

Full Length Research Paper

Determinants of airline choice-making: The Nigerian perspective

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This study is on choice decision-making of the Nigerian domestic air transport industry. It is aimed at determining the factors that influences air travellers' choice of airlines to fly within Nigeria. In doing this, data was collected from air travellers using questionnaires following Likert scale of ranking. This enabled us to obtain the socio-economic characteristics and the airline attributes that helped influenced the air travellers in making their choice of airlines at the selected airports. The data collected were analysed using correlation matrix to check for multi-collinearity problems among the socio-economic characteristics of air travellers and airline attributes. It was discovered that there exist no multi-collinearity problem. Furthermore, a stepwise regression analysis was carried out to determine the factors/attributes that were significantly influencing air travellers in airline choice decision making. To further verify the result of the regression analysis, a discrete choice-modelling analysis was done using NLOGIT. The both results showed that sex, age, marital status, income, comfort, on-board services, frequency, crew behaviour, fare and power of monopoly were significant variables and therefore influence the choice of airline by air travellers. Recommendations amongst others include airlines should use target marketing to attract more patronage from the different age groups, improve comfort and on-board services, increase frequency on major routes, charge competitive fares and apply the power of monopoly by either serving undeveloped routes or make their products distinct from others in the market and airlines should avail their air travellers more opportunities of purchasing tickets before getting to the airport.

Key words: Decision making, revealed preference, stated choice, regression analysis, air travellers.

INTRODUCTION

Commercial air transportation has witnessed some substantial developments in recent pasts. One of such development is the increase in the number of operators and participants in the industry (Ogwude, 1986). We had one airline before 1983; three from 1983 to 1988; nine from 1989 to 1995 and fifteen from 1995 to 2010.

The emergence of more airlines offering scheduled services led to increased level of competition for traffic amongst them. Loosely associated with this development

is the issue of choice for potential travellers in this sub-sector and the choice of route by airlines as they compete for market share.

The increase in number of operators flying same routes has resulted in more competition for traffic which now leaves the air travellers with the need to make a choice on which airline to fly with at any particular time. This decision can be difficult since the average air travellers in Nigeria are faced with relatively homogenous products. The problem then arises as to know what influences the air traveller in flying with one airline instead of others. Most flight scheduled are closely spaced between in time, still passengers have been seen to patronise some airline

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more than others when in the real sense there is little or no choice to be made. This work is geared towards ascertaining what influences the choice-making decision of which airline to fly.

In this study, only operators of commercial aircrafts offering scheduled services were considered. The operations and routes covered within Nigeria were of special interest. Interest in them stems from the fact that they serve majority of air travellers and the traffic in the sub-sector is rapidly increasing.

The objective of this study is to determine the factors that influences air travellers' in choosing which airline to fly within Nigeria. Other specific objectives are:

1. To determine the cause of long queues at airline sales counters at the airports.
2. To determine the major purpose of air travelling within Nigeria.

In line with the preceding statement of the problems and objectives, the following questions were proposed:

- (i) To what extent do the attributes of airlines influence the choice of potential air travellers in choosing which airline to fly?
- (ii) To what extent do the socio-economic attributes of air travellers influence their choice of airline?

For constructive competition and sound choice making to exist, the market is expected to be a perfect competitive market structure. This study therefore is based on the perfect market structure. Perfect competition itself is based on the following assumptions:

- (i) There are many buyers (passengers) and many sellers (airlines) in the industry.
- (ii) Every participant in the industry has full knowledge of events (demand, supply and price).
- (iii) Everybody is a "price taker" because of relatively small size and influence of individuals.
- (iv) All goods and or services are homogenous in nature.
- (v) There is freedom of entry and exit.

The revealed preference hypothesis is considered as a major breakthrough in the theory of demand, because it has made possible the establishment of the 'law of demand' directly (on the basis of the revealed preference axiom) without the use of indifference curves and all their restrictive assumptions (Lancaster et al., 1971).

The revealed preference approach for studying consumer behaviour is therefore, the theoretical framework for this study. It is based on the following:

Rationality: The consumer is assumed to behave rationally, in that he prefers bundles of goods that include more quantities of the commodities.

Consistency: The consumer behaves consistently, that is, if he chooses bundle A in a situation in which bundle B

was also available to him he will not choose B in any other situation in which A is also available. Symbolically if $A > B$, then $B < A$.

Transitivity: If in any particular situation $A > B$ and $B > C$, then $A > C$.

The revealed preference axiom: The consumer, by choosing a collection of goods in anyone budget situation, *reveals his preference* for that particular collection. The chosen bundle is revealed to be preferred among all other alternative bundles available under the budget constraint. The chosen 'basket of goods' maximises the utility of the consumer. The revealed preference for a particular collection of goods implies (axiomatically) the maximisation of the utility of the consumer. The choice of the airline therefore, means that the air traveller is satisfied with its services, all things being equal.

LITRATURE REVIEW

As consumers and citizens, young adults are a critical group to consider. Although, their disposable income is generally below average, their propensity to fly is high, an attribute that is reflected in the targeting of youth markets by low-cost airlines across Europe (Department for Transport, U. K. 2003). The innovation and development of air transport in the last century strongly influenced the pattern of demand. Access to air travel has become affordable to many U.K. residents; one half of adults flew in 2001, with about 50% of these making one return flight, the rest two or more flights (Lethbridge, 2002). This is equally true for Nigeria as noted by Stephens (2008). Despite the relative declining costs, the (nation) U.K. as a whole spent 250% more personal income on air travel over the past decade (Caves, 2002).

Today, trading patterns that are associated with an increasingly integrated global economy are driving, as well as being driven by growth in business travel and airfreight. The orientation of air services that offer affordable fares strongly influences patterns of labour mobility and migration, enhancing the multicultural nature of today's societies, and further increasing demand for air travel to maintain disparate social and religious commitments. At the same time, rising disposable income, decreasing insularity and more frequent exposure to the exotic sights and sounds of once-remote locations (through television and the internet) fuel additional demand for tourism. Travel for education, research and high-level exchange of ideas is also expanding rapidly. Many academics now take it for granted that they should meet colleagues from around the world on a regular basis (Hoyer and Noess, 2001), and UK universities attract large numbers of overseas students many from Nigeria. This travel involves choice making among airlines by air travellers.

Destination choice modelling has been used to study tourists' spatial choice behaviour for example, by Haider and Ewing (1990), Morley (1994), Huybers and Bennett (2000) and Huybers (2003). An airline choice can be conceptualised as a passenger's selection of an airlines from a set of alternatives. The selection is determined by various factors including the comparative attributes of the airlines in the consideration set. The passenger would be expected to choose the airline that generates the highest level of utility. The discrete choice modelling method can be used to analyse airline choices on the basis of the attractiveness of airline and trip attributes. It is consistent with Lancaster's (1966, 1971) theory of consumer choice in which consumption choices are determined by the relative utilities of goods as provided by the characteristics embodied in those goods. It is also based on the behavioural framework of random utility theory (Ben-Akiva and Lerman, 1985; Louviere et al., 2000). Papatheodorou (2001) discusses the application of the characteristics approach in a discrete airline choice framework.

From a scholarly perspective, discrete choice modelling is a useful research method that can be applied to empirically tested theoretical propositions of choice behaviour; for instance in considering the effect of certain attributes on consumer choice. In the case of airline choice, this could include the effect of total expenditure (the "price" of the flight ticket and cost of modal exchanges and waiting times /delays) on passengers' choice of airline to fly. Choice modelling can generate estimates of the relative importance of airlines and trip attributes. The modelling results can be used to simulate changes in attributes and to predict expected changes in an airline's market share. Hence, choice modelling can be employed to assess the positioning of an airline's product within an increasingly competitive market and to generate input into the design of airline's promotion plans.

Stated choice modelling derives its behavioural rigour from the underlying random utility theory. Fesenmaier (1990) and Morley (1995) discuss the justification for the use of stated choice models in travel and tourism applications. Its empirical suitability with respect to travel and tourism is demonstrated by the destination choice modelling applications that have appeared in literature, including the studies mentioned earlier.

Compared with revealed preference models, stated choice model however has two drawbacks. Firstly, it is not straightforward to assume that respondents can adequately handle the changes in attributes across choice sets if these changes are more than marginal. While the determination of acceptable ranges in attributes across a stated choice task is an issue that can be tested in focused groups, there is no guarantee that the attribute changes in the task are within respondents' boundaries of perceived plausibility (McFadden, 1974). The second disadvantage is related to the basic difference between

revealed preference and stated choice models. In stated choice analyses, the choices are not observed in actual markets, in this case model validity problems may arise.

However, some works have focused on the need to consider other variables like convenience, reliability, comfort, security, etc. Attempts have also been made to make these attributes turn into operations by using various measures (Chang and Stopher, 1981). Akpoghme (1989) used convenience, reliability, comfort, security and on-board crew behaviour etc, as attributes for choice decision making by customers, the main difference between his study and that of Chang and Stopher was the inclusion of on-board crew behaviour. The inclusion of on-board crew behaviour further highlights the importance of human-to-human relationship in influencing decision making.

Two major research issues had emerged with respect to the application of attitudinal variables (Tardiff, 1977). The first was whether attributes like comfort could be assessed and measured directly or whether they should be disaggregated into components ("abstract summarisers") such as "comfort of seat" and "air-conditioning", each of which must be measured separately (Johnson, 1975). Second, conflicting findings have been reported on the extent to which attitudinal variables explain travel behaviour and improve travel models. For instance, Hartgen (1974) concluded that attitudinal variables were indeed useful, provided that separate models were developed for different market segments. However, other studies have supported the inclusion of attitudinal (perceptual) variables in the model specification. Abraham (1983), for instance noted that service quality in general was observed to be a significant determinant of air traffic. However, Abrahams opined that travellers appeared to be very sensitive to the fares charged for air travel. In spite of the mode related variables, the way an individual perceived these attributes may be conditioned by his personal characteristics. Hence, socio-economic variables have and could be employed in the analysis of mode choice. This is supported by Stephanedes (1982) who opined that the inclusion of mobility and socio-economic variables allows one to take into account long term changes, for instance, in resident mobility and local economy when determining modal choice.

Socio-demographic characteristics explain only a relatively small amount of the variation in behaviour patterns between individuals (Herz, 1982; Recker and Schuler, 1982; Werrnuth, 1982; Hanson, 1982; Allman et al., 1982; Vidokovic, 1983; Hanson and Huff, 1986).

Another major determinant of air transport demand is price (Smithies, 1973). Gomez-Ibanez et al. (1980) argued that this reflects the fact that value for a business person to be where he is needed is far greater than the cost of air fare to get him there. They therefore concluded that non-business market segments are generally more price-sensitive.

Table 1. Questionnaire administration.

Period	Airport	Number of questionnaire		
		Administered	Valid	Percentage returned
3 - 9 Sep 2009	Owerri	700	620	88.6
10 - 17 Sep 2009	Lagos	7000	6320	90.3
14 - 21 Sep 2009	Enugu	500	480	96.0
22 - 28 Sep 2009	Calabar	700	678	96.9
2 - 9 Oct 2009	Abuja	4000	3240	81.0
15 - 22 Oct 2009	Jos	400	365	91.3
29 Oct - 2 Nov 2009	Kano	3000	2988	99.6
5 - 9 Nov 2009	Maiduguri	1200	1111	92.6

Source: Field work (2009).

Demand for air travel has been increasing steadily as a result of lower air fares occasioned on one hand by improved aircraft performance and operating costs (even though fuel prices have been on the rise for sometime) and the other hand by improved living standard of people (Stephens, 2009). To tap into this, more operators has fluxed the market and new routes have been established. This has created room for more competitions among these operators. However, Carrier (2006) argues that previous studies have not included fare and schedule convenience on a detailed level, which ultimately influences passenger choice. He argued that potential application areas such as pricing policy and revenue management should be considered. Gramming et al. (2005) argued that such a level of detail might, however, be unnecessary for strategic and tactical planning. They opined that fare is an outcome of the revenue management in place, and not necessary for network planning.

This study will examine air travellers' socio-economic attributes (like sex, age, marital status, occupation, income and level of education) and airline attributes (like safety, reliability, comfort, on-board crew behaviour, frequency, power of monopoly, employer's policy) as determining factors in airline choice-decision making to know the most significant factors in the choice making process. Worthy of note is the addition of power of monopoly and employer's policy.

The power of monopoly attribute was added because:

- (i) Some routes which were considered as not too economically viable were served by a few airlines or a single airline;
- (ii) Certain airlines have been able to create a de facto monopoly by offering unique products distinct from what the general market has to offer.

In addition, the employer's policy attribute was added because some airlines have been able to make some business organizations make them their preserved choice

so that their employees must use these airlines for official trips.

RESEARCH METHODOLOGY

We hypothesized that:

- (i) Airline attributes are significant determinant of choice of airline.
- (ii) socio-economic characteristics of air travellers are significant determinants of choice among airlines.

Data collection

Questionnaires were administered to air travellers in selected airports for the purpose of getting their socio-economic attributes and attributes of airlines that influenced their choice of airlines. A total of 17,500 questionnaires were administered to travellers at all the visited airports in Nigeria. The questionnaires were shared to the airports based on the volume of traffic passing through the airports. Table 1 shows how data was collected at the different airports.

Field Assistants were recruited and trained for one day in each airport visited. They were assisted in administering the questionnaires to waiting passengers departing these airports. Five Field Assistants were used each in Lagos and Abuja airports respectively while in the other airports two Field Assistants were used in each respectively. Most of the airlines in the market fly to and from the airports selected and also end their operations there. The choice of these airports is based on the fact that they serve as hubs in the domestic market and at least five of the scheduled air service providers have at least one flight to these airports. This survey was carried out between 3rd of September and 9th of November 2009 (Table 1).

The questionnaires administered to the travellers covered the followings:

- (i) Socio economic characteristics comprising of sex, age, marital status, educational status, occupation, annual income, and residence town and state.
- (ii) Trip characteristics captured the origins and destinations of trips; trip purposes; when first trips were made on any airline and number of times different airlines have been used.
- (iii) Level of service characteristics contained airlines of choice and the attributes that influences such decision.

These attributes were ranked 1 to 5 using the Likert scale to indicate the level of importance attached to each attribute. Ten airlines presently operating scheduled passenger service in the country were selected any of which could be a choice for the passengers. The following airlines were selected: Associated Airline; Aero Contractor; Capital Air; Arik Air; Bellview Airlines; Chanchangi Airlines; IRS Airlines; NICON Air; Overland Air and Virgin Nigeria (now Nigerian Eagle Air).

In this study, the immediate interest is to determine those airline attributes as well as air travellers' socio-economic characteristics which are important in explaining air choice decision-making in Nigeria. A logical approach to this investigation is to examine the pattern revealed by the use of stepwise regression model (Kim 1978). This made it possible to discuss variations in the choice of characteristics of the airlines.

The data collected were thus analyzed using a stepwise regression analysis in order to establish the relationship between air travellers' socio-economic characteristics and airlines attribute and the choice decision-making for each airline in Nigerian domestic aviation market. Preceding the regression analysis was a correlation matrix to check for multi-collinearity problems among the attributes. To verify the result of the regression analysis, a discrete choice modelling was done using the NLOGIT model.

A unique advantage of the model (stepwise regression analysis) is its ability to re-examine at every step of the computation, the independent variables incorporated into the model in the previous steps (Hauser, 1974).

Stepwise multiple regression analysis is thus regarded as essentially a search procedure, capable of identifying which independent variable actually has the strongest relationship with the dependent variable.

As each variable is entered into the regression, an F-test is performed to show whether its contribution to the explanation of variance of the dependent variable is significant. A new coefficient of determination, R^2 is also computed and its significance is ascertained by an F-test. Furthermore, the t-values are calculated and this makes it possible to access the relative importance of variables not yet included in the regression equation.

It is common to distinguish equations for prediction purposes from those for explanation in regression analysis. The former is formulated with the aim of maximising the amount of variation in the dependent variable accounted for by a given set of independent variables.

The emphasis is therefore on obtaining a high coefficient of multiple determinations (R^2). On the other hand, explanation equations seek to disentangle the separate influences of the predictor variables, so that the relationship between each of the predictor variables and the dependent ones can be established.

The emphasis is thus, on obtaining the regression coefficients which are stable and reliable if necessary at the expense of a high R^2 . Our decision rule of used F-test and T-test values for drawing our conclusions. If these values are less than 0.05 of the significance at 5%, we accept the hypothesis and reject it if these values are more than 0.05.

CORRELATION

The study analysed passengers' perception of the airlines attributes and the air travellers' socio-economic characteristics and discovered that most of the independent variables used in the choice of airline had low independence to one another meaning there was low multi-collinearity problems among the independent variables (Table 2).

Significant attributes for airline choice-making

This study has considered the issue of choice of airline by air travellers and the followings are the findings:

1. Using the Likert scale, the study showed that safety ranked highest for all airlines followed by on-board services, reliability, frequency, crew behaviour, comfortability, fare, employers' policy (forced choice) and power of monopoly (route density). There is the need for the airlines to make themselves preferred carriers for employers of labours since majority of those carried are either workers from the organised private sector or government. It can also be said that power of monopoly or route density is not a very important factor in the choice of airline (Table 3 gives the ranking of attributes for individual airlines and all the airlines together). From Tables 3 and 4, one can see that Virgin Nigeria ranked first using the attributes, therefore making it the airline of choice for the Nigerian domestic aviation market. However, Table 5 shows how the attributes were ranked from one airport to another. Passengers boarding from Lagos ranked safety highest but those boarding from Abuja ranked on-board service highest.

However, the coefficient of determination, R^2 computed showed that only 88.6% of the choice decision-making for airline is explained by independent variables while 11.4% of the choice decision-making is explained by the other factors which the study did not capture (Table 6). The standard error of estimate is 2.091. However, the F-test (ANOVA table in Table 6) performed showed that the independent variables all have significant effects combined on the choice of the independent variable (airline) at 5% because the probability value is 0.00000 but the T-test at 5% showed that educational status, occupation, safety, reliability and employers' policy are insignificant variables in the choice of airline by air travellers. While sex, age, marital status, income, comfort, on-board services, frequency, crew behaviour, fare and power of monopoly were significant variables in choice of airline, the following were of less significant: educational status; occupation; safety; reliability and employer's policy (Appendix 2).

The result of this study is presented as follows:

$$Y = 0.0000 + 0.5240X_1 + 0.0375X_2 + -0.4752X_3 + 0.1083X_4 + 0.0504X_5 + -0.1062X_6 + 0.0474X_7 + 0.0392X_8 + 0.1011X_9 + 0.0764X_{10} + 0.0806X_{11} + 0.1787X_{12} + 0.8691X_{13} + -0.7106X_{14} + 0.0178X_{15}$$

Majority of the air travellers are educated and were on business and official trips. The most satisfied but also most difficult group to change were air travellers with higher education, higher income and the civil servants.

The sex of an air traveller does not matter. The demand for air travel is derived and the actual demand to be satisfied might not have anything to do with the gender of the person. Trip purpose do not have gender

Table 2. Correlation matrix.

Correlation variables	Sex	Age	Marital status	Educational status	Occupation	Income	Safety	Reliability	Comfort	On-board services	Frequency	Crew Behaviour	Fare	Power of monopoly	Employer's policy
Sex	1.000														
Age	-0.241	1.000													
Marital status	-0.081	0.405	1.000												
Educational status	0.240	-0.042	0.010	1.000											
Occupation	-0.068	0.180	0.012	-0.122	1.000										
Income	-0.023	0.188	0.081	0.179	0.019	1.000									
Safety	0.019	0.053	0.008	-0.015	0.038	0.058	1.000								
Reliability	0.011	0.069	0.012	0.028	0.026	0.019	0.048	1.000							
Comfort	0.005	-0.008	-0.002	0.003	-0.007	0.012	0.039	0.038	1.000						
On-board services	-0.019	-0.026	0.010	-0.025	0.016	-0.004	0.135	-0.016	0.042	1.000					
Frequency	0.019	0.013	0.007	0.047	-0.025	-0.045	-0.006	0.001	0.100	-0.032	1.000				
Crew Behaviour	0.015	-0.017	-0.001	0.045	-0.044	-0.047	-0.036	-0.045	0.036	-0.041	0.136	1.000			
Fare	0.068	0.068	0.025	-0.002	0.002	-0.039	-0.027	0.028	0.008	0.090	-0.000	0.013	1.000		
Power of Monopoly	-0.075	-0.039	-0.027	0.076	0.002	0.004	0.011	-0.005	-0.002	0.006	0.007	0.010	-0.386	1.000	
Employer's policy	0.080	0.015	0.171	0.288	-0.367	0.115	-0.025	0.014	0.013	-0.010	-0.017	0.009	-0.035	0.093	1.000
Sample size		15881													
Critical value 0.05 (two-tail)		± 0.016													
Critical value 0.01 (two-tail)		± 0.020													

Source: Field work.

undertone.

Even though children below the ages of eighteen are not expected to have a tangible income that can be able to afford air fares, one still see them travel. Thus the age of an air traveller, one can say does not determine the choice decision-making of which airline to use. Aircraft seats do not even consider the age or size of air travellers as they are made to meet a general standard for everybody.

Been married or not should definitely not be of any significant impact on airline choice decision making process. Special seats are not made for married and unmarried air travellers. However, the study showed that this is significant and could be

as a result of how the data was collected. This could be explained by the fact that married and travelling with a spouse attracts certain level of discounts from some airlines particularly when tickets are booked and paid for in advance before the trip (Appendix 1: Tables 1, 2 and 3).

One should expect the air travellers' income to have a significant impact particularly for stratified flights. Stratified flights are flights that involve more than one class of service in a particular aircraft for a particular flight, that is, situations where you have "economic class", "business class" and "first class" in a flight. The analysis has shown that it is significant in the choice of airline. However, many of the carriers on domestic routes

have only one class in a particular fuselage for flights. Those that do have different classes often have them on separate flight, that is, have smaller aircrafts for upper classes of service and in large capacity aircrafts. A good example is seen with some of the mega carriers like Arik Airline, Aero Contractor Airline and Virgin Nigeria Airline. The advantage of the income having a significant impact is that the benefits of the consumer surplus that might be obtainable as some passengers might be willing to pay slightly above the market price (fare) should all the flights be allowed to be stratified.

For a novice flyer, the services obtainable on-board a flight might not be unknown. This will

Table 3. Aggregated airline choice attributes arranged based on airlines.

Airline	Attributes									
	Safety	On-board services	Reliability	Frequency	Crew behaviour	Comfort	Fare	Employers' policy	Power of monopoly	Total (ranking)
Virgin Nigeria	11157	11083	11137	11092	11061	11087	11061	5302	2736	85716
Arik air	10713	10625	10558	10639	10642	10562	6695	4921	7836	83191
Aero contractor	10057	10051	10055	9764	9758	9775	6366	5073	3429	74328
Bellview air	9595	9611	9693	9559	9574	9571	9565	3890	2369	73427
Chanchangi air	9365	9353	9188	9459	9429	9415	9366	4183	2301	72059
IRS air	4405	4402	4293	4294	4301	4347	4384	2075	1081	33582
Overland	3053	3028	3028	3143	3135	3076	3080	5302	746	27591
Nicon air	3148	3158	3216	3154	3175	3169	3171	1387	780	24358
Capital air	1922	1785	1850	1842	1841	1909	1022	926	454	13551
Associated airline	1344	1344	1338	1373	1392	1373	747	630	330	9871
Total (Ranking)	64759	64440	64356	64319	64308	64284	55457	29805	22062	493790
Percentage	13.11468	13.05008	13.03307	13.02558	13.02335	13.01849	11.23089	6.035967	4.467891	

Source: Field work (2009).

Table 4. Airline market share (January to December, 2009).

Period	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Total
Virgin Nig.	48.938	49.995	56.798	45.635	55.367	52.443	51.342	53.596	52.514	57.950	62.402	58.476	645.456
Arik Air	56.329	49.873	42.178	35.627	36.581	39.267	51.279	60.132	53.347	61.882	77.328	78.734	642.557
Aero Cont.	46.680	46.891	40.634	34.496	58.597	49.587	68.870	68.518	60.345	54.707	48.918	57.379	635.622
Chanchagi	37.726	38.139	45.717	42.193	50.938	39.141	50.447	53.999	37.486	38.899	40.575	58.806	534.066
Bellview	10.376	13.295	16.625	13.650	15.527	9.771	11.498	12.686	9.991	11.724	12.436	11.020	148.599

Source: NAMA.

Table 5. Airline choice attributes arranged based on respondents' airports.

Attributes	Airports									Total
	Lagos	Abuja	Owerri	Enugu	Jos	Calabar	Kano	Maiduguri		
Safety	691	617	269	98	669	885	568	348		3797
Reliability	671	764	469	68	651	699	431	264		3753
Comfort	590	531	230	46	615	610	455	497		3077
Frequency	490	590	268	67	567	651	423	278		3056
On-board services	665	866	232	52	571	427	215	257		3028
Crew behaviour (ground or air)	583	399	270	24	622	465	218	223		2581
Only airline on the route	264	163	0	12	654	663	182	495		1938
Fare	304	185	75	45	328	519	254	569		1710
Employer's policy	80	209	118	68	226	37	339	283		1077
MEAN	481.98	4324	241.39	19.85	544.78	550.68	342.78	357.11		6505.46

Source: Field work 2009.

therefore not affect his/her choice of airline if the airlines do not do enough advertisement. The way to give air travellers an insight into what to expect on-board a flight is by regular media advertisements. It should be noted that air services are hardly advertised in Nigeria so novice flyers cannot make up his/her mind to use an airline he/she knows little about. For frequent flyers it can

have a significant impact in choice of airline. The study showed that on-board services have a significant impact on the choice of airline.

Monopoly power exists when an airline is the sole flyer on a particular route. The attribute was seen from the study to have a significant impact on choice of airline. Though many of the airlines fly the lucrative routes, a few

Table 6. Regression analysis of airline choice for all airlines combined.

Variables	Coefficients	Std. error	t (df=3156)	p-value	Confidence interval		Beta
					95% lower	95% upper	
Intercept	b0 = 0.0000	0.0817	6.41	1.63E-10	0.3638	0.6841	0.099
Sex	b1 = 0.5240	0.0030	12.62	1.19E-35	0.0317	0.0434	0.213
Age	b2 = 0.0375	0.0864	-5.50	4.19E-08	-0.6447	-0.3056	-0.089
Marital status	b3 = -0.4752	0.0813	1.33	0.1832	-0.0512	0.2677	0.021
Educational status	b4 = 0.1083	0.1378	0.37	0.7144	-0.2198	0.3206	0.006
Occupation	b5 = 0.0504	0.0478	-2.22	0.0262	-0.1999	-0.0126	-0.033
Income	b6 = -0.1062	0.0392	1.21	0.2261	-0.0294	0.1242	0.017
Safety	b7 = 0.0474	0.0378	1.04	0.3006	-0.0350	0.1134	0.014
Reliability	b8 = 0.0392	0.0378	2.68	0.0074	0.0271	0.1751	0.037
Comfort	b9 = 0.1011	0.0389	1.97	0.0492	0.0003	0.1526	0.027
On-board services	b10 = 0.0764	0.0380	2.12	0.0341	0.0061	0.1552	0.030
Frequency	b11 = 0.0806	0.0376	4.75	2.10E-06	0.1050	0.2524	0.065
Crew behaviour	b12 = 0.1787	0.0321	27.11	1.14E-145	0.8063	0.9320	0.419
Fare	b13 = 0.8691	0.0526	-13.51	1.80E-40	-0.8137	-0.6074	-0.210
Power of monopoly	b14 = -0.7106	0.0529	0.34	0.7366	-0.0859	0.1215	0.006
Employer's policy	b15 = 0.0178						

ANOVA table					
Source	SS	df	MS	F	p-value
Regression	08,088.3960	15	7,205.8931	1647.53	0.00E+00
Residual	13,803.6040	3156	4.3738		
Total	21,892.0000	3171			

R	0.942
R ²	0.887
Adjusted R ²	0.886
Std. error of estimate	2.091
Observations	3171
Predictor variables	15
Dependent variable	Airline

Source: Field work.

fly those routes that are not perceived to be lucrative and this was reflected with the fact that the variable was significant in the choice of airline by air travellers.

Comfort and convenience are closely related. An average air traveller has chosen to fly by air because of the comfort and convenience he/she can enjoy. In addition to this an average air traveller is assumed to value more his/her time far more than an average road traveller. This time valuation can be seen from the willingness to pay high fares to same destination connectable by road so that shorter time (and less man-hour) is spent in transit. The majority of air travellers with this mindset are either for business, official and educational trips. And these classes of air travellers ranked highly comfort/convenience with business travellers scoring it 899, travellers on official functions scoring it 678, and those on educational trips scoring it 246 respectively out of the total score of 2566 recorded

(Table 7). Travellers on business trips, official trips and educational trips do not often pay for their fares and so could be willing to enjoy their flights as much as they can and this is the reason they ranked comfort high in their choice attributes.

Frequency is the number of times an airline is scheduled to fly over a given period of time. Nigerians in general like to arrive late at the airport and often times buy air tickets at the airport. This is supported by this study. Many can be assumed to be doing this because of the fact that they are sure that their airline of choice's ticket can be bought at the airport and that whatever time they get to the airport they will still be able to fly on their preferred airline knowing the published flight schedules.

Crew behaviour is a very important attribute. It is important at the ground level and on-board the aircraft. At the ground level, it can be vital in capturing undecided air travellers who are yet to make a choice of airline. Such

Table 7. Trip purpose of all travellers against airlines attributes.

Trip purpose	Attribute									Total	%
	Safety	Reliability	Comfortability/ Convenience	On-board services	Frequency	Crew behaviour	Fare	Power of monopoly	Employers' policy		
Business	834	1101	899	545	712	621	218	98	182	5210	33
Medical	58	45	106	26	68	67	78	64	0	512	3
Vacation	189	227	219	231	302	38	146	25	21	1398	9
Social/recreation	182	178	321	167	289	142	195	19	0	1493	9
Educational	304	228	246	165	213	209	140	68	102	1675	11
Official function	764	834	678	546	729	553	187	114	219	4624	29
Others	152	132	97	78	169	96	47	96	23	890	6
Total										15802	100

Source: Field work. Result was computed from primary data.

customer relation can be very vital. It could be responsible for many choice of certain airline. On-board treatment of air travellers in previous trips by an airline's flight crew can go a long way in deciding whether to use the airline in subsequent trips.

Not quite long ago when there were still relatively few airlines in operation on domestic route, fares were perceived to be agreed upon by all carriers as all charged the same or nearly the same fare. But with the reforms and the liberalisation of the sub-sector more and strong airlines entered the sector. Many airlines now offer online booking at reduced fares and fare was seen to be a strong determinant of choice. A sort of price wars now exists. The fact that aviation fuel cost had gone up made airfares to rise significantly and the fear of losing customers made most airlines to have fares structures tailored to their cost of operation and not what a "cartel" dictates. This resulted in differences in fares offered by airlines even on the same routes.

However, for the verification, we noted the P-value was 0.03365 indicating that the variables were significant in the choice of airline as a whole

using logit modelling. Looking at the individual P-values of each of the variables one can say the followings are significant: sex; marital status; fare; power of monopoly; employers' policy and age. Income, comfort and crew behaviour had values close to 0.05 which showed that they can have very little effect on choice decision making for airlines by air travellers.

1. Majority of air travellers across board for all airlines are business travellers and those on official functions or duty. This is shown in Table 7. For these groups, fare is of little importance in their choice making decision for airline. Airlines can therefore use consumer surplus to boost revenue.

As expected the predominant trip purpose was business with 33% of the total, while in diminishing order of importance, the airline attribute that affected choice of airline were: reliability; comfortability; safety; frequency of service; crew behaviour; on-board services; fare; employers' policy and power of monopoly (route density) (Table 7). The fare attribute was generally considered to be of little importance for

the choice of airline for all trip purposes except for medical reasons.

A trend was revealed that very few air travellers on business, educational and official trips consider cost to be important while those on medical, social/recreational and vocational trips recorded a higher percentage of them considering cost as a very significant attribute for choice making. This can be expected as business, educational and official travels are often paid for by others (for example, the employers and parents) and not the travellers. This is unlike the case of medical, social/recreational and vacation trips. The travellers bear the cost of the trip themselves. Frequency of service is usually an important consideration in transportation in general and in air transportation in particular. To be able to breakeven aircrafts have to be put on regular usage (though safety should not be jeopardised). To this effect for almost every trip purpose a majority of the air travellers considered frequency to be very important in airline choice decision making. Business travellers ranked frequency fourth showing little interest in it. This was unexpected because the business traveller is

Table 8. Trip purpose of air travellers (shown in percentages for each airline).

Airlines	Trip purpose							Total
	Business	Medical	Vacation	Social	Educational	Official functions	Others	
Associated airline	44	1	0	7	5	35	7	99
Aero contractor	39	1	4	3	11	41	1	100
Capital air	37	2	4	6	17	29	5	100
Arik air	28	1	1	5	17	45	4	101
Bellview air	43	1	1	4	13	35	4	101
Chanchangi air	36	1	1	3	13	45	1	100
IRS air	59	0	1	2	9	27	2	100
Nicon air	50	0	1	2	10	35	2	100
Virgin Nigeria	49	1	1	1	16	32	1	101
Overland	50	1	3	5	12	26	3	100
Ranking of trip purposes								
Total	435	9	17	38	123	350	30	
Percentage	43.41317	0.898204	1.696607	3.792415	12.27545	34.93014	2.994012	

Source: Field work. Result was computed from primary data.

most likely to be concerned about how long he waits at the airport hence, most turn up for their flights around the scheduled departure time. This is why reliability was the most important attribute for business travellers. A sizable percentage of travellers on business, medical and official trips considered the comfort and convenience attribute as of great importance in choice of airline. This was not surprising since these categories of air travellers were likely to be more interested in getting to their destinations at a specific time. For medical trips delays will certainly not be entertained. A fairly high percentage of air travellers on other trip purposes, especially educational trip purpose, cared a great deal about comfort of aircraft, probably due to the nature of their trips which were oriented towards relaxation. For almost all the trip purposes, the safety of the aircraft and safe operations of the airline were of major consideration. This attribute appeared to be of less importance for medical trips probably because the need for prompt medical attention overrides all other considerations. The reliability attribute was also considered to be of great importance in the choice of airline for all trip purposes except medical. Crew behaviour, power of monopoly (route density) and employers' policy were generally of little importance for each of the trip purposes.

Poor reliability and frequency can easily turn away the air travellers on business and official trips. This can be seen with some airlines (particularly with Virgin Nigeria Air), where these classes traveller rank very high reliability and frequency.

2. Majority of the airlines' customers were either business travellers or travellers on official functions as their main customers (Table 8).

Conclusion

The research showed that level of significant in this order (highest to least): safety; on-board services; reliability; frequency; crew behaviour; comfort; fare; employers' policy and power of monopoly. It equally showed that majority of air travellers across board for all airlines are business travellers and those on official functions or duty meaning that air transportation in Nigeria is mainly used by those that do not pay their fares themselves.

Relationship of findings to previous studies

The present results agreed with that of many other studies (Algiers et al., 1975; Mundy, 1977; Gelfond and Kirpalani, 1979; Curtis, 1981; Grayson, 1981; Abraham, 1983; Young and Bertram, 1985). Such studies have shown that although the relative importance among attributes of travel modes varied among studies, mode choice behaviour was constantly influenced by both perceptual and travel variables. Moreover, Hanson and Huff (1986) and Curtis (1981) observed that socio-economic variables still explained only a relatively small amount of the variation in behaviour pattern between individuals. This supports a finding of this study, that modal (airline) attributes are better determinants of choice of airline than socio-economic variables.

Implications

The implication of this study for policy is that it has highlighted some of the variables that influence the

choice of airlines by air travellers. Airlines should avail themselves of the variables and adjust their operations and services accordingly.

RECOMMENDATIONS

In the light of the results of this study, the following recommendations were made to airlines' managements that might be of assistance in planning for the supply of sound and efficient air transportation system:

1. Airlines should use target marketing to attract more patronage from the different age groups.
2. Improve comfort and on-board services.
3. Increase frequency on major routes.
4. Charge competitive fares.
5. Apply the power of monopoly by either serving undeveloped routes or make their products distinct from others in the market.
6. Airlines should avail their air travellers more opportunities of purchasing tickets before getting to the airport.

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APPENDIX 1

Table 1. Ticket purchasing points.

Sales point	Lagos		Abuja		Owerri		Enugu		Jos		Calabar		Kano		Maiduguri	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
The airline's sales outlet in town	652	10	598	18	128	21	124	26	88	24	189	28	912	31	237	21
Travel agency in town	452	7	482	15	122	20	97	20	44	12	68	10	318	11	182	16
Internet	251	4	191	6	2	0	41	9	11	3	57	8	12	0	0	0
At the airline's sales counter in the airport	4965	79	1969	61	368	59	218	45	222	61	364	54	1746	58	692	62
Total	6320		3240		620		480		365		678		2988		1111	

Source: Field work

Table 2. Ticket Purchasing points 1.

Total	Associated air		Aero Contractors		Capital air		Arik air		Bellview Air		Chanchangi air		IRS air		Nicon air		Virgin Nigeria		Overland Air		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
A ¹	2928	95	29	519	21	144	32	514	20	347	15	441	19	212	20	21	3	621	23	14	2
B	1765	27	8	23	1	25	6	435	17	245	10	252	11	99	9	273	35	206	8	180	24
C	565	10	3	108	4	12	3	139	5	78	3	46	2	38	4	27	3	88	3	19	3
D	10623	198	60	1823	74	273	60	1523	58	1699	72	1562	68	732	68	459	59	1821	67	533	71
	15881	330		2473		454		2611		2369		2301		1081		780		2736		746	

Source: Field work.

Table 3. Problems of airport.

Problems	Airport							
	Lagos	Abuja	Owerri	Enugu	Jos	Calabar	Kano	Maiduguri
	% ²	%	%	%	%	%	%	%
Poor ground services	62	55	38	40	41	56	39	20
Fewer sales outlets	13	11	5	8	10	37	11	16
Poor on-board services	46	44	25	29	36	45	49	56
Reliability of flight schedules	58	51	32	24	25	35	45	28

Source: Field work.

¹ Ticket purchasing points as indicated in Table 4.3 are A = airline sales outlets in town, B = travel agencies in town, C = internet and D = at the airline's sales counter in the airport.² The percentages shown are fractions of the number of passengers interviewed at the respective airports.

APPENDIX 2.

 Multinomial Logit Model

Maximum Likelihood Estimates

Model estimated: Sep 03, 2008 at 9:45:50AM

Dependent variable: AIRLICH

Weighting variable: None

Number of observations: 3171

Iterations completed: 34

Log likelihood function: 1346.592

Restricted log likelihood: 1673.632

Chi Squared: 654.4806

Degrees of freedom: 15

Prob[ChiSq > value] = 0.000000

Hosmer-Lemeshow chi-squared = 4.61800

P-Value= 0.3365 with deg.fr.= 6

LOGIT;

Lhs=AIRLCH;Rhs=ONE,SEX,MSTATUS,EDUCTN,OCUPTN,INCME,SAFTY,RELIAB,COMFRT,FREQ,CREWB,FARE,MOPLY,EPOLICY,AGE;Marginal EFFECts\$Normal exit from iterations. Exit satus=0

Variable	Coefficient	Standard Error	lb/St.Er.IP[z >z]	lMean of XI
Characteristics in number of pro[Y=1]				
Constant	-28.8474057	822570.690	0.000	1.0000
SEX	-1.10652563	0.11552379	-9.578	0.0000 0.62346263
MSTATUS	0.39062491	0.11074175	3.527	0.0004 0.63355408
EDUCTN	0.02616448	0.10307984	0.254	0.7996 0.50614948
OCUPTN	0.05013759	0.18183595	0.276	0.7828 0.09902239
INCME	-0.10834851	-0.06271671	-1.728	0.0841 1.52380952
SAFTY	-0.02759456	0.05271917	-0.523	0.6007 4.02901293
RELIAB	0.04943029	0.05156862	0.959	0.3378 4.02901293
COMFRT	-0.09401756	0.05086624	-1.848	0.0646 4.03500473
ONSERV	0.01771566	0.05250408	0.337	0.7358 4.08483128
FREQ	0.04134152	0.05077994	0.814	0.4156 4.03626616
CREWB	-0.09183906	0.05153396	-1.782	0.0747 4.03122044
FARE	0.19558178	0.04212407	4.643	0.0000 3.47177547
MOPLY	32.2207644	822570.690	0.000	1.0000 1.39482813
EPOLICY	-0.19020400	0.07039757	-2.702	0.0069 1.88016399
AGE	-0.04148082	0.00388602	-10.674	0.0000 40.7262693
Logit Model for variable AIRLCH				

APPENDIX 2. Cont'd.

Proportions P0= .220751 P1= .779249

N = 3171, N0= 700, N1=2471

LogL = -1346.59192 logL0 = -1673.8322

Esterella = $1-(L/L0)^{-2Lo/n}$ = 0.20520

Efron: 0.17545 Mcfadden: 0.59550 Ben./Lerman: 0.71562

Cramer 0.17342 Veall/Zim: 0.33314 R²_ML: 0.58649

Information: Akaike I.C. Schwarz I.C.

Source: Field work.