W/African	W/African	3	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	8			
W/African	W/African	4	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	10			
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
W/African	W/African	3	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	8			
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
W/African	W/African		others			Lagos	Cameron	Cameron	Direct	Asky	Busines	8			
Nig	Nig	3	CS	Snr offcer	1	Lagos	Dubai	Adis Ababa	Indirect	Ethiopia	Busines	5			
Nig	Nig	2	stdt			Lagos	Cairo	Cairo	Direct	Egypt	Busines	2			
Nig	Dubai	2	BE	Mdl mng		Lagos	Dubai	Dubai	Direct	Emirate	Leisure	10			
Nig	Nig	3	CS	jnr		Lagos	Dubai	Adis Ababa	Indirect	Ethiopia	Leisure	2			
Nig	Nig	3	BE	Mdl mng		Lagos	India	Adis Ababa	Indirect	Ethiopia	Busines	5			
W/African	W/African	2	CS	other		Lagos	Gambia	Gambia	Direct	Air Nig	Busines				
Nig	Nig	3	stdt		2	Abuja	London	London	Direct	Arik	Busines	8	Fare	Schedule	safety
Nig	UK	3	BE	Top mng	3	Abuja	London	London	Direct	Arik	Leisure	8	Fare	C'vnce	schedule
British	UK	4	CS	Mdl mng	4	Abuja	London	London	Direct	Arik	Leisure	2	Fare		
Nig	Nig	3	CS	Top mng	2	Lagos	HongKong	Dubai	Indirect	Emirate	Busines	10	Schedule	C'vnce	safety
W/African	W/African	4	Diplomat	Snr offcer	1	Lagos	Gambia	Gambia	Direct	Air Nig	Busines	10	Fare	Schedule	comfort
Nig	UK	3	CS	Snr offcer	2	Abuja	London	London	Direct	Arik	Busines	5	Fare	Schedule	safety

Nig	Nig	4	others	Top mng							Busines	2	Fare	C'vnce	safety
Nig	Nig	2	others	Snr offcer	1	Abuja	London	London	Direct	Arik	Busines	2	Schedul e	C'vnce	safety
Nig	Nig	3	others	Snr offcer	1	Abuja	London	London	Direct	Arik	Busines	2	Schedul e	safety	comfort
Nig	Nig	2	stdt	other	1	Abuja	London	London	Direct	Arik	Busines	2	comfort		
Nig	Nig	2	stdt	other	2	Abuja	London	London	Direct	Arik	Busines	2	Fare	Schedul e	C'vnce
Nig	Nig	3	CS	Mdl mng	3	Abuja	London	London	Direct	Arik	Busines	5	Fare	Schedul e	safety
Nig	Nig	2	stdt	other		Abuja	London	London	Direct	Arik	Busines	2			
Nig	Nig	3	CS	Snr offcer	3	Abuja	London	London	Direct	Arik	Leisure	2	Fare	safety	comfort
Nig	Nig	2	others	jnr	2	Abuja	London	London	Direct	Arik	Leisure	3	safety	Fare	C'vnce
Nig	Nig	2	others	Mdl mng	2	Abuja	London	London	Direct	Arik	Leisure	10	Fare	C'vnce	promo
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Leisure	2	Fare	Schedul e	C'vnce
Nig	Nig	4	CS	Snr offcer		Abuja	London	London	Direct	Arik	Leisure	2	Schedul e		
Nig	UK	2	stdt	other	2	Abuja	London	London	Direct	Arik	Leisure	2	Fare	safety	schedul e
Nig	UK	4	others	other	2	Abuja	London	London	Direct	Arik	Leisure	2	Fare	C'vnce	
Nig	UK	4	others	other	2	Abuja	London	London	Direct	Arik	Busines	3	Fare	safety	comfort
Nig	UK	2	cs	Mdl mng	2	Abuja	London	London	Direct	Arik	Leisure	4	Fare	Brandn me	C'vnce
British	Nig	4	CS	Mdl mng	3	Abuja	London	London	Direct	Arik	Leisure	4	Fare	Schedul e	C'vnce
Nig	UK	2	others	other	2	Abuja	London	London	Direct	Arik	Leisure	2	Fare	safety	ffp
Nig	UK	3	others		2	Abuja	London	London	Direct	Arik	Leisure	2	Fare	C'vnce	schedul e
W/African	W/African	3	BE	jnr	3	Lagos	Gambia	Gambia	Direct	Air Nig	Busines	2			
Nig	Nig	3	Diplomat	Mdl mng	2	Lagos	Togo	Togo	Direct	Asky	Busines	4	safety	Fare	C'vnce
Nig	Nig	3	BE	Mdl mng	2	Lagos	London	London	Direct	Vig Atl	Busines	6	Schedul e	safety	comfort
Nig	Nig	3	BE	Mdl mng	3	Lagos	Dubai	Dubai	Direct	Emirate	Busines	9	Schedul	safety	comfort

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W/African	W/African	2	CS	Mdl mng	1	Lagos	Ghana	Accra	Direct	Arik	Busines	5	safety	ffp	comfort
W/African	W/African	4	CS	Snr offcer	1	Lagos	Ghana	Accra	Direct	Vig Nig	Busines	4	Fare	safety	comfort
Nig	Nig	3	CS	Snr offcer	1	Lagos	Cotonou	Cotonou	Direct	Arik	Busines	4	C'vnce	safety	comfort
W/African	W/African	3	stdt	jnr		Lagos	Ghana	Accra	Direct	Asky	Busines	6	Schedule	C'vnce	safety
Nig	Nig	3	BE	Mdl mng	1	Lagos	London	London	Direct	BA	Leisure	6	Fare	C'vnce	Brand nm
W/African	W/African	3	CS	Mdl mng	1	Lagos	London	London	Direct	BA	Busines	4	Fare	C'vnce	comfort
Nig	Nig	3	CS	Snr offcer	2	Lagos	London	London	Direct	BA	Busines	3	Fare	C'vnce	comfort
Nig	W/African	4	BE			Lagos	London	London	Direct	Vig Atl	Busines	5	Fare	safety	comfort
Nig	Nig	4	others			Lagos	London	London	Direct	BA	Leisure	4	Fare	Schedule	C'vnce
British	Italy	4	BE	Top mng	1	Lagos	Frankfurt	Frankfurt	Direct	Lufthansa	Busines	4	Schedule	Brandnme	Fare
Nig	Nig	3	others	jnr	1	Abuja	London	London	Direct	Arik	Busines	10	Fare	safety	Brand nm
Indian	India	4	BE	Top mng		Lagos	Kenya	India	Indirect	Kenya Air	Busines	4	C'vnce	Brandnme	comfort
Nig	Nig	3	others	other		Lagos	China	Dubai	Indirect	Emirate	Busines	2	Fare	C'vnce	schedule
Nig	Nig	5	BE	Top mng	4	Lagos	Manchester	Amsterdam	Indirect	KLM	Busines	2	C'vnce		
Nig	Nig	4	CS	Snr offcer		Lagos	Dubai	London	Indirect	BA	Leisure	3	Fare		
Nig	Nig	2	stdt	other		Lagos	Paris	Paris	Direct	Air France	Busines	6	P&A		
Indian	Dubai	3	BE	Mdl mng		Lagos	Dubai	Dubai	Direct	Emirate	Busines	10	Schedule	C'vnce	safety
Nig	Nig	3	BE	Top mng	2	Lagos	Dubai	Dubai	Direct	Emirate	Busines	6	Schedule		
Nig	USA	3	BE	other	3	Lagos	USA	USA	Direct	Delta	Busines	5	Fare	safety	schedule
Nig	Nig	4	others	Top mng	1	Lagos	USA	Amsterdam	Indirect	KLM	Leisure	5	Fare		
Nig	Nig	5	Rtre	Top mng	1	Lagos	USA	USA	Direct	Delta	Leisure	10	Fare	safety	schedule

Nig	Nig	1	others	other	1	Lagos	Malysia	Turkey	Indirect	Turkish	Busines				
Nig	Norway	3	BE	other	3	Lagos	Norway	Turkey	Indirect	Turkish	Busines	10	Fare	safety	comfort
Nig	Nig	4	BE	Top mng		Lagos	USA	Turkey	Indirect	Turkish	Leisure	2	Fare	safety	comfort
Nig	Nig	2	others	other	2	Lagos					Busines	2			
Nig	Nig	3	CS	Snr offcer	2	Lagos	London	Turkey	Indirect	Turkish	Busines	2	Fare		
Nig	Nig	3	others	Mdl mng	2	Lagos	Turkey	Turkey	Direct	Turkish	Busines	10	ffp	safety	comfort
Nig	Nig	3	BE	other	2	Lagos	Turkey	Turkey	Direct	Turkish	Busines	10	Fare	safety	C'vnce
Nig	Nig	4	CS	Top mng	2	Lagos	Spain	Spain	Direct	Iberia	Busines	2	C'vnce	safety	promo
Nig	Nig	4	CS	Top mng	4	Lagos	S/Africa	S/Africa	Direct	SAA	Busines	6	ffp		
British	Nig	5	BE	Mdl mng	6	Abuja	London	London	Direct	Arik	Busines	8	Schedul e	Fare	Brand nm
USA	USA	2	BE	other	3	Abuja	USA	Frankfurt	Indirect	Lufthans a	Busines	5	Fare	Schedul e	ffp
British	Nig	5	others	Top mng	5	Abuja	London	Amsterdam	Indirect	KLM	Leisure	10	Fare	ffp	comfort
Dutch	Netherlan ds	2	BE	jnr	2	Abuja	Amsterdam	Frankfurt	Indirect	Lufthans a	Busines	5	Fare	Schedul e	promo
Nig	Nig	4	CS	Snr offcer	1	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	2			
Danish	Denmark	3	BE	other		Abuja	Denmark	Amsterdam	Indirect	KLM	Busines	10	Schedul e	C'vnce	safety
Nig	Nig	2	stdt		1	Abuja	USA	Amsterdam	Indirect	KLM	Busines	5	safety	Fare	C'vnce
Nig	Nig	4	CS	Snr offcer	5	Abuja	Italy	Amsterdam	Indirect	KLM	Leisure	2	Schedul e	C'vnce	safety
German	Germany	4	Diplomat	Snr offcer		Abuja	Frankfurt	Frankfurt	Direct	Lufthans a	Leisure	5	C'vnce		
Nig	Nig	2	stdt	other		Abuja	London	Frankfurt	Indirect	Lufthans a	Leisure				
Nig	Nig	2	stdt			Abuja	USA	Amsterdam	Indirect	KLM	Busines	2			
Nig	Swis'land	4	CS	Snr offcer	1	Abuja	Swis'land	Amsterdam	Indirect	KLM	Busines	2	Fare		
Nig	USA	4	BE	Top mng	4	Abuja	USA	Amsterdam	Indirect	KLM	Busines	8	Schedul e	C'vnce	comfort
Nig	Italy	2	BE			Abuja	Italy	Amsterdam	Indirect	KLM	Busines	2			
Denmark	Denmark	3	BE	Top mng	5	Abuja	Denmark	Amsterdam	Indirect	KLM	Busines	10	Schedul e	Fare	ffp

USA	Nig	4	BE	Snr offcer	2	Abuja	USA	Amsterdam	Indirect	KLM	Busines	5	safety	Fare	ffp
Nig	Nig	3	BE	other	2	Abuja	USA	Amsterdam	Indirect	KLM	Leisure	2	Fare	promo	comfort
Nig	Nig	4	CS	Mdl mng		Abuja	USA	Amsterdam	Indirect	KLM	Leisure	5	safety	Fare	comfort
Nig	UK	5	Rtre	other		Abuja	London	London	Direct	Arik	Leisure	8	Fare		
Nig	Nig	4	BE			Abuja	Dubai	Adis Ababa	Indirect	Ethiopia	Busines	2	Schedul e	C'vnce	safety
Nig	Nig	4	CS	Top mng	1	Abuja	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines	5	Fare		
Nig	Nig	3	CS	Snr offcer	1	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	5			
Nig	Nig	4	BE	other	1	Abuja	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines	2	Fare	Schedul e	safety
Nig	Nig	3	CS	Snr offcer	1	Abuja		Adis Ababa	Indirect	Ethiopia	Busines				
Nig	Nig	4	CS	Top mng	2	Abuja	Dubai	Adis Ababa	Indirect	Ethiopia	Busines	5	C'vnce	Fare	comfort
Nig	Nig	4	CS	Top mng	2	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines				
W/African	S/Africa	4	CS	Mdl mng		Abuja	S/Africa	Adis Ababa	Indirect	Ethiopia	Busines	10	P&A		
Nig	USA	3	CS	Snr offcer	3	Abuja	USA	Amsterdam	Indirect	KLM	Leisure	5	Fare	Schedul e	ffp
Nig	Nig	3	stdt	other	1	Abuja	USA	Amsterdam	Indirect	KLM	Busines	10	Fare	Schedul e	C'vnce
Indian	India	3	others	Snr offcer	1	Lagos	India	Dubai	Indirect	Emirate	Busines	2	Schedul e	safety	Brand nm
Nig	Germany	3	cs	other	1	Lagos	Frankfurt	Frankfurt	Direct	Lufthans a	Busines	10	Fare	C'vnce	safety
Nig	Nig	1	others	other	1	Abuja	London	London	Direct	Arik	Busines	2	C'vnce	Brandn me	comfort
Nig	UK	3	others	Snr offcer	2	Abuja	London	London	Direct	Arik	Busines	10	Schedul e	C'vnce	Fare
Nig	UK	3	CS	other	3	Abuja	London	London	Direct	Arik	Leisure	4	Fare	safety	C'vnce
Nig	UK	2	others	other	2	Abuja	London	London	Direct	Arik	Leisure	1	Fare	Schedul e	C'vnce
Nig	Nig	5	BE	Top mng	3	Lagos	Togo	Togo	Direct	Air Nig	Busines	8	Schedul e	C'vnce	safety
W/African	Nig	4	BE	Mdl mng	2	Lagos	London	London	Direct	Vig Atl	Busines	10	Fare	Schedul e	safety
Nig	Nig	3	BE	Top mng	4	Lagos	Senegal	Senegal	Direct	Air Nig	Busines	10	Fare	Comfort	

Canadian	Canada	4	CS	Snr offcer	4	Abuja	Canada	Frankfurt	Indirect	Lufthansa	Busines	5	Fare	Comfort	C'vnce
USA	USA	2	others	Snr offcer	4	Abuja	USA	USA	Direct	Delta	Leisure	5	Fare	promo	schedule
Nig	Nig	3	others	Snr offcer	3	Abuja	USA	USA	Direct	Delta	Leisure	2	Fare	Schedule	safety
Nig	Nig	4	CS	Mdl mng	1	Abuja	USA	USA	Direct	Delta	Busines	5	Fare	Schedule	safety
USA	USA	3	BE	Mdl mng	4	Abuja	USA	USA	Direct	Delta	Busines	5	Schedule	ffp	Brand nm
Nig	Nig	4	CS	other	1	Abuja	USA	USA	Direct	Delta	Busines	8	Fare		
Nig	Nig	4	CS	Snr offcer	2	Abuja	USA	USA	Direct	Delta	Leisure	2	C'vnce		
USA	USA	3	others	other		Abuja	USA	USA	Direct	Delta	Busines	10	ffp	Fare	comfort
Nig	Nig	3	CS	Mdl mng	1	Abuja	USA	Amsterdam	Indirect	KLM	Busines	2	Fare	Schedule	safety
Nig	Nig	4	BE	Top mng	4	Abuja	USA	USA	Direct	Delta	Busines	2	Fare	Schedule	C'vnce
USA	USA	4	BE	Top mng	6	Abuja	USA	USA	Direct	Delta	Busines	8	C'vnce	safety	schedule
Nig	Nig	3	BE	Top mng	3	Abuja	USA	USA	Direct	Delta	Leisure	5	Fare	Schedule	C'vnce
Nig	Nig	4	others			Abuja	USA	USA	Direct	Delta	Busines	2	C'vnce	safety	Fare
Nig	Nig	2	stdt	other	1	Abuja	Frankfurt	Frankfurt	Direct	Lufthansa	Busines				
Nig	Nig	4	CS	Snr offcer	2	Abuja	Ireland	Frankfurt	Indirect	Lufthansa	Leisure	2	Fare	Schedule	C'vnce
Canadian	Canada	2	CS	other	4	Abuja	Canada	Frankfurt	Indirect	Lufthansa	Busines	10	Brandnm	Comfort	schedule
Nig	Nig	2	others	jnr	1	Abuja	London	Frankfurt	Indirect	Lufthansa	Leisure	2	Fare	Schedule	C'vnce
Nig	Nig	3	BE	Top mng	3	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	10	Schedule	C'vnce	ffp
Nig	USA	3	BE	Top mng	4	Abuja	USA	Amsterdam	Indirect	KLM	Leisure	10	Fare	safety	promo
Nig	Nig	4	CS	Top mng	1										
Nig	Nig	2	others	other	1	Abuja	London	Amsterdam	Indirect	KLM	Leisure	8	Fare	Schedule	safety

USA	USA	4	others	other	4	Abuja	USA	Frankfurt	Indirect	Lufthansa	Leisure	2	C'vnce	Schedule	Fare
Nig	Nig	2	stdt		1	Abuja	London	Frankfurt	Indirect	Lufthansa	Leisure	2	Fare	Schedule	C'vnce
Nig	UK	3	CS	Mdl mng	2	Abuja	London	London	Direct	Arik	Busines	8	Fare	Schedule	C'vnce
Nig	Nig	4	BE	Top mng		Abuja	London	Amsterdam	Indirect	KLM	Busines	8	C'vnce		
British	UK	2	BE	other	3	Abuja	London	Amsterdam	Indirect	KLM	Leisure	8	safety	Comfort	ffp
Nig	Nig	3	others	Mdl mng	2	Abuja	Italy	Amsterdam	Indirect	KLM	Leisure	2	Brandnm	Schedule	C'vnce
Nig	USA	3	others	other	1	Abuja	USA	Amsterdam	Indirect	KLM	Leisure	2			
Nig	Ukraine	3	Diplomat	Mdl mng	1	Abuja	Ukraine	Frankfurt	Indirect	Lufthansa	Leisure	8	Fare	Schedule	safety
Nig	Nig	3	CS	Snr offcer	1	Abuja	Poland	Amsterdam	Indirect	KLM	Leisure				
Nig	Nig	3	CS	other	3	Abuja	Scotland	Amsterdam	Indirect	KLM	Leisure	5	Schedule	Fare	safety
Nig	USA	3	others			Abuja	USA	Amsterdam	Indirect	KLM	Busines	8	Schedule	safety	comfort
Ukrainian	Ukraine	3	others	Snr offcer	1	Abuja	Ukraine	Amsterdam	Indirect	KLM	Leisure	2	Schedule	Fare	comfort
Nig	UK	3	CS		3	Abuja	London	Frankfurt	Indirect	Lufthansa	Leisure	2	Fare		
Nig	Nig	4	CS	Snr offcer		Abuja	Ukraine	Amsterdam	Indirect	KLM	Leisure	2	Fare		
Nig	Nig	4	CS	Top mng	2	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	2	safety	Comfort	Fare
Irish	UK	4	BE	Top mng	4	Abuja	London	London	Direct	Arik	Busines	10	Fare	Schedule	safety
Nig	Nig	4	BE	Top mng	3	Lagos	Dubai	Dubai	Direct	Emirate	Busines	7	Schedule	C'vnce	Fare
Nig	Nig	2	stdt	other	1	Lagos	USA	USA	Direct	Delta	Leisure	2	Fare	Schedule	C'vnce
Nig	Nig	4	BE	Top mng	3	Lagos	Senegal	Senegal	Direct	Air Nig	Busines	2	Fare	Brandnme	comfort
Nig	Nig	3	BE	Mdl mng	2	Lagos	Dubai	Dubai	Direct	Emirate	Busines	7	Schedule	safety	comfort
Nig	Nig	3	others	Mdl mng	1	Lagos	USA	USA	Direct	Delta	Leisure	5	Schedule	Fare	

Nig	Nig	2	CS		1	Lagos	London	London	Direct	Vig Atl	Leisure		Fare		
Nig	Nig	3	BE	Snr offcer	1	Lagos	Togo	Togo	Direct	Arik	Busines	4	Schedule	safety	comfort
Nig	Nig	3	Diplomat	Top mng	3	Lagos	Dubai	Dubai	Direct	Emirate	Busines	6	Fare	Schedule	safety
Nig	Nig	3	BE		1	Lagos	London	London	Direct	BA	Leisure	5	Fare	C'vnce	comfort
Nig	Nig	4	CS	Mdl mng	1	Lagos	London	Turkey	Indirect	Turkish	Leisure	3	Fare	Schedule	comfort
Nig	Nig	3	CS	Snr offcer	1	Lagos	USA	Dubai	Indirect	Emirate	Leisure	5	Fare	Schedule	safety
Nig	Nig	4	Diplomat	Top mng	2	Lagos	Ghana	Accra	Direct	Air Nig	Leisure	7	Fare	C'vnce	safety
Nig	Nig	3	BE	other	2	Lagos	London	London	Direct	Vig Atl	Leisure		Fare	C'vnce	schedule
W/African	Nig	4	BE	Mdl mng	1	Lagos	Abidjan	Abidjan	Direct	Asky	Leisure	8	Schedule	C'vnce	Fare
British	UK	2	stdt		1	Lagos	London	London	Direct	Vig Atl	Leisure	4	Brandnm	Comfort	Fare
Nig	UK	4	Rtre	Mdl mng	1	Lagos	London	London	Direct	Vig Atl	Leisure	4	safety	ffp	Brand nm
Nig	Nig	4	CS	Mdl mng	2	Lagos	Amsterdam	Amsterdam	Direct	KLM	Leisure	4	Schedule	Fare	C'vnce
Nig	Nig	4	CS	Mdl mng	1	Lagos	London	Frankfurt	Indirect	Lufthansa	Leisure	2	Schedule	C'vnce	safety
Nig	Nig	3	others	other	3	Lagos	London	Dubai	Indirect	Emirate	Busines	10	Fare	C'vnce	ffp
Nig	Nig	3	Diplomat	Top mng	3	Lagos	London	London	Direct	Vig Atl	Leisure	8	Fare	C'vnce	Brand nm
Nig	Nig	2	stdt	other		Lagos	London	London	Direct	Vig Atl	Busines	1	Brandnm	ffp	comfort
Nig	Nig	2	stdt			Lagos	Italy	Amsterdam	Indirect	KLM	Busines	1	Schedule	C'vnce	Fare
Nig	Nig	2	others	Snr offcer	1	Lagos	London	London	Direct	Vig Atl	Leisure	3	Fare	C'vnce	schedule
Nig	Nig	3	CS	Top mng	2	Lagos	London	Turkey	Indirect	Turkish	Leisure	2	Fare	Schedule	promo
Nig	Spain	4	BE	Mdl mng	1	Lagos	Spain	Spain	Direct	Iberia	Busines	3	safety	Fare	comfort
Nig	UK	4	others	Mdl mng	3	Lagos	London	Paris	Indirect	Air France	Busines	2	Fare	safety	C'vnce

Nig	Russia	2	others	other	1	Lagos	Egypt	Cairo	Direct	Egypt	Leisure	10			
Nig	Nig	3	CS	Mdl mng	1	Lagos	Dubai	Dubai	Direct	Emirate	Leisure	1	Fare	safety	Brand nm
Nig	Nig	5	CS	Top mng	2	Lagos	S/Arabia	Doha	Indirect	Qatar Air	Busines	10	P&A	Comfort	schedule
W/African	W/African	3	BE	other	1	Lagos	Gambia	Gambia	Direct	Air Nig	Busines	2	Fare		
Nig	Nig	4	be	Top mng	2	Lagos	Dubai	Dubai	Direct	Emirate	Leisure	5	Fare	Schedule	C'vnce
Nig	Nig	4	CS	Snr offcer	1	Lagos	Paris	Paris	Direct	Air France	Busines	1	ffp	C'vnce	comfort
Nig	Nig	2	BE	other		Lagos	Dubai	Dubai	Direct	Emirate	Busines	2	Fare	safety	Brand nm
Nig	Nig	3	CS	Snr offcer		Lagos	London	Dubai	Indirect	Emirate	Leisure	2	safety		
Nig	Nig	2	stdt	other	1	Lagos	Malysia	Doha	Indirect	Qatar Air	Busines	10	safety		
Nig	Nig	3	BE	jnr	1	Lagos	Dubai	Dubai	Direct	Emirate	Busines	10	Schedule		
Nig	Nig	4	CS	Mdl mng	2	Lagos	Singapore	Doha	Indirect	Qatar Air	Busines	6	safety	Comfort	Fare
Nig	Nig	2	stdt	Top mng	2	Lagos	Dubai	Dubai	Direct	Emirate	Busines				
Nig	Nig	3	CS	Snr offcer	2	Lagos	Dubai	Dubai	Direct	Emirate	Busines	5	Schedule	safety	comfort
Nig	Nig	3	BE	jnr		Lagos	India	Dubai	Indirect	Emirate	Busines	10			
Nig	Nig	4	BE	Top mng	2	Lagos	Senegal	Senegal	Direct	Air Nig	Busines	10	Schedule	safety	comfort
Nig	Nig	4	CS	Mdl mng	1	Lagos	USA	USA	Direct	United A	Leisure	3	Schedule	safety	comfort
Nig	Nig	3	others	Top mng	3	Lagos	USA	USA	Direct	Delta	Leisure	6	Schedule	C'vnce	Fare
Chinese	Nig	3	BE	Top mng	3	Lagos	Dubai	Dubai	Direct	Emirate	Leisure	10	Fare	safety	schedule
S/African	Ss/Africán	2	stdt	other	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	5	Schedule	C'vnce	promo
S/African	Ss/Africán	3	CS	Mdl mng		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Leisure	2	C'vnce	safety	Brand nm
S/African	Ss/Africán	3	others	other	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			

Nig	Dubai	2	BE	Mdl mng		Lagos	Dubai	Nairobi	Indirect	Kenya Air	Busines	2	C'vnce	safety	comfort
S/African	Ss/Afircan	1	stdt	other		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines				
Sri Lankan	W/African	2	BE	Mdl mng		Lagos	Ghana	Accra	Direct	Vig Nig	Busines	5	Fare	C'vnce	safety
W/African	W/African	3	BE	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Busines	10			
Nig	W/African	4	BE	Top mng		Lagos	Cotonou	Cotonou	Direct	Ethiopia	Busines	2			
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Busines	2	Fare	Schedul e	safety
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Busines	2	Schedul e	safety	C'vnce
W/African	Nig	3	cs	other		Lagos	Dubai	Dubai	Direct	Emirate	Busines	4	safety	Brandn me	comfort
USA	USA	4	BE	Top mng	4	Abuja	USA	USA	Direct	Delta	Busines	10	Schedul e	ffp	Fare
Nig	Nig	3	cs	Snr offcer	2	Abuja	London	London	Direct	Arik	Busines	2	Fare	C'vnce	Brand nm
Nig	Nig	3	stdt	Mdl mng	1	Abuja	London	London	Direct	Arik	Busines	2	Fare	safety	comfort
Nig	Nig	4	CS	Mdl mng	1	Abuja	London	London	Direct	Arik	Leisure	6	Fare	C'vnce	safety
Nig	uk	3	others	Snr offcer	3	Abuja	London	London	Direct	Arik	Leisure	2	C'vnce	Fare	promo
Nig	UK	2	CS	jnr	2	Abuja	London	London	Direct	Arik	Leisure	2	Fare	C'vnce	comfort
Nig	Nig	3	CS	Snr offcer		Abuja	London	London	Direct	Arik	Leisure	2			
Nig	Nig	3	CS	Snr offcer		Abuja	Scotland	London	Indirect	Arik	Busines	2	Fare		
Nig	Nig	3	others	Snr offcer		Abuja	London	London	Direct	Arik	Leisure	5	Fare	C'vnce	promo
Nig	Nig	3	BE			Abuja	USA	Amsterdam	Indirect	KLM	Leisure	5	C'vnce		
Nig	Nig	4	CS	Snr offcer	2	Abuja	London	Amsterdam	Indirect	KLM	Leisure	10	ffp	safety	
Nig	Nig	2	stdt		1	Abuja	Scotland	Amsterdam	Indirect	KLM	Busines	3	C'vnce	Schedul e	Fare
Nig	Nig	4	BE	Top mng	3	Abuja	London	Frankfurt	Indirect	Lufthans a	Leisure	3	Fare	C'vnce	schedul e
Nig	Nig	2	stdt	other		Abuja	London	Frankfurt	Indirect	Lufthans a	Leisure	3	C'vnce	safety	Fare
Nig	Thailand	3	BE	Top mng	1	Abuja	Thailand	Adis Ababa	Indirect	Ethiopia	Busines				

Nig	Nig	3	BE	Top mng	4	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	10			
Nig	Nig	3	others	Top mng	2	Abuja	India	Adis Ababa	Indirect	Ethiopia	Busines	3	Fare	Schedul e	C'vnce
Nig	Nig	4	CS	Top mng	3	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	8	comfort		
Nig	Nig	4	CS	Top mng	3	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines				
Nig	Nig	3	CS	Snr offcer		Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	3	Fare		
Nig	Nig	3	CS	Snr offcer	2	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines		Fare	Schedul e	
British	UK	5	BE		4	Abuja	London	Amsterdam	Indirect	KLM	Busines	10	Schedul e	Fare	C'vnce
Swiss	Swis'land	5	others	Top mng		Abuja	Swis'land	Amsterdam	Indirect	KLM	Busines	10	Schedul e	safety	ffp
British	UK	3	BE	Mdl mng	3	Abuja	London	Amsterdam	Indirect	KLM	Busines	10	ffp	Fare	C'vnce
Nig	Nig	3	CS	Mdl mng	2	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	5	Fare	C'vnce	Brand nm
Nig	Nig	3	CS	Mdl mng	1	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	3	Fare	C'vnce	Schedul e
Nig	Nig	4	CS	Snr offcer	1	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines	2			
Nig	Nig	4	CS	Snr offcer	1	Abuja	China	Adis Ababa	Indirect	Ethiopia	Busines				
Nig	Nig	4	BE		1	Lagos	USA	Dubai	Indirect	Emirate	Leisure	10	ffp	C'vnce	Schedul e
Nig	Dubai	4	others	Snr offcer	4	Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	10	Fare	C'vnce	Safety
Nig	Nig	2	stdt	other		Abuja	London	London	Direct	Arik	Busines	5			
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Busines	2	Schedul e		
Barbadose	Barbadose	4	CS	Snr offcer	2	Abuja	Barbadose	London	Indirect	Arik	Leisure	5	P&A		
Nig	uk	2	stdt		1	Abuja	London	London	Direct	Arik	Busines	2	Fare	Schedul e	Safety
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Busines	2	Fare	C'vnce	Brand nm
Nig	Nig	5	Rtre		2	Lagos	London	Dubai	Indirect	Emirate	Leisure	4	Fare	Schedul e	Ffp
Nig	Nig	2	BE	Mdl mng	1	Abuja	London	London	Direct	Arik	Busines	2	Fare		

Nig	Nig	3	BE	Top mng	4	Abuja	London	London	Direct	Arik	Busines	10	Fare		
Nig	Nig	2	others	other		Abuja	London	London	Direct	Arik	Leisure	2	Brandnm	Schedule	Fare
Nig	Nig	4	CS	Top mng	1	Abuja	London	London	Direct	Arik	Leisure	2	Fare	C'vnce	Safety
Nig	uk	3	CS	Snr offcer	2	Abuja	London	London	Direct	Arik	Leisure	8			
Nig	Nig	5	Rtre			Abuja	London	London	Direct	Arik	Busines				
Nig	Nig	4	CS	Top mng	2	Abuja	London	London	Direct	Arik	Busines	5	Fare	safety	Comfort
Nig	Nig	3	others	Snr offcer	2	Abuja	London	London	Direct	Arik	Busines	2	Fare		
Nig	Nig	2	BE	other	1	Lagos	Dubai	Nairobi	Indirect	Kenya Air	Leisure	2	Fare		
Nig	Nig	2	stdt			Abuja	London	London	Direct	Arik	Busines	2	Fare	C'vnce	Ffp
Nig	Nig	3	stdt			Abuja	London	London	Direct	Arik	Busines	5	Fare		
Nig	Nig	3	BE	Top mng	1	Lagos	Dubai	Nairobi	Indirect	Kenya Air	Busines	2	Fare	C'vnce	Safety
Nig	Nig	2	BE	jnr	1	Lagos	Dubai	Dubai	Direct	Emirate	Busines	10	Schedule		
W/African	W/African	4	BE	Mdl mng		Lagos	Dubai	Dubai	Direct	Emirate	Busines	10	Schedule		
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Indian	Nig	3	others	Mdl mng	2	Lagos	India	Dubai	Indirect	Emirate	Leisure	5	C'vnce	Schedule	Fare
W/African	W/African	5	Rtre	Top mng		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines				
W/African	W/African	5	others	Top mng		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/African	4	others	other		Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/African	3	BE	Top mng		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	10			
Nig	Nig	2	stdt			Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines	2			
S/African	Ss/Africn	3	others			Lagos	Botswana	Nairobi	Indirect	Kenya Air	Leisure				
S/African	Ss/Africn	4	CS	Snr offcer	2	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines		Fare	Schedule	C'vnce

S/African	Ss/Afircan	4	CS	Snr offcer		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines				
Nig	Nig	4	BE	Top mng	3	Lagos	China	Doha	Indirect	Qatar Air	Busines	10	ffp		
Nig	Nig	3	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	5	others			Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Nig	Nig	4	CS	Snr offcer	4	Lagos	Dubai	Dubai	Direct	Emirate	Busines	2	Fare	C'vnce	safety
Nig	Nig	4	others	Top mng	2	Lagos	Dubai	Dubai	Direct	Emirate	Busines	2	C'vnce		
Nig	uk	3	BE	Top mng	3	Lagos	Ghana	Accra	Direct	Arik	Busines	19	safety	Fare	comfort
W/African	W/African	3	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	10			
W/African	W/African	4	Rtre	jnr		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines	2			
W/African	W/African	3	BE	Top mng		Lagos	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines				
W/African	W/African	4	BE	Top mng		Lagos	S/Arabia	Adis Ababa	Indirect	Ethiopia	Busines	2			
W/African	W/African	6	others	Snr offcer	2	Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	5	others	Top mng	1	Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	3	others	Snr offcer		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
Sri Lankan	W/African	2	BE	Mdl mng		Lagos	Ghana	Accra	Direct	Vig Nig	Leisure	10	Fare	Schedule	C'vnce
Chinese	china	2	BE	Top mng		Lagos	Adis Ababa	Adis Ababa	Direct	Ethiopia	Busines	5			
Nig	Nig	5	others	Top mng		Lagos	India	Dubai	Indirect	Emirate	Leisure	2			
Lebanese	Lebanon	4	others	Top mng		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
Nig	Nig	5	others	Top mng	2	Lagos	Ghana	Accra	Direct	Air Nig	Busines	10	Fare	Schedule	promo
Nig	Nig	5	Rtre	Snr offcer		Lagos	India	Dubai	Indirect	Emirate	Leisure	5			
S/African	Ss/Afircan	4	CS	Snr offcer	4	Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2	Fare	C'vnce	ffp

S/African	Ss/Afircan	2	stdt	other		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			
British	Hongkong	3	CS	Mdl mng	4	Lagos	HongKong	Nairobi	Indirect	Kenya Air	Busines	8	Fare	C'vnce	safety
Norway	Hongkong	4	BE	Top mng	5	Lagos	HongKong	Nairobi	Indirect	Kenya Air	Busines	5	Fare	C'vnce	safety
S/African	Ss/Afircan	2	stdt	other		Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/Afircan	2	BE	Mdl mng		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2			
S/African	Ss/Afircan	3	CS	Mdl mng		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	8	Schedul e	C'vnce	Fare
S/African	Ss/Afircan	3	BE	jnr	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	Fare	ffp	schedul e
Nig	Nig	3	others			Lagos	S/Arabia	Dubai	Indirect	Emirate	Busines	2			
Indian	India	3	others			Lagos	India	Adis Ababa	Indirect	Ethiopia	Leisure	5			
Nig	Nig	3	BE	Top mng		Lagos	India	Adis Ababa	Indirect	Ethiopia	Leisure	2			
Indian	India	3	others			Lagos	India	Adis Ababa	Indirect	Ethiopia	Leisure	2			
Nig	Nig	3	stdt			Lagos	Egypt	Cairo	Direct	Egypt	Busines	2			
Nig	Nig	3	BE			Lagos	Abidjan	Abidjan	Direct	Ethiopia	Busines	2			
Nig	Nig	4	BE	Mdl mng		Lagos	Ghana	Accra	Direct	Arik	Busines	10			
W/African	Nig	3	others	Mdl mng	1	Lagos	Dubai	Dubai	Direct	Emirate	Busines	5			
W/African	W/African	4	others			Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
Nig	S/Africa	3	stdt	Mdl mng		Lagos	S/Africa	S/Africa	Direct	SAA	Busines	8			
W/African	W/African	4	others			Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
Nig	Nig	3	others			Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Chinese	china	2	BE	Top mng		Lagos	Adis Ababa	Adis Ababa	Direct	Ethiopia	Busines	10	C'vnce	ffp	Fare
Nig	UK	3	others	Top mng	2	Lagos	Ghana	Accra	Direct	Arik	Leisure	10	Schedul e	C'vnce	Fare
W/African	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Angola	Angola	2				Lagos	Adis Ababa	Adis Ababa	Direct	Ethiopia	Busines	8			

Congolese	Congo	3	others			Lagos	Congo	Congo	Direct	Asky	Busines	2			
Nig	Nig		stdt			Lagos	Dubai	Dubai	Direct	Emirate	Busines	2	C'vnce	Fare	schedul e
Nig	Nig	2	BE	Top mng		Lagos	Cairo	Cairo	Direct	Egypt	Busines	2			
Lebanese	Nig	3	others	other		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
Nig	Nig	2	stdt			Lagos	S/Africa	Nairobi	Indirect	Kenya Air	Busines	10	comfort		
Lebanese	Nig	4	BE	other		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
Nig	Nig	2	others	Snr offcer		Lagos	Ghana	Accra	Direct	Air Nig	Busines	10	Schedul e		
Nig	Nig	3	others	other		Lagos	Ghana	Accra	Direct	Arik	Busines	10	Fare	Schedul e	C'vnce
W/African	W/African	3	others	other		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
W/African	W/African	3	others	other		Lagos	Lebanon	Lebanon	Direct	MEA	Leisure	10			
W/African	W/African	4	BE	Top mng		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
Cameroun	Cameroun		others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Nig	UK	3	BE	Mdl mng	4	Lagos	London	Dubai	Indirect	Emirate	Leisure	10			
W/African	W/African	2	others			Lagos	Ghana	Accra	Direct	Air Nig	Busines	2			
W/African	W/African	2				Lagos	Ghana	Accra	Direct	Air Nig	Busines	2			
Nig	Ethiopia	3	Diplomat	Snr offcer	4	Lagos	Adis Ababa	Adis Ababa	Direct	Ethiopia	Busines	10	C'vnce		
Pakistani	Nig	3	CS	other		Lagos	Pakistan	Cairo	Indirect	Egypt	Leisure	2			
Nig	Nig	3	CS	Mdl mng		Lagos	Dubai	Dubai	Direct	Emirate	Busines	10			
Nig	W/African	4	Diplomat	Snr offcer		Lagos	Cotonou	Cotonou	Direct	Egypt	Busines	8			
W/African	W/African	2	stdt			Lagos	Ghana	Accra	Direct	Air Nig	Busines	5			
Angola	Angola	2	stdt			Lagos	Dubai	Cairo	Indirect	Egypt	Busines	5			
Nig	Nig	3	others	Top mng	3	Lagos	Ghana	Accra	Direct	Arik	Busines	10	Fare		
Nig	W/African	4	others	other		Lagos	S/Arabia	Jeddah	Direct	Max	Busines	2			
W/African	W/African	2	others	other		Lagos	Ghana	Accra	Direct	Air Nig	Leisure	2			
W/African	W/African	2	others			Lagos	Ghana	Accra	Direct	Air Nig	Busines	2			
Nig	Nig	2	stdt			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			

W/African	W/African	5	others	other		Lagos	S/Arabia	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	2	stdt			Lagos	Ghana	Accra	Direct	Air Nig	Busines	5			
Nig	Nig	4	BE	Top mng		Lagos	China	Doha	Indirect	Qatar Air	Busines	10			
Nig	Dubai	2	others	jnr		Lagos	Dubai	Dubai	Direct	Emirate	Busines	10			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Congolese	Congo	3	others			Lagos	Congo	Congo	Direct	Asky	Busines	2			
Nig	Nig	2	stdt			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
Nig	Nig	2	stdt			Lagos	Egypt	Cairo	Direct	Egypt	Busines	2			
Cameroun	Cameroun	4	others	Snr offcer		Lagos	Cameron	Cameron	Direct	Asky	Busines	8			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	2			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Cameroun	Cameroun	2	others			Lagos	Cameron	Cameron	Direct	Asky	Busines	5			
Nig	Nig	4	others	other	2	Lagos	Uganda	Adis Ababa	Indirect	Ethiopia	Busines	5	safety	Brandnme	comfort
British	uk	4	BE	Top mng	5	Lagos	London	London	Direct	Arik	Busines	10	Fare	Schedule	C'vnce
Nig	Nig	2	stdt	other	1	Lagos	Mozambiqu	Nairobi	Indirect	Kenya Air	Busines	2			
Nig	Nig	2	BE	Mdl mng	1	Lagos	China	Adis Ababa	Indirect	Ethiopia	Busines	5			
Indian	India	3	BE			Lagos	India	Adis Ababa	Indirect	Ethiopia	Busines	10			
Nig	Nig	3	BE	Mdl mng		Lagos	Dubai	Adis Ababa	Indirect	Ethiopia	Busines	10			
Nig	Nig	3	others	Mdl mng	5	Lagos	Uganda	Nairobi	Indirect	Kenya Air	Leisure	10			
Nig	Nig	2	BE			Lagos	HongKong	Nairobi	Indirect	Kenya Air	Busines	2			
Brundi	Brundi	3	BE		2	Lagos	Burundi						comfort	safety	schedule
Nig	Nig	2	stdt			Lagos	China	Adis Ababa	Indirect	Ethiopia	Busines	2			

Nig	Dubai	3	BE	Mdl mng	1	Lagos	Dubai	Nairobi	Indirect	Kenya Air	Busines	5	Fare	safety	
Nig	Nig	3	BE	Top mng		Lagos	HongKong	Nairobi	Indirect	Kenya Air	Busines	10	P&A		
Indian	India	3	others	Mdl mng	1	Lagos	India	Doha	Indirect	Qatar Air	Busines	5	Fare	C'vnce	
Nig	Nig	3	others	other		Lagos	Zambia	Nairobi	Indirect	Kenya Air	Leisure	2			
Nig	Nig	4	BE	other		Lagos	S/Africa	Nairobi	Indirect	Kenya Air	Leisure	2			
Nig	Nig	2	BE	Top mng		Lagos	China	Doha	Indirect	Qatar Air	Busines	8	safety	Comfort	
Nig	Nig	3	BE	Mdl mng	5	Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	10	Fare	promo	
Nig	Nig	2	stdt			Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines	2			
Nig	Nig	3	BE	other		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	5			
Nig	Nig	3	BE	Mdl mng		Lagos	Dubai	Doha	Indirect	Qatar Air	Busines	2			
W/African	W/African	3	others	other		Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines	2			
S/African	Ss/African	3	others	Top mng		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	Fare	safety	
Nig	Nig	2	stdt			Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines				
S/African	Ss/African	4	CS	Snr offcer		Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2			
W/African	W/African	4	BE			Lagos	S/Arabia	Jeddah	Direct	Max	Busines	3			
S/African	Ss/African	3	BE	other	1	Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2	Schedule	safety	Fare
S/African	Ss/African	3	cs	jnr		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	2	Fare	Schedule	C'vnce
S/African	Ss/African	2	BE	other		Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	8	Fare	Schedule	C'vnce
S/African	Ss/African	3	BE	Top mng	1	Lagos	Botswana	Nairobi	Indirect	Kenya Air	Busines	8	Fare	Schedule	C'vnce
S/African	Ss/African	3	others	other		Lagos	Botswana	Nairobi	Indirect	Kenya	Busines	2			

										Air					
S/African	Ss/Afircan	4	CS	jnr	1	Lagos	Gabon	Nairobi	Indirect	Kenya Air	Busines	2	ffp		
Nig	Nig	3	Diplomat	Snr offcer		Lagos	Kenya	Nairobi	Direct	Kenya Air	Busines	2	Schedul e	Fare	C'vnce
Nig	Nig	3	CS	Snr offcer		Lagos	Dubai	Adis Ababa	Indirect	Ethiopia	Busines	10	Fare	Schedul e	safety
Nig	Nig	2				Lagos	Egypt	Cairo	Direct	Egypt	Busines	2			
Congolese	Congo	2	others			Lagos	Congo	Congo	Direct	Asky	Busines	2			
Nig	Nig	2	stdt			Lagos	Turkey	Cairo	Indirect	Egypt	Busines	5			

Appendix 8: Pax final destinations and Airline used

		Airline used																					Total
			Air Franc	Air Nig	Arik	Asky	BA	Delta	Egypt	Emirate	Ethiopia	Iberia	Kenya Air	KLM	Lufthansa	Max	MEA	Qatar Air	SAA	Turkish	United A	Vig Atl	Vig Nig	
Final destination country		3	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	6
	Abidjan	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	Adis Aba	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
	Amsterda	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
	Barbados	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Botswana	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	25
	Burundi	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
	Cairo	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Cameron	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	China	0	0	0	0	0	0	0	0	3	19	0	2	0	0	0	0	3	0	0	0	0	0	27
	Congo	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Congo	0	0	0	0	6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
	Cotonou	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	Denmark	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
	Dubai	0	0	0	0	0	1	0	2	25	7	0	6	0	0	0	0	10	0	0	0	0	0	51
	Egypt	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Frankfur	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
	Gabon	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6
	Gambia	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	Gabon	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	Ghana	0	0	17	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	33
	Guinea	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	HongKong	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	5
	India	0	0	0	0	0	0	0	0	5	7	0	0	0	0	0	0	1	0	0	0	0	0	13
	Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Italy	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
	Kenya	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	7
	Korea	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
	Lebanon	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	17	0	0	0	0	0	0	18
	Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	London	0	1	0	56	0	5	0	0	4	0	0	0	7	7	0	0	0	0	3	0	10	0	93

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	Malysia	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3
	Manchest	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	Mozambiq	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	Pakistan	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Paris	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Poland	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	Russia	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	S.Africa	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2
	S/Africa	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	2	0	0	0	0	5
	S/Arabia	0	0	0	0	0	0	0	0	1	7	0	16	0	0	24	0	1	0	0	0	0	0	49
	Scotland	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
	Senegal	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Singapor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Spain	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
	Swis'land	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
	Syria	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Thailand	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Togo	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Turkey	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3
	Uganda	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
	Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
	USA	0	0	0	0	0	0	17	0	2	0	0	0	15	2	0	0	1	0	1	1	0	0	39
	Zambia	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	Zimbabwe	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total		4	3	26	70	42	6	17	15	44	51	2	80	37	18	24	17	18	3	8	1	10	6	502

APPENDIX 8

Final destination country * Journey purpose Cross tabulation

Count

		Journey purpose			
			Business	Leisure	Total
Final destination country	Abidjan	0	2	1	3
	Addis Ababa	0	5	0	5
	Amsterdam	0	1	1	2
	Barbados	0	0	1	1
	Botswana	0	23	2	25
	Burundi	1	2	0	3
	Cameroon	0	29	0	29
	Canada	0	2	0	2
	China	0	27	0	27
	Congo	0	9	1	10
	Cotonou	0	3	0	3
	Denmark	0	2	0	2
	Dubai	0	43	8	51
	Egypt	0	6	1	7
	Frankfurt	0	3	1	4
	Gabon	0	7	0	7
	Gambia	0	4	0	4
	Ghana	0	27	6	33
	Hong Kong	0	5	0	5
	India	0	7	6	13
	Ireland	0	0	1	1
	Italy	0	2	2	4
	Kenya	0	7	0	7
	Korea	0	2	0	2
	Lebanon	0	4	14	18
	Liberia	0	1	0	1
	London	0	43	50	93
	Malaysia	0	3	0	3
	Manchester	0	1	0	1
	Mozambique	0	1	0	1
	Norway	0	1	0	1
	Pakistan	0	1	1	2
	Paris	0	2	0	2
	Poland	0	0	1	1
	Russia	0	1	0	1
	S/Africa	0	4	3	7
	S/Arabia	0	49	0	49
	Scotland	0	2	1	3
	Senegal	0	3	0	3
	Singapore	0	1	0	1
	Spain	0	2	0	2
	Swis'land	0	2	0	2
	Syria	0	0	1	1
	Thailand	0	1	0	1
	Togo	0	3	0	3
	Turkey	0	3	0	3
	Uganda	0	1	1	2
	Ukraine	0	0	3	3
	USA	0	18	21	39
	Zambia	0	0	1	1
	Zimbabwe	0	0	1	1
	3	370	129	502	

Appendix 9: Database used in calibration of the model with ALI

Country	Pax traffic	AggGDP($)	Trade($)	Fare($)	Dist (KM)	ALI	Dummy	lnPax	lnGDP	lnTrade
UK	392528	2.44E+12	2.1E+09	845	5168	14	1	12.88	28.52	21.46
Ghana	152754	2.25E+11	3E+08	149	517	30	1	11.94	26.14	19.52
United States	152188	1.48E+13	2.34E+10	1100	10701	26	1	11.93	30.32	23.88
United Arab Emi	109680	4.91E+11	1.13E+09	611	5969	14	1	11.61	26.92	20.84
South Africa	107266	5.57E+11	1.77E+09	570	4715	14	1	11.58	27.05	21.29
India	51377	1.92E+12	7.97E+09	876	8174	0	1	10.85	28.28	22.8
China	49424	6.12E+12	6.24E+09	1500	11935	0	0	10.81	29.44	22.55
Italy	43078	2.25E+12	3.35E+09	581	5137	10	0	10.67	28.44	21.93
Germany	39376	3.47E+12	6.41E+08	799	5212	14	0	10.58	28.88	20.28
Netherlands	35734	9.73E+11	2.6E+09	899	5029	14	0	10.48	27.6	21.68
Cameroon	35090	2.16E+11	4.58E+08	179	785	30	1	10.47	26.1	19.94
France	34566	2.75E+12	4.12E+09	1021	4965	14	0	10.45	28.64	22.14
Egypt	34184	4.13E+11	72198792	535	3700	30	0	10.44	26.75	18.09
Ethiopia	30623	2.23E+11	969039	548	3838	30	0	10.33	26.13	13.78
Lebanon	27519	2.33E+11	47616811	596	4471	14	0	10.22	26.17	17.68
Ireland	26237	4.05E+11	1.29E+08	834	5774	0	1	10.17	26.73	18.68
Qatar	26029	2.92E+11	16033644	578	5544	10	0	10.17	26.4	16.59
Benin	20805	2E+11	56438401	94	154	30	0	9.94	26.02	17.85
Saudi Arabia	19530	6.28E+11	4.89E+08	551	4612	10	1	9.88	27.17	20.01
Kenya	19176	2.25E+11		594	3915	30	1	9.86	26.14	
Senegal	18142	2.07E+11	1.73E+08	433	2573	30	0	9.81	26.05	18.97

Malaysia	17855	4.31E+11	6.36E+08	1311	11590	0	1	9.79	26.79	20.27
Sierra Leone	17556	1.96E+11	4179054	363	1849	30	1	9.77	26	15.25
Canada	16824	1.77E+12	1.81E+09	1337	11582	0	1	9.73	28.2	21.32
Ivory Coast (Co	14426	2.16E+11	1.28E+09	214	890	30	0	9.58	26.1	20.97
Turkey	12276	9.28E+11	4.6E+08	611	5033	10	0	9.42	27.56	19.95
Spain	11796	1.6E+12	2.25E+09	592	4843	10	0	9.38	28.1	21.54
Switzerland	10853	7.22E+11	2.11E+08	1164	5405	0	0	9.29	27.3	19.17
Israel	10008	4.11E+11	1.1E+08	745	7262	0	1	9.21	26.74	18.52
Hong Kong	8033	4.18E+11	3.22E+08	1365	12036	0	1	8.99	26.76	19.59
South Korea	6147	1.21E+12	3.35E+08	1671	12874	0	0	8.72	27.82	19.63
Belgium	5403	6.63E+11	2.56E+09	886	5302	0	0	8.59	27.22	21.66
Gambia	4949	1.94E+11	1382910	408	2357	0	1	8.51	25.99	14.14
Brazil	4600	2.28E+12	5.32E+09	1114	14056	0	0	8.43	28.46	22.39
Philippines	4578	3.93E+11	6620162	1576	13015	0	1	8.43	26.7	15.71
Equatorial Guin	4514	2.08E+11	2.3E+09	165	742	0	0	8.41	26.06	21.56
Singapore	4331	4.02E+11	5.22E+08	1426	11903	0	1	8.37	26.72	20.07
Liberia	4174	1.95E+11	2868759	299	1537	0	1	8.34	25.99	14.87
Austria	3994	5.73E+11	82044600	880	5743	0	0	8.29	27.07	18.22
Russian Federat	3527	1.67E+12	40016965	1274	8281	0	0	8.17	28.15	17.5
Sweden	3421	6.53E+11	2.97E+08	1010	6604	0	0	8.14	27.2	19.51
Greece	3297	4.95E+11	1.39E+08	784	6741	0	0	8.1	26.93	18.75
Gabon	3033	2.07E+11	11589131	220	984	0	0	8.02	26.05	16.27
Morocco	2984	2.84E+11		533	3390	10	0	8	26.37	
Australia	2909	1.12E+12	7.28E+08	1595	17153	0	1	7.98	27.74	20.41
Uganda	2644	2.11E+11	2127020	537	4540	0	1	7.88	26.07	14.57
Denmark	2546	5.04E+11		846	5758	0	0	7.84	26.94	

Poland	2533	6.63E+11	1.3E+08	876	5911	0	0	7.84	27.22	18.68
Pakistan	2466	3.71E+11	63238936	892	7469	0	1	7.81	26.64	17.96
Ukraine	2462	3.32E+11	67860058	954	5858	0	0	7.81	26.53	18.03
Indonesia	2376	9E+11	7.37E+08	1157	12609	0	1	7.77	27.53	20.42
Tanzania	2329	2.17E+11	8696706	651	5068	0	1	7.75	26.1	15.98
Japan	2253	5.65E+12	1.03E+09	2434	13927	0	0	7.72	29.36	20.76
Romania	2080	3.55E+11	13948120	750	6434	0	0	7.64	26.6	16.45
Norway	2016	6.07E+11	2.14E+08	966	6110	0	0	7.61	27.13	19.18
Zambia	1692	2.1E+11	58044	591	5874	0	1	7.43	26.07	10.97
Cyprus	1549	2.17E+11	25351616	584	6365	0	0	7.35	26.1	17.05
Zimbabwe	1515	2.01E+11	703135	541	5755	0	1	7.32	26.03	13.46
Mexico	1506	1.23E+12		1266	12400	0	0	7.32	27.84	
Botswana	1482	2.09E+11	1.29E+09	516	4855	0	0	7.3	26.06	20.98
Portugal	1383	4.23E+11	1.34E+09	711	5911	0	0	7.23	26.77	21.01
Chad	1216	2.01E+11	1.72E+08	278	5319	0	1	7.1	26.03	18.96
Togo	1159	1.97E+11	1442269	123	481	0	1	7.06	26.01	14.18
Hungary	1145	3.22E+11	8858633	711	5775	0	0	7.04	26.5	16
Congo Democrati	1065	2.06E+11		368	2814	0	0	6.97	26.05	
Finland	991	4.32E+11		601	6522	0	0	6.9	26.79	
Bulgaria	974	2.41E+11	31192296	833	6242	0	0	6.88	26.21	17.26
Bahrain	933	2.14E+11	1.02E+08	712	5989	0	0	6.84	26.09	18.44
Tunisia	913	2.38E+11	14734981	908	6947	0	0	6.82	26.2	16.51
Czech Republic	889	3.86E+11		880	5683	0	0	6.79	26.68	
Bangladesh	885	2.94E+11	2.33E+08	777	9530	0	1	6.79	26.41	19.27
Oman	883	2.41E+11	33244327	772	6321	0	0	6.78	26.21	17.32
Congo	793	2.07E+11	1.26E+08	307	3607	0	0	6.68	26.06	18.65

Sudan	743	2.56E+11	10619098	468	3929	10	1	6.61	26.27	16.18
Jamaica	736	2.08E+11	1465609	1426	11700	0	1	6.6	26.06	14.2
Angola	684	2.78E+11	1.63E+08	672	7125	0	0	6.53	26.35	18.91
Croatia	683	2.55E+11	14651882	609	5808	0	0	6.53	26.26	16.5
Serbia	674	2.32E+11	733047	921	5802	0	0	6.51	26.17	13.5
Kuwait	635	3.03E+11	1298174	678	6187	0	0	6.45	26.44	14.08
Mauritius	617	2.03E+11		957	9505	0	1	6.42	26.04	
Jordan	604	2.21E+11		985	5873	0	0	6.4	26.12	
Mozambique	602	2.03E+11		587	5373	0	0	6.4	26.04	
Syria	591	2.53E+11	69835535	557	5871	0	0	6.38	26.26	18.06
Algeria	578	3.53E+11	9.27E+08	821	6113	0	0	6.36	26.59	20.65
Costa Rica	558	2.3E+11	1190988	1261	12037	0	0	6.32	26.16	13.99
Vietnam	557	3E+11	1.23E+08	1090	11802	0	0	6.32	26.43	18.63
Iran	535	5.25E+11		679	6955	0	0	6.28	26.99	
Malawi	534	1.99E+11	14957	532	6034	0	0	6.28	26.02	9.61
Taiwan	521	2.38E+11	4.55E+08	1085	13135	0	0	6.26	26.19	19.94
Namibia	465	2.06E+11	6583074	545	5756	0	1	6.14	26.05	15.7
Honduras	436	2.09E+11	647158	1349	11615	0	0	6.08	26.07	13.38
Sri Lanka	425	2.43E+11	3163399	778	9173	0	1	6.05	26.22	14.97
Libya	395	2.56E+11	1014620	560	3175	10	0	5.98	26.27	13.83
New Zealand	388	3.2E+11	1.43E+08	1671	20288	0	1	5.96	26.49	18.78
Rwanda	388	1.99E+11		551	4937	0	0	5.96	26.02	
Bahamas	360	2.01E+11	7419526	1236	10719	0	0	5.89	26.03	15.82
Colombia	352	4.82E+11	3013311	1380	12059	0	0	5.86	26.9	14.92
Luxembourg	340	2.47E+11	4026868	666	5073	0	0	5.83	26.23	15.21
El Salvador	307	2.15E+11	202314	1319	11780	0		5.73	26.09	12.22

Venezuela	306	5.86E+11	1033026	1377	12718	0	0	5.72	27.1	13.85
Argentina	292	5.62E+11	1.18E+08	1257	13907	0	0	5.68	27.06	18.59
Latvia	286	2.18E+11	21268624	953	6298	0	0	5.66	26.11	16.87
Guatemala	282	2.35E+11		1314	11648	0	0	5.64	26.18	
Yemen	229	2.2E+11	21814	731	6004	0	0	5.43	26.12	9.99
Belarus	219	2.48E+11		642	6048	0	0	5.39	26.24	
Georgia	213	2.05E+11	20447876	966	5773	0	0	5.36	26.05	16.83
Mali	205	2.03E+11	1079325	363	3192	0	0	5.32	26.04	13.89
Malta	194	2.02E+11	1304986	693	6415	0	1	5.27	26.03	14.08
Lesotho	177	1.96E+11		645	4931	0	0	5.18	26	
Swaziland	148	1.97E+11	28593323	630	4870	0	0	5	26.01	17.17
Panama	141	2.2E+11	44919386	1490	12771	0	0	4.95	26.12	17.62
Maldives	139	1.96E+11		1160	8869	0	1	4.93	26	
Burkina Faso	135	2.02E+11	62153353	213	1358	0	0	4.91	26.03	17.95
Kazakhstan	135	3.43E+11	899004	916	9272	0	0	4.91	26.56	13.71
Azerbaijan	134	2.45E+11	5950	974	6512	0	0	4.9	26.23	8.69
Niger	124	1.99E+11		193	1431	0	1	4.82	26.02	
Trinidad and To	122	2.14E+11	6497297	2146	14116	0	1	4.8	26.09	15.69
Belize	118	1.95E+11	1.11E+09	1192	11310	0	0	4.77	26	20.83
Moldova	116	1.99E+11		589	5356	0	0	4.75	26.02	
Burundi	107	1.95E+11	2703	526	4838	0	0	4.67	26	7.9
Nepal	107	2.07E+11	8108	804	8926	0	0	4.67	26.05	9
Peru	103	3.51E+11	3.21E+08	1686	14123	0	0	4.63	26.58	19.59
Seychelles	93	1.95E+11	5666	793	7968	0	0	4.53	25.99	8.64
Cambodia	77	2.05E+11		1393	11360	0	0	4.34	26.05	
Dominican Repub	75	2.45E+11	128203	1803	12290	0	0	4.32	26.23	11.76

Slovenia	75	2.41E+11	4548960	605	5618	0	0	4.32	26.21	15.33
Lithuania	74	2.3E+11	868210	982	5963	0	0	4.3	26.16	13.67
Brunei Darussal	67	2.04E+11	3297801	3170	12859	0	1	4.2	26.04	15.01
Guinea	61	1.98E+11	1266223	366	1961	0	0	4.11	26.01	14.05
Madagascar	56	2.02E+11	8849	818	6552	0	0	4.03	26.03	9.09
Estonia	39	2.13E+11	718916	725	6264	0	0	3.66	26.08	13.49
Ecuador	36	2.52E+11	118290	1111	13482	0	0	3.58	26.25	11.68

Sources: (IATA PaxIs, 2011; World Bank, 2011; FMOA, 2011; and NBS 2011)

Appendix 10: Database used in calibration of the model with ASA variables as dummies

Country	Passenger	AggGDP($)	Trade($)	Fare($)	Distance($)	Dmy Lang	lnPax	lnGDP	lnTrade	Basa(rstrt)	Basa(com)	OSA	YD
UK	392528	2.44E+12	2.1E+09	845	5168	1	12.88	28.524	21.464	0	1	0	0
Ghana	152754	2.25E+11	3E+08	149	517	1	11.937	26.139	19.52	0	0	0	1
United States	152188	1.48E+13	2.34E+10	1100	10701	1	11.933	30.324	23.878	0	0	1	0
United Arab Emi	109680	4.91E+11	1.13E+09	611	5969	1	11.605	26.92	20.843	0	1	0	0
South Africa	107266	5.57E+11	1.77E+09	570	4715	1	11.583	27.047	21.293	0	1	0	0
India	51377	1.92E+12	7.97E+09	876	8174	1	10.847	28.284	22.798	0	0	0	0
China	49424	6.12E+12	6.24E+09	1500	11935	0	10.808	29.443	22.554	0	0	0	0
Italy	43078	2.25E+12	3.35E+09	581	5137	0	10.671	28.44	21.931	1	0	0	0
Germany	39376	3.47E+12	6.41E+08	799	5212	0	10.581	28.876	20.278	0	1	0	0
Netherlands	35734	9.73E+11	2.6E+09	899	5029	0	10.484	27.604	21.68	0	1	0	0
Cameroon	35090	2.16E+11	4.58E+08	179	785	1	10.466	26.099	19.942	0	0	0	1
France	34566	2.75E+12	4.12E+09	1021	4965	0	10.451	28.644	22.139	0	1	0	0
Egypt	34184	4.13E+11	72198792	535	3700	0	10.44	26.746	18.095	0	0	0	1
Ethiopia	30623	2.23E+11	969039	548	3838	0	10.33	26.132	13.784	0	0	0	1
Lebanon	27519	2.33E+11	47616811	596	4471	0	10.223	26.173	17.679	0	1	0	0
Ireland	26237	4.05E+11	1.29E+08	834	5774	1	10.175	26.727	18.677	0	0	0	0

Qatar	26029	2.92E+11	16033644	578	5544	0	10.167	26.4	16.59	1	0	0	0
Benin	20805	2E+11	56438401	94	154	0	9.943	26.023	17.849	0	0	0	1
Saudi Arabia	19530	6.28E+11	4.89E+08	551	4612	1	9.88	27.166	20.008	1	0	0	0
Kenya	19176	2.25E+11		594	3915	1	9.861	26.14		0	0	0	1
Senegal	18142	2.07E+11	1.73E+08	433	2573	0	9.806	26.054	18.969	0	0	0	1
Malaysia	17855	4.31E+11	6.36E+08	1311	11590	1	9.79	26.79	20.271	0	0	0	0
Sierra Leone	17556	1.96E+11	4179054	363	1849	1	9.773	25.999	15.246	0	0	0	1
Canada	16824	1.77E+12	1.81E+09	1337	11582	1	9.731	28.202	21.315	0	0	0	0
Ivory Coast (Co	14426	2.16E+11	1.28E+09	214	890	0	9.577	26.101	20.974	0	0	0	1
Turkey	12276	9.28E+11	4.6E+08	611	5033	0	9.415	27.556	19.948	1	0	0	0
Spain	11796	1.6E+12	2.25E+09	592	4843	0	9.376	28.102	21.535	1	0	0	0
Switzerland	10853	7.22E+11	2.11E+08	1164	5405	0	9.292	27.305	19.168	0	0	0	0
Israel	10008	4.11E+11	1.1E+08	745	7262	1	9.211	26.742	18.516	0	0	0	0
Hong Kong	8033	4.18E+11	3.22E+08	1365	12036	1	8.991	26.759	19.59	0	0	0	0
South Korea	6147	1.21E+12	3.35E+08	1671	12874	0	8.724	27.82	19.629	0	0	0	0
Belgium	5403	6.63E+11	2.56E+09	886	5302	0	8.595	27.22	21.664	0	0	0	0
Gambia	4949	1.94E+11	1382910	408	2357	1	8.507	25.994	14.14	0	0	0	0
Brazil	4600	2.28E+12	5.32E+09	1114	14056	0	8.434	28.456	22.394	0	0	0	0

Philippines	4578	3.93E+11	6620162	1576	13015	1	8.429	26.698	15.706	0	0	0	0
Equatorial Guin	4514	2.08E+11	2.3E+09	165	742	0	8.415	26.059	21.556	0	0	0	0
Singapore	4331	4.02E+11	5.22E+08	1426	11903	1	8.374	26.721	20.074	0	0	0	0
Liberia	4174	1.95E+11	2868759	299	1537	1	8.337	25.994	14.869	0	0	0	1
Austria	3994	5.73E+11	82044600	880	5743	0	8.293	27.074	18.223	0	0	0	0
Russian Federat	3527	1.67E+12	40016965	1274	8281	0	8.168	28.146	17.505	0	0	0	0
Sweden	3421	6.53E+11	2.97E+08	1010	6604	0	8.138	27.204	19.508	0	0	0	0
Greece	3297	4.95E+11	1.39E+08	784	6741	0	8.101	26.927	18.749	0	0	0	0
Gabon	3033	2.07E+11	11589131	220	984	0	8.017	26.054	16.266	1	0	0	0
Morocco	2984	2.84E+11		533	3390	0	8.001	26.374		1	0	0	0
Australia	2909	1.12E+12	7.28E+08	1595	17153	1	7.976	27.743	20.406	0	0	0	0
Uganda	2644	2.11E+11	2127020	537	4540	1	7.88	26.074	14.57	0	0	0	0
Denmark	2546	5.04E+11		846	5758	0	7.842	26.945		0	0	0	0
Poland	2533	6.63E+11	1.3E+08	876	5911	0	7.837	27.22	18.682	0	0	0	0
Pakistan	2466	3.71E+11	63238936	892	7469	1	7.81	26.638	17.962	0	0	0	0
Ukraine	2462	3.32E+11	67860058	954	5858	0	7.809	26.527	18.033	0	0	0	0
Indonesia	2376	9E+11	7.37E+08	1157	12609	1	7.773	27.526	20.418	0	0	0	0
Tanzania	2329	2.17E+11	8696706	651	5068	1	7.753	26.102	15.978	0	0	0	0

Japan	2253	5.65E+12	1.03E+09	2434	13927	0	7.72	29.363	20.757	0	0	0	0
Romania	2080	3.55E+11	13948120	750	6434	0	7.64	26.596	16.451	0	0	0	0
Norway	2016	6.07E+11	2.14E+08	966	6110	0	7.609	27.131	19.18	0	0	0	0
Zambia	1692	2.1E+11	58044	591	5874	1	7.434	26.07	10.969	0	0	0	0
Cyprus	1549	2.17E+11	25351616	584	6365	0	7.345	26.102	17.048	0	0	0	0
Zimbabwe	1515	2.01E+11	703135	541	5755	1	7.323	26.027	13.463	0	0	0	0
Mexico	1506	1.23E+12		1266	12400	0	7.317	27.837		0	0	0	0
Botswana	1482	2.09E+11	1.29E+09	516	4855	0	7.301	26.063	20.977	0	0	0	0
Portugal	1383	4.23E+11	1.34E+09	711	5911	0	7.232	26.77	21.015	0	0	0	0
Chad	1216	2.01E+11	1.72E+08	278	5319	1	7.103	26.028	18.962	0	0	0	0
Togo	1159	1.97E+11	1442269	123	481	1	7.055	26.006	14.182	0	0	0	0
Hungary	1145	3.22E+11	8858633	711	5775	0	7.043	26.499	15.997	0	0	0	0
Congo Democrati	1065	2.06E+11		368	2814	0	6.971	26.049		0	0	0	0
Finland	991	4.32E+11		601	6522	0	6.899	26.793		0	0	0	0
Bulgaria	974	2.41E+11	31192296	833	6242	0	6.881	26.21	17.256	0	0	0	0
Bahrain	933	2.14E+11	1.02E+08	712	5989	0	6.838	26.09	18.439	0	0	0	0
Tunisia	913	2.38E+11	14734981	908	6947	0	6.817	26.195	16.506	0	0	0	0
Czech Republic	889	3.86E+11		880	5683	0	6.79	26.678		0	0	0	0

Bangladesh	885	2.94E+11	2.33E+08	777	9530	1	6.786	26.407	19.268	0	0	0	0
Oman	883	2.41E+11	33244327	772	6321	0	6.783	26.206	17.319	0	0	0	0
Congo	793	2.07E+11	1.26E+08	307	3607	0	6.676	26.055	18.651	0	0	0	0
Sudan	743	2.56E+11	10619098	468	3929	1	6.611	26.267	16.178	1	0	0	0
Jamaica	736	2.08E+11	1465609	1426	11700	1	6.601	26.06	14.198	0	0	0	0
Angola	684	2.78E+11	1.63E+08	672	7125	0	6.528	26.351	18.909	0	0	0	0
Croatia	683	2.55E+11	14651882	609	5808	0	6.526	26.263	16.5	0	0	0	0
Serbia	674	2.32E+11	733047	921	5802	0	6.513	26.17	13.505	0	0	0	0
Kuwait	635	3.03E+11	1298174	678	6187	0	6.454	26.437	14.076	0	0	0	0
Mauritius	617	2.03E+11		957	9505	1	6.425	26.038		0	0	0	0
Jordan	604	2.21E+11		985	5873	0	6.404	26.123		0	0	0	0
Mozambique	602	2.03E+11		587	5373	0	6.4	26.038		0	0	0	0
Syria	591	2.53E+11	69835535	557	5871	0	6.382	26.256	18.062	0	0	0	0
Algeria	578	3.53E+11	9.27E+08	821	6113	0	6.36	26.59	20.647	0	0	0	0
Costa Rica	558	2.3E+11	1190988	1261	12037	0	6.324	26.159	13.99	0	0	0	0
Vietnam	557	3E+11	1.23E+08	1090	11802	0	6.323	26.427	18.628	0	0	0	0
Iran	535	5.25E+11		679	6955	0	6.282	26.986		0	0	0	0
Malawi	534	1.99E+11	14957	532	6034	0	6.28	26.015	9.613	0	0	0	0

Taiwan	521	2.38E+11	4.55E+08	1085	13135	0	6.256	26.194	19.935	0	0	0	0
Namibia	465	2.06E+11	6583074	545	5756	1	6.142	26.05	15.7	0	0	0	0
Honduras	436	2.09E+11	647158	1349	11615	0	6.078	26.066	13.38	0	0	0	0
Sri Lanka	425	2.43E+11	3163399	778	9173	1	6.052	26.217	14.967	0	0	0	0
Libya	395	2.56E+11	1014620	560	3175	0	5.979	26.269	13.83	1	0	0	0
New Zealand	388	3.2E+11	1.43E+08	1671	20288	1	5.961	26.493	18.78	0	0	0	0
Rwanda	388	1.99E+11		551	4937	0	5.961	26.018		0	0	0	0
Bahamas	360	2.01E+11	7419526	1236	10719	0	5.886	26.028	15.82	0	0	0	0
Colombia	352	4.82E+11	3013311	1380	12059	0	5.864	26.901	14.919	0	0	0	0
Luxembourg	340	2.47E+11	4026868	666	5073	0	5.829	26.233	15.208	0	0	0	0
El Salvador	307	2.15E+11	202314	1319	11780		5.727	26.093	12.218	0	0	0	0
Venezuela	306	5.86E+11	1033026	1377	12718	0	5.724	27.096	13.848	0	0	0	0
Argentina	292	5.62E+11	1.18E+08	1257	13907	0	5.677	27.055	18.588	0	0	0	0
Latvia	286	2.18E+11	21268624	953	6298	0	5.656	26.106	16.873	0	0	0	0
Guatemala	282	2.35E+11		1314	11648	0	5.642	26.182		0	0	0	0
Yemen	229	2.2E+11	21814	731	6004	0	5.434	26.117	9.99	0	0	0	0
Belarus	219	2.48E+11		642	6048	0	5.389	26.238		0	0	0	0
Georgia	213	2.05E+11	20447876	966	5773	0	5.361	26.048	16.833	0	0	0	0

Mali	205	2.03E+11	1079325	363	3192	0	5.323	26.036	13.892	0	0	0	0
Malta	194	2.02E+11	1304986	693	6415	1	5.268	26.031	14.082	0	0	0	0
Lesotho	177	1.96E+11		645	4931	0	5.176	26		0	0	0	0
Swaziland	148	1.97E+11	28593323	630	4870	0	4.997	26.008	17.169	0	0	0	0
Panama	141	2.2E+11	44919386	1490	12771	0	4.949	26.119	17.62	0	0	0	0
Maldives	139	1.96E+11		1160	8869	1	4.934	25.999		0	0	0	0
Burkina Faso	135	2.02E+11	62153353	213	1358	0	4.905	26.034	17.945	0	0	0	0
Kazakhstan	135	3.43E+11	899004	916	9272	0	4.905	26.56	13.709	0	0	0	0
Azerbaijan	134	2.45E+11	5950	974	6512	0	4.898	26.226	8.691	0	0	0	0
Niger	124	1.99E+11		193	1431	1	4.82	26.018		0	0	0	0
Trinidad and To	122	2.14E+11	6497297	2146	14116	1	4.804	26.091	15.687	0	0	0	0
Belize	118	1.95E+11	1.11E+09	1192	11310	0	4.771	25.997	20.829	0	0	0	0
Moldova	116	1.99E+11		589	5356	0	4.754	26.019		0	0	0	0
Burundi	107	1.95E+11	2703	526	4838	0	4.673	25.998	7.902	0	0	0	0
Nepal	107	2.07E+11	8108	804	8926	0	4.673	26.054	9.001	0	0	0	0
Peru	103	3.51E+11	3.21E+08	1686	14123	0	4.635	26.583	19.586	0	0	0	0
Seychelles	93	1.95E+11	5666	793	7968	0	4.533	25.994	8.642	0	0	0	0
Cambodia	77	2.05E+11		1393	11360	0	4.344	26.046		0	0	0	0

Dominican Repub	75	2.45E+11	128203	1803	12290	0	4.317	26.226	11.761	0	0	0	0
Slovenia	75	2.41E+11	4548960	605	5618	0	4.317	26.206	15.33	0	0	0	0
Lithuania	74	2.3E+11	868210	982	5963	0	4.304	26.161	13.674	0	0	0	0
Brunei Darussal	67	2.04E+11	3297801	3170	12859	1	4.205	26.043	15.009	0	0	0	0
Guinea	61	1.98E+11	1266223	366	1961	0	4.111	26.012	14.052	1	0	0	0
Madagascar	56	2.02E+11	8849	818	6552	0	4.025	26.033	9.088	0	0	0	0
Estonia	39	2.13E+11	718916	725	6264	0	3.664	26.084	13.485	0	0	0	0
Ecuador	36	2.52E+11	118290	1111	13482	0	3.584	26.251	11.681	0	0	0	0

Sources: (IATA PaxIs, 2011; World Bank, 2011; FMOA, 2011; and NBS 2011)

Appendix 11: Regression Output for 2010 data

```
GET
  FILE='K:\DATA FROM OLD PC\My Documents\137(2010).sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT lnPax
  /METHOD=STEPWISE lnGDP LnTrade Fare Distance ALI Dummy
  /PARTIALPLOT ALL
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

```
[DataSet1] K:\DATA FROM OLD PC\My Documents\137(2010).sav
```

Descriptive Statistics

	Mean	Std. Deviation	N
lnPax	7.43102	2.142816	113
lnGDP	26.65531	.868196	113
LnTrade	17.10917	3.533296	113
Air Fare($)	874.37	483.820	113
Distance(KM)	7205.25	3986.131	113
Air Lib Index	4.21	8.898	113
Lang/Culture Link	.31	.464	113

Correlations

		lnPax	lnGDP	LnTrade	Air Fare ($)	Distance (KM)	Air Lib Index	Lang/Culture Link
Pearson Correlation	lnPax	1.000	.554	.640	-.223	-.271	.637	.347
	lnGDP	.554	1.000	.603	.312	.273	.164	.046
	LnTrade	.640	.603	1.000	.055	.053	.269	.135
	Air Fare($)	-.223	.312	.055	1.000	.846	-.341	.067
	Distance(KM)	-.271	.273	.053	.846	1.000	-.425	.095
	Air Lib Index	.637	.164	.269	-.341	-.425	1.000	.148
	Lang/Culture Link	.347	.046	.135	.067	.095	.148	1.000
Sig. (1-tailed)	lnPax	.	.000	.000	.009	.002	.000	.000
	lnGDP	.000	.	.000	.000	.002	.042	.316
	LnTrade	.000	.000	.	.282	.287	.002	.077
	Air Fare($)	.009	.000	.282	.	.000	.000	.242
	Distance(KM)	.002	.002	.287	.000	.	.000	.158
	Air Lib Index	.000	.042	.002	.000	.000	.	.059
	Lang/Culture Link	.000	.316	.077	.242	.158	.059	.
N	lnPax	113	113	113	113	113	113	113
	lnGDP	113	113	113	113	113	113	113
	LnTrade	113	113	113	113	113	113	113
	Air Fare($)	113	113	113	113	113	113	113

	Distance(KM)	113	113	113	113	113	113	113
	Air Lib Index	113	113	113	113	113	113	113
	Lang/Culture Link	113	113	113	113	113	113	113

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LnTrade	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Air Lib Index	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	lnGDP	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	Lang/Culture Link	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
5	Distance(KM)	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: lnPax

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.640[a]	.410	.405	1.653077	.410	77.192	1	111	.000	
2	.802[b]	.643	.636	1.292179	.233	71.662	1	110	.000	
3	.829[c]	.687	.678	1.215490	.044	15.318	1	109	.000	
4	.857[d]	.734	.724	1.124836	.047	19.277	1	108	.000	
5	.885[e]	.784	.774	1.018948	.050	24.613	1	107	.000	1.350

a. Predictors: (Constant), LnTrade
b. Predictors: (Constant), LnTrade, Air Lib Index
c. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP
d. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link
e. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)
f. Dependent Variable: lnPax

ANOVA[f]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	210.941	1	210.941	77.192	.000[a]
	Residual	303.326	111	2.733		
	Total	514.266	112			
2	Regression	330.596	2	165.298	98.997	.000[b]
	Residual	183.670	110	1.670		
	Total	514.266	112			
3	Regression	353.228	3	117.743	79.695	.000[c]
	Residual	161.038	109	1.477		
	Total	514.266	112			
4	Regression	377.618	4	94.405	74.613	.000[d]
	Residual	136.648	108	1.265		
	Total	514.266	112			
5	Regression	403.173	5	80.635	77.664	.000[e]
	Residual	111.093	107	1.038		
	Total	514.266	112			

a. Predictors: (Constant), LnTrade
b. Predictors: (Constant), LnTrade, Air Lib Index
c. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP
d. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link
e. Predictors: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)
f. Dependent Variable: lnPax

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.786	.772		1.017	.311					
	LnTrade	.388	.044	.640	8.786	.000	.640	.640	.640	1.000	1.000
2	(Constant)	1.677	.613		2.737	.007					
	LnTrade	.307	.036	.506	8.545	.000	.640	.632	.487	.927	1.078
	Air Lib Index	.121	.014	.501	8.465	.000	.637	.628	.482	.927	1.078
3	(Constant)	-13.984	4.043		-3.459	.001					
	LnTrade	.210	.042	.347	5.038	.000	.640	.435	.270	.606	1.650
	Air Lib Index	.121	.013	.501	8.994	.000	.637	.653	.482	.927	1.078
	lnGDP	.649	.166	.263	3.914	.000	.554	.351	.210	.636	1.573
4	(Constant)	-14.785	3.746		-3.947	.000					
	LnTrade	.192	.039	.317	4.939	.000	.640	.429	.245	.599	1.670
	Air Lib Index	.114	.012	.474	9.137	.000	.637	.660	.453	.915	1.093
	lnGDP	.680	.154	.276	4.426	.000	.554	.392	.220	.634	1.576
	Lang/Culture Link	1.022	.233	.222	4.391	.000	.347	.389	.218	.966	1.035
5	(Constant)	-20.399	3.577		-5.703	.000					
	LnTrade	.181	.035	.298	5.117	.000	.640	.443	.230	.596	1.677
	Air Lib Index	.082	.013	.340	6.267	.000	.637	.518	.282	.687	1.455
	lnGDP	.941	.149	.381	6.322	.000	.554	.521	.284	.556	1.800
	Lang/Culture Link	1.223	.215	.265	5.695	.000	.347	.482	.256	.932	1.073
	Distance(KM)	.000	.000	-.272	-4.961	.000	-.271	-.432	-.223	.673	1.486

a. Dependent Variable: lnPax

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	lnGDP	.264[a]	2.988	.003	.274	.636	1.573	.636
	Air Fare($)	-.259[a]	-3.751	.000	-.337	.997	1.003	.997
	Distance(KM)	-.306[a]	-4.552	.000	-.398	.997	1.003	.997
	Air Lib Index	.501[a]	8.465	.000	.628	.927	1.078	.927
	Lang/Culture Link	.265[a]	3.823	.000	.342	.982	1.019	.982
2	lnGDP	.263[b]	3.914	.000	.351	.636	1.573	.606
	Air Fare($)	-.093[b]	-1.527	.130	-.145	.861	1.162	.801
	Distance(KM)	-.108[b]	-1.698	.092	-.161	.789	1.268	.734
	Lang/Culture Link	.211[b]	3.874	.000	.348	.968	1.033	.915
3	Air Fare($)	-.208[c]	-3.508	.001	-.320	.738	1.355	.545
	Distance(KM)	-.213[c]	-3.484	.001	-.318	.698	1.434	.562
	Lang/Culture Link	.222[c]	4.391	.000	.389	.966	1.035	.599
4	Air Fare($)	-.249[d]	-4.651	.000	-.410	.724	1.382	.540
	Distance(KM)	-.272[d]	-4.961	.000	-.432	.673	1.486	.556
5	Air Fare($)	-.111[e]	-1.299	.197	-.125	.275	3.640	.255

a. Predictors in the Model: (Constant), LnTrade

b. Predictors in the Model: (Constant), LnTrade, Air Lib Index

c. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP

d. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link

e. Predictors in the Model: (Constant), LnTrade, Air Lib Index, lnGDP, Lang/Culture Link, Distance(KM)

f. Dependent Variable: lnPax

Collinearity Diagnostics

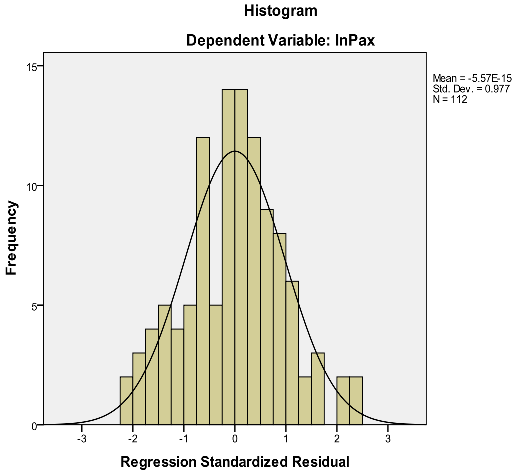
Model	Dimension		Eigenvalue	Condition Index	Variance Proportions					
					(Constant)	LnTrade	Air Lib Index	lnGDP	Lang/Culture Link	Distance (KM)
1	dimension1	1	1.980	1.000	.01	.01				
		2	.020	9.829	.99	.99				
2	dimension1	1	2.292	1.000	.01	.01	.06			
		2	.688	1.825	.01	.00	.88			
		3	.019	10.857	.99	.99	.05			
3	dimension1	1	3.239	1.000	.00	.00	.02	.00		
		2	.737	2.097	.00	.00	.92	.00		
		3	.024	11.724	.01	.70	.06	.00		
		4	.000	94.299	.99	.29	.00	1.00		
4	dimension1	1	3.642	1.000	.00	.00	.02	.00	.02	
		2	.738	2.221	.00	.00	.87	.00	.01	
		3	.595	2.473	.00	.00	.06	.00	.96	
		4	.023	12.455	.01	.70	.05	.00	.00	
		5	.000	100.110	.99	.30	.00	1.00	.00	
5	dimension1	1	4.386	1.000	.00	.00	.01	.00	.02	.01
		2	.870	2.245	.00	.00	.52	.00	.03	.03
		3	.596	2.713	.00	.00	.06	.00	.92	.00
		4	.124	5.937	.00	.01	.34	.00	.02	.85
		5	.023	13.669	.01	.70	.04	.00	.00	.00
		6	.000	116.663	.99	.28	.03	1.00	.01	.11

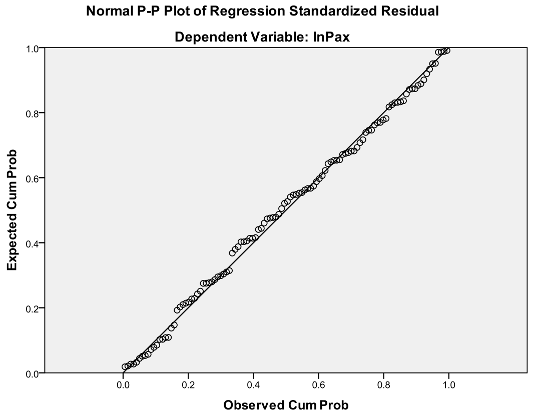
a. Dependent Variable: lnPax

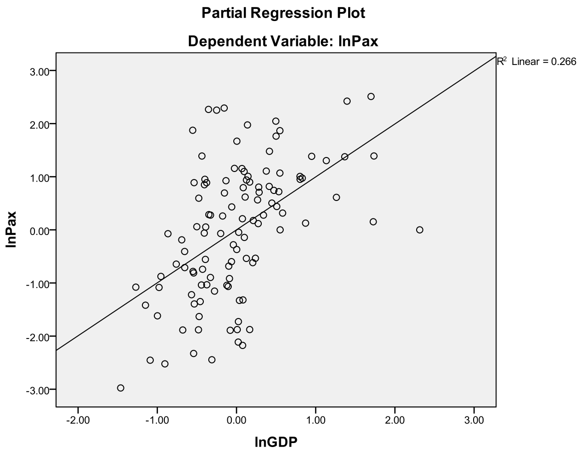
Residuals Statistics

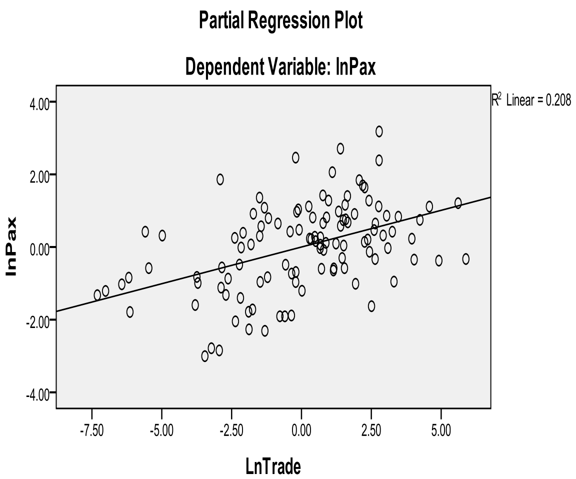
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.42653	14.21984	7.43102	1.897303	113
Residual	-2.286971	2.241496	.000000	.995944	113
Std. Predicted Value	-1.584	3.578	.000	1.000	113
Std. Residual	-2.244	2.200	.000	.977	113

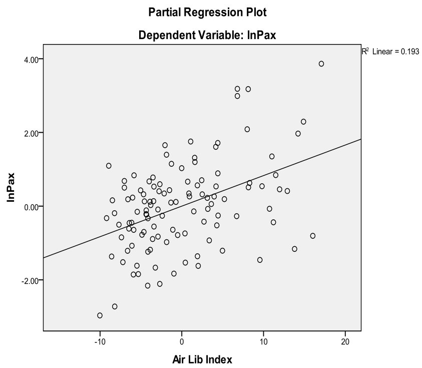
a. Dependent Variable: lnPax

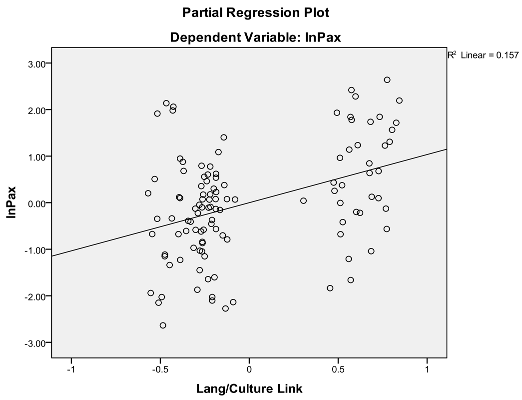


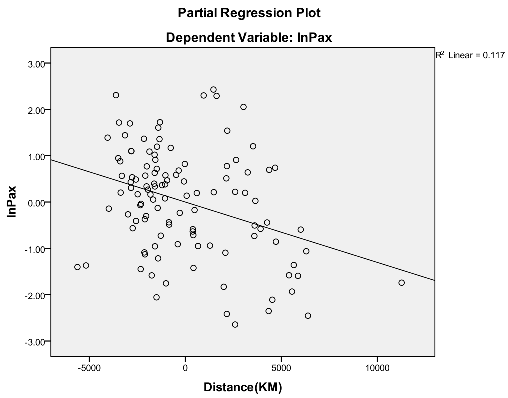


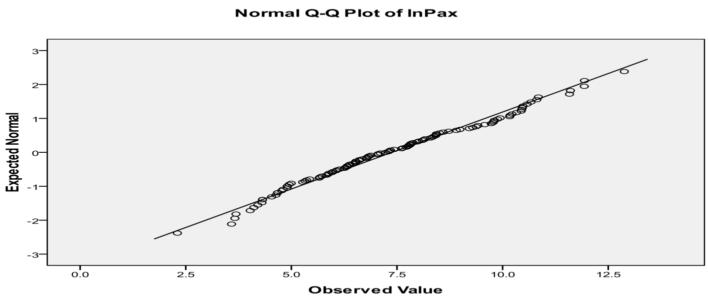


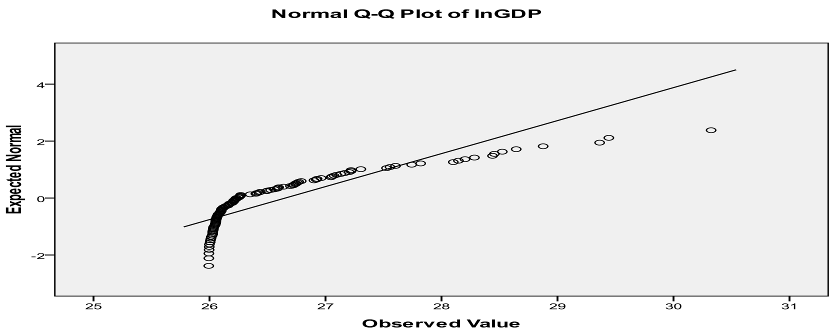


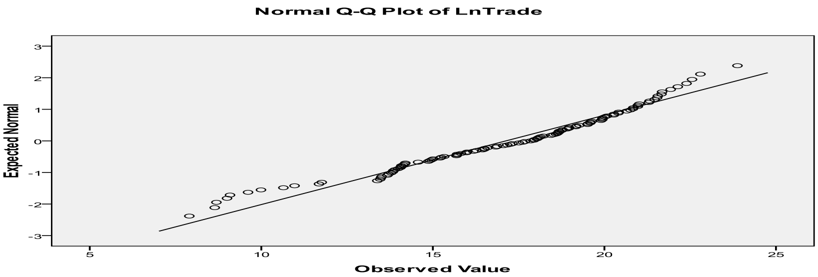

Partial Regression Plot
Dependent Variable: lnPax
R² Linear = 0.193
lnPax
Air Lib Index

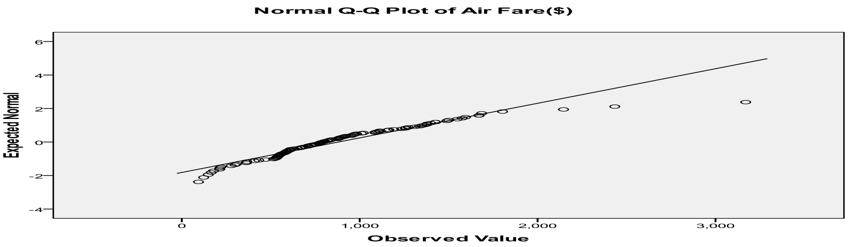

Partial Regression Plot
Dependent Variable: lnPax
R² Linear = 0.157
lnPax
Lang/Culture Link

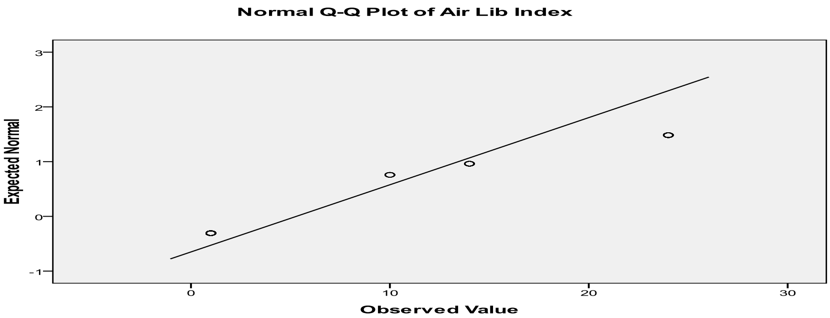

Partial Regression Plot
Dependent Variable: lnPax
R² Linear = 0.117
lnPax
Distance(KM)

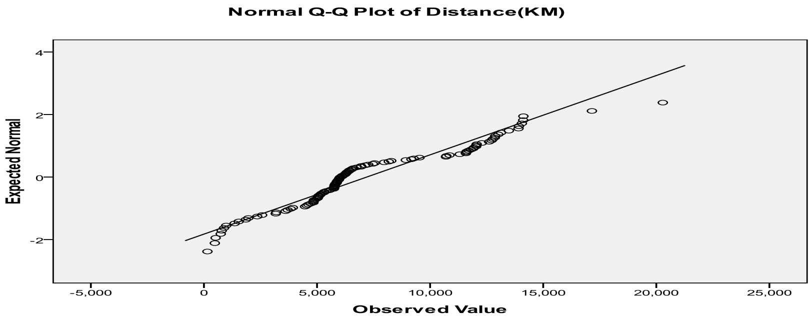

Normal Q-Q Plot of lnPax
Expected Normal
Observed Value


Normal Q-Q Plot of lnGDP
Expected Normal
Observed Value


Normal Q-Q Plot of LnTrade
Expected Normal
Observed Value


Normal Q-Q Plot of Air Fare($)
Expected Normal
Observed Value


Normal Q-Q Plot of Air Lib Index
Expected Normal
Observed Value


Normal Q-Q Plot of Distance(KM)
Expected Normal
Observed Value

Case wise Diagnostics

Case Number		Std. Residual	lnPax	Predicted Value	Residual	Status
	1	.784	12.880	12.08100	.799360	
	2	.613	11.937	11.31197	.624611	
	3	-2.244	11.933	14.21984	-2.286971	
	4	1.238	11.605	10.34353	1.261790	
	5	1.001	11.583	10.56305	1.020016	
	6	.490	10.847	10.34778	.499162	
	7	1.165	10.808	9.62121	1.186978	
	8	.128	10.671	10.54051	.130260	
	9	-.381	10.581	10.96900	-.388093	
	10	.424	10.484	10.05190	.431960	
	11	-.830	10.466	11.31091	-.845235	
	12	-.659	10.451	11.12248	-.671850	
	13	.493	10.440	9.93708	.502431	
	14	1.735	10.330	8.56157	1.767936	
	15	2.117	10.223	8.06522	2.157413	
	16	1.653	10.175	8.49041	1.684519	
	17	2.200	10.167	7.92547	2.241496	
	18	-.992	9.943	10.95396	-1.011014	
	19	-.408	9.880	10.29512	-.415410	
	20	.	9.861	.	.	M[a]
	21	.193	9.806	9.60919	.196797	
	22	1.769	9.790	7.98798	1.802057	
	23	-.433	9.773	10.21387	-.440720	
	24	.221	9.731	9.50564	.224923	
	25	-.671	9.577	10.26071	-.683926	
dimensi	26	.048	9.415	9.36668	.048723	
on0	27	-.803	9.376	10.19399	-.818476	
	28	.351	9.292	8.93484	.357358	
	29	.936	9.211	8.25767	.953469	
	30	1.198	8.991	7.77027	1.221041	
	31	1.270	8.724	7.42995	1.293768	
	32	.251	8.595	8.33925	.255458	
	33	1.008	8.507	7.48026	1.026680	
	34	.078	8.434	8.35444	.079367	
	35	1.532	8.429	6.86823	1.560785	
	36	.511	8.415	7.89421	.520731	
	37	.523	8.374	7.84105	.532502	
	38	.593	8.337	7.73267	.603959	
	39	.762	8.293	7.51580	.776745	
	40	.142	8.168	8.02385	.144355	
	41	.385	8.138	7.74491	.392773	
	42	.759	8.101	7.32729	.773476	
	43	1.097	8.017	6.89904	1.118267	
	44	.	8.001	.	.	M[a]
	45	-.118	7.976	8.09542	-.119852	
	46	.555	7.880	7.31435	.565697	
	47	.	7.842	.	.	M[a]
	48	.123	7.837	7.71196	.125199	
	49	-.216	7.810	8.02997	-.219613	
	50	.842	7.809	6.95074	.857994	
	51	-.770	7.773	8.55738	-.784209	
	52	.231	7.753	7.51809	.235105	

53	-1.188	7.720	8.93097	-1.210949	
54	.976	7.640	6.64584	.994282	
55	-.079	7.609	7.68914	-.080273	
56	.950	7.434	6.46557	.968095	
57	1.027	7.345	6.29923	1.046140	
58	.422	7.323	6.89342	.429752	
59	.	7.317	.	.	M[a]
60	.107	7.301	7.19248	.108665	
61	-.468	7.232	7.70932	-.477308	
62	.369	7.103	6.72766	.375663	
63	.496	7.055	6.55031	.505006	
64	.466	7.043	6.56849	.474669	
65	.	6.971	.	.	M[a]
66	.	6.899	.	.	M[a]
67	.418	6.881	6.45564	.425767	
68	.240	6.838	6.59414	.244263	
69	.602	6.817	6.20381	.612926	
70	.	6.790	.	.	M[a]
71	-.944	6.786	7.74716	-.961570	
72	.325	6.783	6.45230	.331028	
73	-.266	6.676	6.94707	-.271248	
74	-2.205	6.611	8.85790	-2.247208	
75	.405	6.601	6.18869	.412536	
76	-.226	6.528	6.75821	-.230250	
77	.092	6.526	6.43246	.094030	
78	.694	6.513	5.80579	.707439	
79	.343	6.454	6.10388	.349741	
80	.	6.425	.	.	M[a]
81	.	6.404	.	.	M[a]
82	.	6.400	.	.	M[a]
83	-.311	6.382	6.69889	-.317076	
84	-1.065	6.360	7.44461	-1.085039	
85	1.327	6.324	4.97198	1.352378	
86	.222	6.323	6.09601	.226556	
87	.	6.282	.	.	M[a]
88	1.332	6.280	4.92343	1.356968	
89	.332	6.256	5.91785	.337901	
90	-1.155	6.142	7.31883	-1.176793	
91	1.219	6.078	4.83581	1.241833	
92	-.777	6.052	6.84427	-.792176	
93	-1.318	5.979	7.32235	-1.343465	
94	-.203	5.961	6.16791	-.206900	
95	.	5.961	.	.	M[a]
96	.505	5.886	5.37109	.515019	
97	.029	5.864	5.83399	.029639	
98	-.441	5.829	6.27844	-.449493	
99	1.079	5.727	4.62756	1.099287	
100	-.004	5.724	5.72768	-.004092	
101	-.682	5.677	6.37202	-.695268	
102	-.613	5.656	6.28111	-.625115	
103	.	5.642	.	.	M[a]
104	.336	5.434	5.09151	.342211	
105	.	5.389	.	.	M[a]
106	-.917	5.361	6.29580	-.934506	

107	-.793	5.323	6.13061	-.807601	
108	-1.614	5.268	6.91230	-1.644446	
109	.	5.176	.	.	M[a]
110	-1.427	4.997	6.45078	-1.453565	
111	-.523	4.949	5.48196	-.533196	
112	.	4.934	.	.	M[a]
113	-2.182	4.905	7.12839	-2.223112	
114	-.782	4.905	5.70232	-.797043	
115	.012	4.898	4.88549	.012349	
116	.	4.820	.	.	M[a]
117	-1.304	4.804	6.13291	-1.328890	
118	-1.364	4.771	6.16017	-1.389481	
119	.	4.754	.	.	M[a]
120	-.098	4.673	4.77254	-.099716	
121	.242	4.673	4.42653	.246299	
122	-1.415	4.635	6.07635	-1.441625	
123	.085	4.533	4.44569	.086905	
124	.	4.344	.	.	M[a]
125	-.273	4.317	4.59571	-.278220	
126	-1.844	4.317	6.19604	-1.878550	
127	-1.472	4.304	5.80421	-1.500142	
128	-1.909	4.205	6.14974	-1.945052	
129	-2.165	4.111	6.31705	-2.206180	
130	-.731	4.025	4.76994	-.744584	
131	-1.953	3.664	5.65354	-1.989982	
132	-.831	3.584	4.43055	-.847027	

a. Missing Case
b. Dependent Variable: lnPax

Appendix 12: Regression Output with ASAs as Dummies

```
DATASET ACTIVATE DataSet5.
SAVE OUTFILE='K:\Post VIVA analysis.sav'
 /COMPRESSED.
DATASET ACTIVATE DataSet1.
DATASET CLOSE DataSet5.
DATASET ACTIVATE DataSet1.
SAVE OUTFILE='C:\Users\u0976229\Documents\OLD PC documents\137(2010)_2.sav'
 /COMPRESSED.
DATASET ACTIVATE DataSet2.
DATASET CLOSE DataSet1.
DATASET ACTIVATE DataSet4.
GET
  FILE='K:\Post VIVA analysis.sav'.
DATASET NAME DataSet6 WINDOW=FRONT.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT LnPax
  /METHOD=STEPWISE LnGDP LnTrade Distance Fare DummLang BASArst BASAcom OSA YD
  /PARTIALPLOT ALL
  /SCATTERPLOT=(*ZRESID ,*ZPRED).
```

Descriptive Statistics

	Mean	Std. Deviation	N
Log passenger	7.44624	2.146306	112
Log agg GDP	26.66033	.870450	112
Log trade	17.15285	3.518403	112
Distance	7164.40	3980.221	112
Cultural/language	.32	.469	112
Dummy ALI1(BASA rest)	.16	.369	112
DummyALI2(BASA comm)	.06	.243	112
DummyALI3(OSA)	.01	.094	112
DummyALI4(YD)	.08	.273	112
Average Air fare	870.40	484.143	112

Correlations

		LnPax	LnGDP	LnTrade	Distance	Fare	DummLang	BASArst	BASAcom	OSA	YD
Pearson Correlation	LnPax	1.000	.552	.637	-.265	-.218	.312	.206	.443	.199	.363
	LnGDP	.552	1.000	.602	.282	.320	.027	.146	.305	.401	-.177
	LnTrade	.637	.602	1.000	.069	.068	.116	.114	.266	.182	.045
	Distance	-.265	.282	.069	1.000	.844	.095	-.169	-.136	.085	-.403
	Fare	-.218	.320	.068	.844	1.000	.050	-.157	-.058	.045	-.342
	DummLang	.312	.027	.116	.095	.050	1.000	.032	.059	.138	.078
	BASArst	.206	.146	.114	-.169	-.157	.032	1.000	-.072	-.026	-.082
	BASAcom	.443	.305	.266	-.136	-.058	.059	-.072	1.000	-.025	-.076
	OSA	.199	.401	.182	.085	.045	.138	-.026	-.025	1.000	-.028
	YD	.363	-.177	.045	-.403	-.342	.078	-.082	-.076	-.028	1.000
Sig. (1-tailed)	LnPax	.	.000	.000	.002	.010	.000	.015	.000	.018	.000
	LnGDP	.000	.	.000	.001	.000	.389	.063	.001	.000	.031
	LnTrade	.000	.000	.	.235	.239	.112	.116	.002	.028	.319
	Distance	.002	.001	.235	.	.000	.160	.038	.076	.187	.000
	Fare	.010	.000	.239	.000	.	.302	.049	.273	.318	.000

	DummLang	.000	.389	.112	.160	.302	.	.370	.267	.074	.207
	BASArst	.015	.063	.116	.038	.049	.370	.	.227	.391	.195
	BASAcom	.000	.001	.002	.076	.273	.267	.227	.	.399	.212
	OSA	.018	.000	.028	.187	.318	.074	.391	.399	.	.385
	YD	.000	.031	.319	.000	.000	.207	.195	.212	.385	.
N	LnPax	112	112	112	112	112	112	112	112	112	112
	LnGDP	112	112	112	112	112	112	112	112	112	112
	LnTrade	112	112	112	112	112	112	112	112	112	112
	Distance	112	112	112	112	112	112	112	112	112	112
	Fare	112	112	112	112	112	112	112	112	112	112
	DummLang	112	112	112	112	112	112	112	112	112	112
	BASArst	112	112	112	112	112	112	112	112	112	112
	BASAcom	112	112	112	112	112	112	112	112	112	112
	OSA	112	112	112	112	112	112	112	112	112	112
	YD	112	112	112	112	112	112	112	112	112	112

Model Summary[h]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.637[a]	.406	.401	1.661	.406	75.236	1	110	.000
2	.720[b]	.518	.509	1.503	.112	25.291	1	109	.000
3	.786[c]	.618	.607	1.344	.100	28.264	1	108	.000
4	.827[d]	.684	.672	1.229	.066	22.152	1	107	.000
5	.855[e]	.730	.717	1.140	.047	18.358	1	106	.000
6	.887[f]	.787	.775	1.018	.057	28.088	1	105	.000
7	.893[g]	.797	.783	.998	.010	5.077	1	104	.026

a. Predictors: (Constant), LnTrade
b. Predictors: (Constant), LnTrade, YD
c. Predictors: (Constant), LnTrade, YD, BASAcom
d. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP
e. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang
f. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance
g. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance, BASArst
h. Dependent Variable: LnPax

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	207.519	1	207.519	75.236	.000[b]
	Residual	303.406	110	2.758		
	Total	510.925	111			
2	Regression	264.660	2	132.330	58.571	.000[c]
	Residual	246.265	109	2.259		
	Total	510.925	111			
3	Regression	315.741	3	105.247	58.236	.000[d]
	Residual	195.184	108	1.807		
	Total	510.925	111			
4	Regression	349.218	4	87.304	57.769	.000[e]
	Residual	161.707	107	1.511		
	Total	510.925	111			
5	Regression	373.090	5	74.618	57.384	.000[f]
	Residual	137.835	106	1.300		

Model		Sum of Squares	df	Mean Square	F	Sig.
	Total	510.925	111			
6	Regression	402.180	6	67.030	64.721	.000[g]
	Residual	108.745	105	1.036		
	Total	510.925	111			
7	Regression	407.241	7	58.177	58.355	.000[h]
	Residual	103.684	104	.997		
	Total	510.925	111			

a. Dependent Variable: LnPax
b. Predictors: (Constant), LnTrade
c. Predictors: (Constant), LnTrade, YD
d. Predictors: (Constant), LnTrade, YD, BASAcom
e. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP
f. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang
g. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance
h. Predictors: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance, BASArst

Coefficients[a]

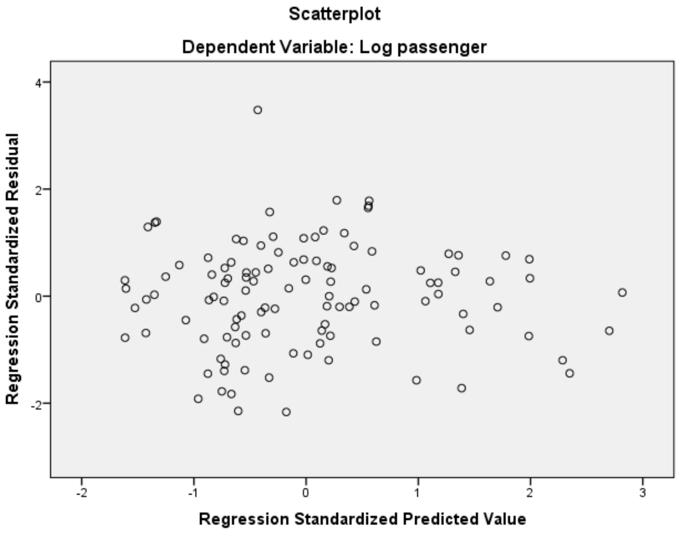
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.787	.784		1.005	.317
	LnTrade	.389	.045	.637	8.674	.000
2	(Constant)	.733	.709		1.033	.304
	LnTrade	.380	.041	.622	9.349	.000
	YD	2.630	.523	.335	5.029	.000
3	(Constant)	1.461	.649		2.251	.026
	LnTrade	.326	.038	.533	8.628	.000
	YD	2.859	.470	.364	6.086	.000
	BASAcom	2.906	.547	.329	5.316	.000
4	(Constant)	-18.644	4.313		-4.323	.000
	LnTrade	.208	.043	.340	4.866	.000
	YD	3.367	.443	.428	7.602	.000
	BASAcom	2.497	.507	.283	4.921	.000
	LnGDP	.829	.176	.337	4.707	.000
5	(Constant)	-19.456	4.005		-4.858	.000
	LnTrade	.190	.040	.311	4.764	.000
	YD	3.255	.412	.414	7.906	.000
	BASAcom	2.409	.471	.273	5.114	.000
	LnGDP	.860	.164	.349	5.256	.000
	DummLang	1.000	.233	.219	4.285	.000
6	(Constant)	-24.175	3.683		-6.563	.000
	LnTrade	.180	.036	.294	5.050	.000
	YD	2.426	.399	.309	6.077	.000
	BASAcom	1.770	.437	.201	4.046	.000
	LnGDP	1.086	.152	.441	7.140	.000
	DummLang	1.177	.211	.257	5.580	.000
	Distance	.000	.000	-.282	-5.300	.000
7	(Constant)	-22.585	3.682		-6.134	.000
	LnTrade	.176	.035	.289	5.049	.000
	YD	2.606	.400	.332	6.519	.000
	BASAcom	1.990	.440	.226	4.522	.000
	LnGDP	1.020	.152	.414	6.705	.000
	DummLang	1.135	.208	.248	5.465	.000
	Distance	.000	.000	-.243	-4.405	.000
	BASArst	.891	.395	.107	2.253	.026

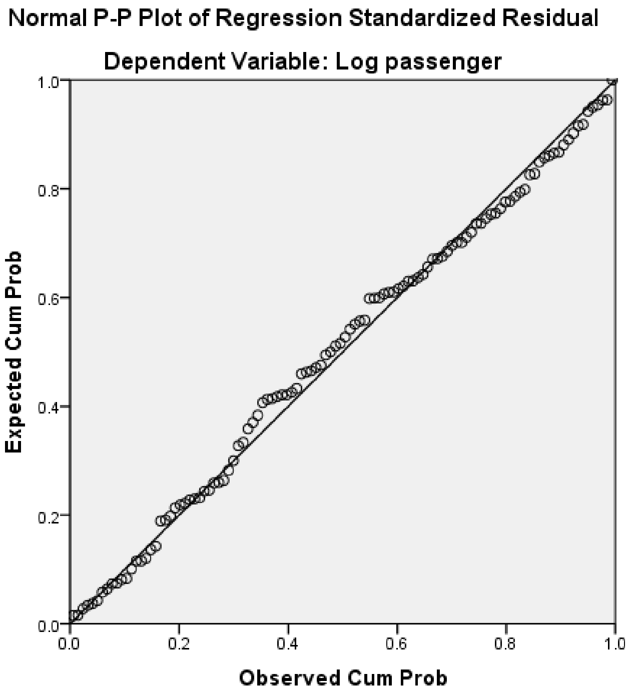
a. Dependent Variable: LnPax

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	LnGDP	.264[b]	2.969	.004	.274	.637
	Distance	-.311[b]	-4.587	.000	-.402	.995
	Fare	-.262[b]	-3.770	.000	-.340	.995
	DummLang	.242[b]	3.424	.001	.312	.987
	BASArst	.135[b]	1.849	.067	.174	.987
	BASAcom	.295[b]	4.143	.000	.369	.929
	OSA	.086[b]	1.156	.250	.110	.967
	YD	.335[b]	5.029	.000	.434	.998
2	LnGDP	.397[c]	5.111	.000	.441	.596
	Distance	-.209[c]	-2.960	.004	-.274	.830
	Fare	-.166[c]	-2.389	.019	-.224	.876
	DummLang	.218[c]	3.407	.001	.311	.981
	BASArst	.166[c]	2.533	.013	.237	.979
	BASAcom	.329[c]	5.316	.000	.455	.922
	OSA	.099[c]	1.470	.145	.140	.966
3	LnGDP	.337[d]	4.707	.000	.414	.578
	Distance	-.140[d]	-2.124	.036	-.201	.791
	Fare	-.128[d]	-2.031	.045	-.193	.864
	DummLang	.207[d]	3.633	.000	.331	.980
	BASArst	.206[d]	3.581	.001	.327	.966
	OSA	.126[d]	2.102	.038	.199	.959
4	Distance	-.235[e]	-3.947	.000	-.358	.732
	Fare	-.239[e]	-4.157	.000	-.374	.778
	DummLang	.219[e]	4.285	.000	.384	.978
	BASArst	.182[e]	3.425	.001	.316	.957
	OSA	.026[e]	.435	.665	.042	.809
5	Distance	-.282[f]	-5.300	.000	-.459	.714
	Fare	-.265[f]	-5.126	.000	-.447	.771
	BASArst	.174[f]	3.555	.001	.328	.956
	OSA	-.011[f]	-.201	.841	-.020	.789
6	Fare	-.131[g]	-1.534	.128	-.149	.275
	BASArst	.107[g]	2.253	.026	.216	.859
	OSA	-.037[g]	-.728	.468	-.071	.782
7	Fare	-.123[h]	-1.468	.145	-.143	.274
	OSA	-.020[h]	-.395	.693	-.039	.763

a. Dependent Variable: LnPax
b. Predictors in the Model: (Constant), LnTrade
c. Predictors in the Model: (Constant), LnTrade, YD
d. Predictors in the Model: (Constant), LnTrade, YD, BASAcom
e. Predictors in the Model: (Constant), LnTrade, YD, BASAcom, LnGDP
f. Predictors in the Model: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang
g. Predictors in the Model: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance
h. Predictors in the Model: (Constant), LnTrade, YD, BASAcom, LnGDP, DummLang, Distance, BASArst


Scatterplot
Dependent Variable: Log passenger
Regression Standardized Residual
Regression Standardized Predicted Value
4
2
0
-2
-2
-1
0
1
2
3


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Log passenger
Expected Cum Prob
Observed Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

THE END