Factors Affecting Airport Choice of Cargo Routing in Nigeria

J.A .Adenigbo [1] and A.E[1] Ubogu

[1] Department of Geography, Ahmadu Bello University (ABU), Zaria, Nigeria

Abstract

This paper identifies and examines the myriad of factors that influence the choice of airport for cargo routing in Nigeria's major international airports. The study made use of primary data collected by administering questionnaire to cargo agents randomly at the four major international airports in Nigeria. In all, a total of 367 respondents were interviewed. The respondents were asked to rank-order 13 variables that influence their choice of routing cargo. These variables were analyzed using factor analysis. The results show that all the identified variables are important factors that affect airport choice of cargo routing. It also revealed that airport service quality is the most significant factor that affects choice of airport cargo routing in Nigeria. The study therefore recommends that service quality of airports in Nigeria be standardised to encourage patronage of agents and airlines alike.

Keywords: Air cargo, airport, Nigeria, service quality, routing.

1. Introduction

Airports are essential part of the air transport system. They provide all the infrastructures needed to enable passengers and freight to transfer from surface to air mode and to allow airlines to take off and land. The basic airport infrastructure consists of runways, taxiways, apron space, gates, passenger and freight terminals, and ground transport interchanges. Airports bring together a wide range of facilities and services in order to be able to fulfil their role within the air transport industry. These services include air traffic control, security, fire and rescue in the airfield. Handling facilities are provided so that passengers, their baggage, and freight can be successfully transferred between aircraft and terminals, and processed within the terminal (Graham, 2003).

Air cargo transportation system is designed to provide fast and efficient shipment of goods. Air transport is the fastest mode of transport. It is used safely to carry high-valued and time-critical goods. The meaning of air cargo in this work takes the definition provided by the International Air Transport Association (IATA) as being the equivalent of goods, meaning any property carried or to be carried on an aircraft except mail or other property carried under terms of an international postal convention, or baggage carried under a passenger ticket and baggage check, but baggage moving under an airway bill or shipment record.

The proper functioning of air cargo transport affects the economic viability not only of the aviation industry, but also of the national and international high-value, just-in-time supply chain that serves many other manufacturing, service and trading industries. Indeed, the trend in air cargo logistics of most manufacturing and distribution system that relies on meeting immediate needs, as opposed to carrying large inventories "just-in-case" is the adoption of Just-In-Time (JIT) techniques (Boeing, 2005). In the new fast-cycle logistics era, air cargo enables businesses, regardless of their location, to connect distant markets and global supply chains in an efficient, expeditious, and reliable manner (Kasarda and Sullivan, 2006). The emergence of globally integrated, Just-In-Time (JIT) production and distribution systems and the emergence of e-commerce and e-business have made air cargo the fastest growth area in the cargo sector (Hui *et al* 2004). Furthermore, Hsu *et al* (2005) argued that the way to deliver high-tech products by liner shipping is less efficient than by airline and it shows the importance of air cargo.

Various factors can affect an airport's ability to attract the flow of air cargo. The study of Hiroshi *et al* (2005) on Northeast Asia airports identified few factors to include; the airports' low current cargo traffic patterns, poor airport infrastructure capacity and activities, lack of linkage with regional and intercontinental airport network, poor service quality, and airport cost factors. It is apparent that these factors could influence airport choice in Nigeria. Potentially, this could lead to one airport having a larger share of the flow of cargo, at the same time enhancing specialized handling of some cargo type in an airport at the expense of others. This can therefore give a perception that there are underlying reasons for which more cargoes are preferably routed through a particular airport.

A review of studies on Nigeria air transport has revealed that not much attention had been accorded to air cargo, while deliberate attention had been given to the analysis of the flow of passengers, aircraft movement, flight operations emphasising safety and security, and issues on policy and bilateral agreements. Such works include that of Ayakpat (2010) which examined the effects of liberalisation and open skies agreement on Nigeria's airline passenger operations in Nnamdi Azikwe international airport, Abuja. In the same vein, Idrisu (2004) worked on the commercial and regulatory implications for air transport liberalization and open skies agreement in Nigeria while Chikwe (2001) also examined open skies policy of air transport and assessed its regulatory and commercial implications and opportunities for

Nigeria. In addition, Gambiye (2010) carried out an assessment of the ticketing and reservation operations of IRS Airline in Yola; while Oladele (2005) assessed the African air transport in the 21st century by contrasting Nigeria's and Kenya's experiences; Similarly, Yahaya (2005) carried out an assessment of airport capacity utilization in Nigeria.

However, related works on air cargo carried out in Nigeria are in different dimensions and not as intensive compared to what has been done in other countries. Specific works on air cargo in Nigeria are that of Afolabi (2005) on the bane of air cargo development in Nigeria, which highlighted the problem of warehouses in air cargo handling, and suggested that it is the prerogative of the Federal Airport Authority of Nigeria (FAAN) to provide and build warehouses that can house different kinds of goods. Conversely, Olateru's (2005) study on the importance of air cargo business to the economy of Nigeria revealed that most airlines relied so much on cargo business for revenue generation even though they were not dedicated cargo airlines. Furthermore, the study asserts that cargo business is a 40 billion-dollar business which the airlines and government can make a lot of money from, and recommended that the government should close the gap between the volume of import and export of air cargo in the country.

This dearth of empirical studies relating to the factors affecting airport choice of cargo routing in Nigeria is as a result of underdevelopment of supply chain management in the air cargo industry. According to Ayodele (2010) facts and figures on cargo movement in and out of Nigerian airports show that cargo transportation can contribute significantly to Nigeria's Gross Domestic Product (GDP), if properly developed. The author further asserted that air cargo is the most vital and lucrative aspect of air transportation, yet the most neglected. However, in other countries, there are compact of body of researches in related areas that identify common themes and provide the basis on which to develop empirical research for this study. Examples of such works include Zhang (2003); Hui *et al* (2004); Gardiner *et al* (2005) and Kasarda *et al* (2006).

A cursory assessment of these studies reveals that most of these studies in the Nigerian aviation sector ignored the role choice factors play in the routing of cargo through certain airports. Meanwhile, these factors play important roles in the ability of an airport to compete optimally in a competitive aviation cargo market. This study therefore examines the factors influencing airport choice for routing cargo in Nigeria with a view to identifying the explanatory factors that are most significant in the choice of airport for cargo routing in Nigeria

.

2. Materials and Methods

This study relied on primary source of data collection which involves the use of well structured and self administered questionnaire at the four major international airports in Nigeria. The study sampled a total of 392 out of the 18,780 Nigerian Aviation Handling Company (NAHCO) registered agents as at 2010. The agents operate under the Association of Nigeria Custom Licensed Agents (ANCLA) at the premises of the airports on a daily basis. Copies of the questionnaire were proportionally distributed at the airports and administered randomly to the agents (see Table 1). The sample size for the study was determined using a formula developed by Yamane (1967) for determining the sampling size where a population is known.

The formula is as follows;

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

Where,

n = Sample size;
N = Population size;
and *e* = level of significance (set at 0.05 for this study)
Hence, $n = \frac{18780}{1 + 18780(.05)^2}$

$= 392$

Table 1: Distribution of Questionnaire

Airports	**Total No of Cargo Agents in 2010**	**Sample Size**
Lagos	10,414	217
Abuja	5,883	123
Kano	1,486	31
Port Harcourt	997	21
Total	**18,780**	**392**

Source: Authors' computation

The respondents were required to rank 13 independent variables of airport location, airport capacity, concentration of industries/firms in the zone, cargo security, airline flight route, market size, cost of cargo handling, busiest airport, airport infrastructure, service quality, customs efficiency, airport charges and airline flight frequency in order of importance as it affects their choice of routing cargo through airports in Nigeria. Out of the 392 respondents sampled, a total of 367 copies of the questionnaire were successfully retrieved and found worthy to be used for the analysis.

Factor Analysis (FA) was employed to determine the relationship between a dichotomous dependent variable (airport choice) and the independent variables. FA is concerned with whether the covariances or correlations between a set of observed variables can be explained in terms of a smaller number of unobservable constructs known as common factors. It determines the number of common factors needed to adequately describe the correlations between the observed variables, and estimating how each factor is related to each observed variable, that is estimating the factor loadings (Oyesiku, 2000).

According to Sabine and Brain (2004), exploratory factor analysis is concerned with whether the correlations between a set of observed variables x_1, $x_{2,}$..., x_q can be explained in terms of a smaller number of unobservable common factors, $f_{1,}$ $f_{2,}$...f_k, where k<q and hopefully more less. In mathematical terms, the factor analysis model can be written as follows;

$$\chi_1 = \lambda_{11} f_1 + \lambda_{12} f_2 ... + \lambda_{1k} f_k + u_1$$

$$\chi_2 = \lambda_{21} f_1 + \lambda_{22} f_2 ... + \lambda_{2k} f_k + u_2$$

.

.

.

$$\chi q = \lambda_{q1} f_1 + \lambda_{q1} f_2 ... + \lambda_{qk} f_k + u_q \quad (2)$$

The equations above can be re-written as:

$$\chi = \Lambda f + u, \tag{3}$$

Where,

$$\chi = \begin{bmatrix} x_1 \\ . \\ . \\ . \\ xq \end{bmatrix}, \Lambda = \begin{bmatrix} xu \ldots \lambda_{1k} \\ . \\ . \\ . \\ \lambda q_1 \ldots \lambda qk \end{bmatrix}, \quad f = \begin{bmatrix} f_1 \\ . \\ . \\ . \\ fk \end{bmatrix}, \; u = \begin{bmatrix} u_1 \\ . \\ . \\ . \\ uq \end{bmatrix} \tag{4}$$

Furthermore, since the factors are unobserved, their location and scale can be fixed arbitrarily, therefore we can assume that only part of the variation in a given population is contained within the variables used to define that population. For this reason, only some of the observed variations in choice factors in the study area are due to variations in all the variables under consideration.

The study area is Nigeria with four major international airports that are strategically located to serve as regional airport hubs for air traffic in passengers and cargoes. These airports are located in Lagos, serving as hub for traffic in southwestern part of Nigeria; Kano, hub for traffic in northwestern and northeastern parts; Port Harcourt, hub for traffic in southeastern and Abuja, hub for traffic in north-central parts of Nigeria.

3. Results and Discussion

The role airports play in the movement of cargo from location to location cannot be overemphasised. Cargo handlers, shippers and airlines alike are so conscious of this that efforts are put in place individually to ensure business is transacted with utmost efficiency at airports.

Table 2 shows the result of the reliability test using KMO and Bartlett's Test of sampling adequacy to determining if the variables were sufficiently reliable to allow the use of Factor Analysis. The KMO result shows a reliability value of 0.80 which indicates that the data obtained is adequate and reliable for the analysis. According to Cornish (2007), a KMO result should be over 0.700 to be sufficiently correlated. Therefore, with an r value of above this threshold the variables are well correlated and reliable for the analysis.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.800
Bartlett's Test of Sphericity	Approx. Chi-Square	717.809
	Df	78
	Sig.	.054

Source: Authors' computation

The Correlation matrix of the variables in Table 3 revealed that all the variables are positively correlated. This implies that all the variables have a close relationship with one another. Indeed, any effect on one factor will produce a corresponding measure of effect on the other. The result as presented in Table 3 shows that the most correlated pair of variables are cargo security and airport service quality (r = 0.673). This is obvious as the better the airport service quality, the more secured will be cargoes handled. Airport charges was also found to be positively and strongly correlated with custom efficiency (r = 0.641). This is because the custom efficiency has a close relationship with airport charges. The more efficient the custom services, perhaps the more charges that importers have to pay. This is true of the recently introduced electronic data interchange which helps in fast clearing of cargoes at the airports but with corresponding increased airport charges.

Similarly, airport infrastructure showed a strong correlation with airport service quality with an r value of 0.639. In fact, this result clearly implies that the better the airport infrastructures, the more efficient will be the perceived airport service quality. Another pair of variables that are strongly correlated is airport infrastructure and the capacity/size of the airport. This revealed an r value of 0.621. Indeed, airport capacity has a close relationship with airport infrastructure. Therefore, airports with better infrastructures all things being equal, approximates the international airports with large capacity to handle cargoes.

The level of infrastructure provided at any airport is a measure of its size/capacity. The more infrastructures are provided at any airport, the more the size/capacity of the airport because infrastructural provisions take up more land mass. Airport infrastructural facilities provided enhanced cargo security and the cost/efficiency of cargo handling at any airport. That cargo is secured at airports is a reflection of service quality which by extension is a function of adequate infrastructure at the airport. Efficient customs operations and services improve air cargo security and service quality. When customs operations are not efficient, airport service quality will depreciate and manifest in cargo insecurity. But customs efficiency with increased airport charges will relate to influence the airport overall performance. While frequency of airline flight at any airport is a function of airport service quality and charges.

Table 4 presents the communalities estimates of the variables after the extraction of the three common factors shows that very little of the variance of the item "busiest airport" (with 23.1%) can be attributed to the three common factors. Also, the variances of items 'location of airport', 'route of airline flight', 'cost and efficiency of cargo handling' and 'frequency of cargo flight' with 43.1%, 43.4%, 43.6% and 45.9% respectively will have little to attribute to the common factors. It implies from Table 4 that agents in their choice for routing cargo through airports in Nigeria do not consider whether the airport is busy or not. This indicates that the item "busiest airport" can be taken out of the variables to be examined. Nevertheless, the communality values equally indicates that of all the variables under consideration, airport charges displayed the highest variance of 79.7% which means that this variable can be attributed to the three common factors.

Table 3: Correlation Matrix Table of the Airport Choice Factors

	Location of Airport	Size/Capacity of Airport	Concentration of Industries	Cargo Security	Route of airline flight	Size of market	Cost/ Efficiency of Cargo Handling	Busiest Airport	Airport Infrastructure	Airport Service Quality	Custom Efficiency	Airport Charges	Frequency of Cargo Flight
Location of Airport	1.000	.520	.128	.502	.214	.031	.300	.165	.522	.420	.263	.067	.256
Size/Capacity of Airport		1.000	.455	.452	.496	.281	.437	.160	.621	.449	.188	.033	.283
Concentration of Industries			1.000	.318	.402	.616	.450	.314	.388	.359	.175	.128	.303
Cargo Security				1.000	.470	.108	.526	.252	.555	.673	.552	.260	.338
Route of airline flight					1.000	.313	.423	.387	.404	.446	.337	.280	.485
Size of market in the zone						1.000	.294	.373	.043	.222	.151	.143	.167
Cost /Efficiency of Cargo Handling							1.000	.233	.509	.478	.380	.326	.334
Busiest Airport								1.000	.170	.276	.218	.248	.220
Airport Infrastructure									1.000	.639	.339	.214	.415
Airport Service Quality										1.000	.602	.399	.519
Custom Efficiency											1.000	.641	.434
Airport Charges												1.000	.602
Frequency of Cargo Flight													1.000

Source: Authors' computation

Table 4: Communalities of the Airport Routing Choice Factors

	Initial	Extraction
Location of Airport	.460	.431
Size/Capacity of Airport	.588	.635
Concentration of Industries	.566	.635
Cargo Security	.629	.602
Route of Airline Flight	.502	.434
Size of Market in the Zone	.524	.670
Cost and Efficiency of Cargo Handling	.448	.436
Busiest Airport	.277	.231
Airport Infrastructure	.648	.677
Airport Service Quality	.662	.667
Custom Efficiency	.612	.599
Airport Charges	.613	.797
Frequency of Cargo Flight	.556	.459

Extraction Method: Principal Axis Factoring.

Source: Authors' computation

Three (3) factors with eigen-values greater than one (1) were produced and altogether accounted for 65% of the total variance of the variables (Table 5). In determining the number of factors needed to represent the data set, the Kaiser's procedure of selecting the factor with eigenvalue greater than 1 criterion was adopted. The first factor accounted for 41% of the variance with eigenvalue of 5.317 while the other two factors have 12.21% and 11.89% of the total cumulative variance with eigenvalue 1.587 and 1.545 respectively.

Table 5: Percentage of Total Variance Explained by the Three Factors

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	5.317	40.900	40.900
2	1.587	12.207	53.107
3	1.545	11.888	64.995

Extraction Method: Principal Axis Factoring.
Source: Authors' computation

Table 6 shows the rotated factor matrix of the explanatory variables. In the table, three factors were extracted to explain the underlying similarities of the 13 variables. The factors were rotated using varimax rotation in order to maximise their orthogonality and clearly describe the pattern of the three factors, and the relative factor score of each factors are named. Variables with absolute value of factor score below 0.4 were suppressed because in practice, according to Sabine and Brian (2004), a largely arbitrary threshold value of 0.4 is often equated to 'high' loadings; in addition, variables were sorted by size (see Table 6).

Table 6: Rotated Factor Matrix

	Factor		
	1	2	3
Airport Infrastructure	.786		
Size/Capacity of Airport	.713		
Cargo Security	.672		
Location of Airport	.651		
Airport Service Quality	.613	.499	
Cost/Efficiency of Cargo Handling	.471		
Airport Charges		.885	
Custom Efficiency		.712	
Frequency of Cargo Flight		.573	
Size of market in the zone			.815
Concentration of Industries			.742
Route of airline flight			.426
Busiest Airport			.403

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization

Source: Authors' computation

It is seen from the Table 6 that all the 13 variables are loaded on the three extracted factors. This implies that all the variables are significant to influence the choice of routing cargo through airports in Nigeria. Loaded on Factor 1 are; airport infrastructure, airport size/capacity, cargo security, airport location, service quality and cost/efficiency of cargo handling. Factor 2 has airport charges, custom efficiency, frequency of cargo flight and airport service quality; while Factor 3 loads on size of market in the zone, concentration of industries, route of airline flight and busiest airport. Therefore, the extracted factors 1, 2 and 3 can be labelled as Airport Infrastructure and Service (AIS), Airport Charges (AC) and Airport Patronage (AP) respectively.

Of all the 13 variables identified and factor analysed, 6 of them loaded on Factor 1-AIS (see Table 6). Airport infrastructure and size/capacity of airport loaded high with 78.6% and 71.3% respectively, followed by cargo security, location of airport and airport service quality with 67.2%, 65.1% and 61.3% respectively. This shows that airport infrastructure with the highest loaded value accounts to be the most significant of the variables correlated with Factor 1. Of the four variables that rotates on Factor 2, airport charges seems to be the most significant with load value of 88.5%, followed by customs efficiency with 71.2%. The variables that load on Factor 3 have size of market in the zone to be the most significant with 81.5%, followed by concentration of industries in zone with 74.2%. This implies that cargo agents, even airlines alike, desire to carry out their businesses at reduced cost.

Airport charges have a significant impact on the choice of airport for cargo routing in Nigeria. It is also of magnificent influence for the choice of airlines patronage of an airport. The work of Berechman and De Wit (1996) found out that airport charges had influence on passenger airlines' location decision. This will indirectly affect the flow of cargo at any airport since most airlines carry cargo in the belly of their passenger aircrafts. And cargo operations involve individual shippers represented by agent(s), if airport charges are high, agents will tend to route cargo through airports with reduced charge for him to gain more confidence from the shipper by handling cargo at a reduced rate.

As a matter of fact, customs operations at any airport in the world is a factor that influence choice of airport usage for both passenger and cargo traffic. Zhang and Zhang (2002) identified the importance of customs efficiency to cargo flow and stated that any customs administration that can provide reliable, timely clearance, or immediate release based on pre-clearance, creates a competitive advantage for the station airport. The frequency of cargo flight refers to a factor that has to do with how often does the airport receive or dispatch cargo aircraft on either scheduled or charter basis.

Only four of the variables rotated on Factor 3. The importance of market size especially in relation to population was brought out by the study to reflect another significant factor that influences the choice of airport cargo routing in Nigeria. Though, this variable rotates on Factor 3, of a fact, it is the variable with the highest loadings (81.5%). Concentration of industries that follows also attributes to the influence of population.

The special note here is that only airport service quality loads and rotates on both Factor 1 and 2. This implies that it is the most significant factor among the variables in the discussion of factors that influence the choice of airport for cargo routing in Nigeria. This is in line with the findings of Hiroshi *et al* (2004). Airports overall service quality is produced as a result of the combined activities of various organisations such as airlines, handling agents, customs and immigration officials, as well as concessionaires. These different bodies may have different ultimate objectives and conflicting views on what determines satisfactory or quality service (Lemer, 1992). In effect, the airport operator only has partial control of all the processes which make up the final product. Areas of responsibility, therefore, have to be very clearly identified and the airport operator must define a common goal for all as regards service quality.

Graham (2003) pointed out queuing and waiting processes as an area of concern regarding airport's quality of service as a result of increased emphasis on cargo security. Similarly, Hiroshi et al (2004) considered airport service quality in terms of time costs factors to include cruising/flight time, loading/unloading and customs clearance time, and waiting time caused by schedule delay. But Maiden (2000), measured airport service quality using objective and subjective measures. Objective indicators measure the service delivered and can cover areas such as flight delays, availability of lifts, escalators and trolleys, and operational research surveys of factors such as queue length, space provision, waiting time, and baggage reclaim time. These objective measures can only cover a limited range of issues and service dimensions. For instance, while they can measure the reliability of equipment, they cannot tell whether consumers feel safe, assured and satisfied with their use of the equipment (Graham, 2003). Subjective measures enable the quality of service to be assessed through the eyes of users rather than airport management.

In another way, airport service quality can be assessed by looking at the speed of movement, frequency of service, and reliability of service, susceptibility to loss and damage, and spatial accessibility of service. The greater the speed of movement for shipments, the higher the quality of the airport service, since shipments arrive at their destinations within a shorter period of time. Frequency of service is how often the service is provided; with higher frequencies, service will be available more often (thereby the higher the quality of service).

4. Policy Implications and Recommendations

While it is imperative for shippers to decide which airport to route cargo because of the locations of origin and destination of cargo, it is also important that airports are equipped and driven to handle cargo traffic of varying nature in Nigeria. The airports' management structure should focus on increasing airlines' patronage in Nigeria. Just as this study has identified airport service quality as the most important airport choice factor for routing cargo

in Nigeria, it therefore implies that it would be more effective for airports management to attract cargo by reducing air cargo connecting time, rather than reducing airport charges because agents and airlines will prefer to operate at airports with high quality of service.

International air transport is regulated by a complex web of bilateral air service agreements signed between countries. Although liberal bilateral agreements have become more widespread, many still impose restrictions (Cheung, 2002). Bilateral air services agreements and inter-airline agreements influence flight frequencies. In countries where more than one national carrier operates international services, the country's own licensing or regulatory controls may influence the sectors on which their airlines operate. For Nigeria, the focus on bilateral agreements should be driven towards increase flight frequency of both passenger and cargo at the airports

Historically, revenue collection was a major function of customs administration. The importance of this role diminishes as tariff barriers are gradually being removed. Customs administration increasingly plays an important role in attracting international air cargo. Unpredictable delays in customs clearance procedure or unexplained changes in the classification of goods disrupt efficient logistic flows, and thus hinders hub development in air cargo traffic. New technology, such as Electronic Data Interchange system, simplifies the customs procedure by computerizing shipment information, and makes it more efficient by allowing pre-clearance of the shipment. The government of Nigeria should consider establishing bonded areas so that the cargo can be cleared close to their destination points.

This study did not observe the extent of efficiency enhancement achieved at the airports in customs clearance process. Since the efficiency of customs is often measured by time, a concern might arise based on the correlation between customs efficiency and airport charges. Similarly, if the airlines realize that freight forwarders have a higher willingness to pay for the airports that have efficient customs administration, and that there are routes in which such airlines have some degree of market power, they might increase the line-haul cost to increase their revenue.

5. Conclusion

The government, at present is actively pursuing economic policies that would help develop designated airport in the country into regional transport and logistics hub. The ability of the airports to attract carriers and air cargo traffic is crucial to the establishment of a transport and logistics hub. In view of this, Nigeria government needs to galvanise efforts that will ensure a reduction of the degree at with identified factors affect cargo traffic and handling in our airports.

Acknowledgement

The authors are very grateful to the agents that participated in the administration of the questionnaire. Many thanks also go to the Branch Chairman of ANCLA at each of the airports.

References

Afolabi, C. (2005)**.** Bane of Air Cargo Development in Nigeria. Paper presented at the first yearly cargo conference organized by Aviation Review, Lagos, from http://news.biafranigeriaworld.com/achive/guardian/2005/12/27. Accessed 8/7/2011

Ayakpat S. (2010). The Effects of Liberalisation and Open Skies Agreement on Nigeria Airlines Passenger Operations in Nnamdi Azikwe International Airport, Abuja. Unpublished PGD project, Nigerian Institute of Transport Technology (NITT), Zaria.

Ayodele, S (2010). Why world mega Cargo carriers avoid Nigeria's Air Transport market. Report in the Business Day Newspaper on Thursday, 30 December 2010.

Berechman, J. and De Wit, J., 1996**.** An analysis of the effects of European aviation deregulation on an airline's network structure and choice of a primary West European hub airport. *Journal of Transport Economics and Policy 30, 251–274.*

Boeing, (2005)**.** World Air Cargo Forecast (WACF 2004/2005). Online: http://www.boeing.com/commercial/cargo/WACF_2004-2005. Accessed 1/3/2011.

Cheung, W. (2002**).** Increasing the Competitiveness of Air Cargo Industry in Hong Kong. *IFT Research Report, GSP/48/00.*

Chikwe K. (2001). Open Skies: The Regulatory and Commercial Implications and Opportunities for Nigeria. *Aviation Review Journal Aug, ??*

Cornish, K. (2007). Statistics: Factor Analysis. Mathematics Learning Support Centre. http://mlsc.lboro.ac.uk/resources/statistics/Factoranalysis.pdf.

Gambiye, A. (2010). An Assessment of Ticketing and Reservation Operations of IRS Airline in Yola. An Unpublished Diploma project, Nigerian Institute of Transport Technology (NITT), Zaria.

Gardiner, J; Ison, S and Humpreys I (2005). Factors influencing cargo airlines' choice of airport: an international survey. *Journal of Air Transport Management vol.11, 393 – 399.*

Graham, A. (2003). *Managing Airports: An International Perspective.* Second Edition Butterworth- Heinemann, Oxford.

Hiroshi, O. Tae-Seung, K. Tae, H.O and Chunyan, Y (2005). Choice of air cargo transshipment airport: an application to air cargo traffic to/from Northeast Asia. *Journal of Air Transport Management* 11, 149 – 159.

Hsu, C. Yang, L. Lian, P. and Chen, Y. (2005). High tech firms perception and demand for air cargo logistics services. *Journal of the Eastern Asia Society for Transportation Studies 6, 2868 – 2880.*

Hui, G. W. L. Hui, Y.V and Zhang, A (2004). Analysing China's Air Cargo Flows and Data. *Journal of Air Transport Management* 10, 125 – 135.

Idrisu I.D. (2004). The Commercial & Regulatory Implications for Air Transport Liberalization & Open Skies Agreement in Nigeria. Ph.D Thesis St. Clemens University, Turks & Carcos Island, British West Indies.

Kasarda, J.D and Sullivan, D.L (2006). Air cargo, Liberalisation and Economic Development. Annals of Air and Space Law, McGill University, Montreal.

Karsarda, J.D; Stephen, J.A and Makoto, M. (2006). The impact of Air Cargo Industry on the Global Economy. Centre for Air Commerce Kenan Institute of Private Enterprise, Kenan-Flagler Business School, University of North Carolina, Chapel Hill, USA. Paper prepared for The International Air Cargo Association, Air Cargo Forum, Calgary, Canada.

Lemer, A.C (1992). Measuring performance of airport passenger terminals. *Transport Research* 26(1), 37 – 45.

Maiden S. (2000). Measuring Service Quality at Airports. University of Westminster and Cranfield University Airport Economics and Financial Symposium. London, March.

Oladele S.F. (2005). African Air Transport in the 21st Century. A Case Study of the Contrasting Experience of Nigeria and Kenya. An M.Sc Thesis at the Cranfield University.

Olateru, A. (2005). The Economic Importance of Cargo Business to the Nigerian Economy. Paper Delivered presented at the First Yearly Cargo Conference organized by Aviation Review, Lagos.

Oyesiku K.O (2000). *Fundamentals of Research Methodology.* HEBP, Lagos.

Sabine L and Brian S.E (2004). A Handbook of Statistical Analyses using SPSS. Chapman and Hall/CRC Press, New York.

Yahaya, D.B. (2005). Airports Capacity Utilisation in Nigeria. An unpublished MTL Research study at the Nigerian Institute of Transport Technology (NITT), Zaria.

Zhang, A. (2003). Analysis of international air cargo hub: the case of Hong Kong. *Journal of Air Transport Management* 9 (2003) 123 – 138.

Zhang, A and Zhang, Y., (2002). Issues on liberalization of air cargo services in international aviation. *Journal of Air Transport Management* 8, 275–287.