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Understanding Econometric Modeling: Domestic Air Travel in Nigeria and Implication for Planning Process

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ABSTRACT

For planning process, this study examined the econometric model of domestic air travel in Nigeria vis-à-vis some selected economic variables. Furthermore, quantitative (inferential) statistics has used which relies on data obtained from relevant government institutions in Nigeria. In addition, the model was estimated using Ordinary Least Square (OLS) regression. From the estimate, the predictor variables constant revealed that Domestic Passenger demand is a negative value, which signifies that the predictors (economic variables) cannot give true estimate of the domestic airline forecast regardless of the positive regression coefficient for the predictors. On the other side, Domestic Passenger demand positively contributes to economic indicators. When validating the model estimate, test of significance revealed that, there is no statistically significant relationship between the variables. Based on the insignificance, the model estimate cannot give a good forecast. Test for multicollinearity revealed that the coefficient of determination (R^2) is 0.805 which is greater than 0.8. This signifies that there is a problem of multicollinearity. Based on this problem, the model estimate cannot give a good forecast. Goodness of fit test revealed that 80.5% of the dependent variable, Domestic Passenger demand, could be explained by the independent variables. The regression value signifies that the model can give a true forecast. Finally, based on the issues of validation, it is therefore concluded that the model cannot give a true forecast, hence economic indicators contributes little or no to air transport demand but rather air transport demand contributes significantly to economic indicators.

1. Introduction

Transportation is a service that is rarely demanded to execute its own purpose but it mainly to execute other objectives in any nation. Not only does transportation provides mobility for people and goods, it also helps shape an area's economic health and quality of life. Because of the high pertinence of transportation, it is expedient for a country or nation to embark on integrating man, material, money, and machinery towards the realization of diversified modes of transport before such country can boast to have achieved a diversified economy and a sustainable development [1]. Transportation is a process that involves movement of commuters, goods, and services from a given point of origin to specific destination [2]. It affects every human being in the course of his daily activities and it is difficult to conceive a situation where transportation does not play a significant role in the life of any individual

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[3]. Transportation helps us achieve the basic objectives of living in the city, which is the functional efficiency of land uses, infrastructures, services, and improvement in the quality of life. As a result of the importance, there is economic advantage. It has been affirmed that no transport organization can operate profitably unless there is a demand for its services and the estimation of expected future demands is a key element in planning transport operations [1]. Transportation as a system comprises of the following modes: Road transport; Air transport; Water transport; Pipeline transport, and Cable transport. For this study, air transport will be focused.

Civil Aviation, through a complicated interaction with other econometric sectors, benefits from and contributes to the economic development of all nations. As incomes and production level increase, the demand for aviation services expands. The role of air transport as a catalyst for general economic and social development due to the expedition and flexibility has been provided by the global air transport system. It has widened the markets for numerous types of products, and it has also promoted the exchange and interaction of ideas, professional experience and skills among the nations. Since the role of air transport increasingly gains importance in the economic development of countries and regions, and aviation is the leading edge of industry, it is important to take due account of the economic and social benefits, which an efficient air transport system can offer. To ensure that future air transport needs are properly assessed together with the associated financial and human resources that need to be provided [4].

The analysis of air travel demand is very essential to an airport for making decisions on capacity utilization and for designing airport facilities. Examining the relationship between economic variables and air travel demand (passenger demand) is very important for developing infrastructure facilities and passenger services at an airport in the future. Analysis of air passenger demand helps us identify the future requirements of such facilities. Economic indicators determine the passenger demand per route at a particular airport, region, or city. The most common economic indicators are Gross Domestic Product (GDP), GDP per capita, population (Pop), income, and income per capita. There are many studies addressing the relation between the air passenger demand with operating variables and/or economic indicators. Airlines must know these indicators to predict the behavior of the passenger demand, and then make decisions such as whether it is profitable to establish their hub in a particular airport or not [5].

The aim is to examine the relationship between domestic air travel demands and select economic indices. In other to achieve this, econometric model will be adopted. The null hypothesis of the study states that there is no statistical significant relationship between the % change in domestic air passenger traffic and the % change in economic indices. The select economic indicators are Consumer Price Index (Inflation), exchange rate (BDC), and real gross domestic product (GDP).

2. Literature Review

The demand for air transport has been consistently increasing worldwide. In 1950s and 1960s, annual growth rates of 15% or more were common. Annual growth rate of 5%-6% persisted through the 1980s and 1990s. Growth rates are not consistent in all regions but countries with a de-regulated airline industry have more competition and greater pricing freedom. This results in lower-fares and sometimes dramatic spurts in traffic growth. The U.S, Australia, Canada, Japan, Brazil, Mexico, India, and other markets exhibit this trend [6]. The industry has been observed to be cyclical in its financial performance. Besides, economic growth, higher disposable incomes, and increased leisure time on the demand side, combined with falling real airport and airline tariffs, and technical change in the supply side have been considered as important driving forces behind the long-term growth of international air transport.

2.1. Drivers of Air Transport Demand

According to the airline passenger survey conducted by Airbus, it was revealed that the most prominent reasons of increasing desire to use air transportation listed by passengers in order of importance are:

I. Economic growth (especially in the emerging countries where wealth of citizens is increasing, and more people are able to benefit from aviation and to see more of the world).
II. Increasing desire to spend holidays and free time abroad and in different places of home country.
III. Globalization (leading people to migrate for working or living in different countries and cities).
IV. Time concerns (time is getting more and more valuable resulting in growing desire to take faster means of transport) [7].

It should be noted that the drivers of air transport demand might differ from country to country. It may depend not only on country's economic and social background or geographic location and size, but also on some important events like economic downturns or deregulations that could decrease or boost the demand. Forecasting the future demand for air transportation and understanding determining factors are crucial in the aviation sector to form transport policies [8]. With the help of in-depth analysis of the key determinants, airports and airlines can develop their marketing strategies in order to increase the demand for their enterprise. They can decide whether to increase airport facilities, expand airline fleet and flight network according to the demand forecasts. Airports use forecasts to decide if further capacity increase is necessary and profitable.

From literature surveys conducted, it was revealed that in year 1994, there was on deficiency of inclusion of wealth variables in the demand models for air transportation [9]. In their research, the authors found that many time series studies have an autocorrelation problem in the errors term. The study mentioned that autocorrelation problem might be the result of model misspecification in previous studies as a result of the way income is represented. Therefore, they used permanent income instead of current income as a determinant of wealth of individual. Their model includes airfares, financial assets, non-financial assets, wage per employee, CPI as determinants of passenger demand. Notwithstanding the study tried to include percentage change in CPI, percentage change in GDP, family size, these variables appeared to have insignificant coefficients and were removed from the model.

In the year 2009, David conducted a study on the socio-economic impact of air transport in small island states: An evaluation of liberalization gains for the Caribbean Community (Caricom).GDP, employment, and income are the independent variables while the volume of air traffic (passenger) is the dependent variable considered for the analysis. The study was carried out in island states of the Caribbean and not in Nigeria. A more plausible result may be obtained if conducted in Nigeria. In the year 2012, Çağlar investigated phenomenal growth of the Turkish domestic air transport demand in the last three decades. Meanwhile, air transport demand growth is associated with income, population, airfares, and the introduction of deregulations. Based on the literature review, the study creates demand model for domestic air transport market. The model used income, population, crude oil prices, and alternative modes of transportation such as railroad and high-speed rail, consumption, expenditure and liberalization dummies as determinants of air transport growth. In the year 2015, Abraham, Saheed, and Chinyere conducted a study on air transportation development and economic growth in Nigeria [10]. The study developed a series of econometrics models including dynamic ordinary regression equation, co-integration, error correction model and granger causality techniques to examine the relationship between general GDP as dependent variable and GDP of air transport service, GDP of agricultural

sector, GDP of manufacturing sector, and GDP of electricity sector as independent variables. The analyses suggests a positive influence of air transport on economic growth, a long run equilibrium relationship and a causal unidirectional relations from air transport to economic growth. Their study is limited to Gross Domestic Product (GDP) to determine the relationship between economic growth and air transport. In that same year, Owoputi examined aviation industry development in Nigeria economy. His study emphasized the benefits of the air transport sector, which creates three distinct types of economic impact- contribution to GDP, jobs and tax revenues generated by the sector and its supply chain. The economic benefits relate to the passenger using the air transport service. Statistically, his study lacked testable fact to really examine the contributions of aviation industry development in Nigeria economy. In addition, the study relied on past-published data and was devoid of statistical analysis. In the year 2014, Muhammad et al. conducted a study on analysis of the economic benefits of Gombe International Airport in Nigeria [11]. The study was limited to the impact of air transport on GDP and employment creation. It was also limited Gombe International Airport. A more plausible result would be obtained if other economic variables were considered and conducted on the entire airports in Nigeria.

So far, limited researches have carefully examined domestic air transport demand in Nigeria. Several studies have been carried out in different countries. The studies would give a more plausible result if they were conducted in Nigeria. This might be as a result of socio-economic and political differences, level of development and other factors. Furthermore, some did not scientifically x-ray the relationship between the contributions of aviation industry and development of Nigeria economy. Finally, economic variables involved in some studies are limited. This study examines the relationship between some selected economic indicators: Gross Domestic Product (GDP), Consumer Price Index (CPI), and Exchange rate (BDC) in so far as they are inextricably linked to the performance of aviation sector and the creation of additional passenger and aircraft flows.

3. Methodology

This study is a quantitative (inferential) study and it relied on information and data obtained from relevant government institutions and agencies in Nigeria. The hypothesis will be tested using inferential statistics.

3.1. Study Area

Nigeria is located in the West Africa sub-region. It is bounded in the north by Niger Republic, south by Atlantic Ocean, east by Cameroon and Chad and west by Benin Republic. It is the most populous country in Africa. With respect to NPC, 2006, Nigeria accounted for more than 140 millions. By August 2011, it was estimated to be about 167 millions. Nigeria is located within the longitude 3^0E and 15^0E and latitude 4^0N and 14^0N of the equator [12]. Presently, Nigeria has about twenty (20) functional domestic airports. The most functional domestic airports are located in the following areas, Lagos, Abuja, Port Harcourt, Kano, Enugu, Osubi, Kaduna, Calabar, Sokoto, Benin, Maiduguri, Jos, Owerri, Yola, Ilorin, Ibadan, Minna, Akure, Katsina, and Makurdi. As at today, Federal Airport Authority, Nigerian Airspace Management Agency, and Nigeria Civil Aviation Authority under the ministry of aviation manages all the listed domestic or local airports. It should be noted that some international airports also function as domestic airports.

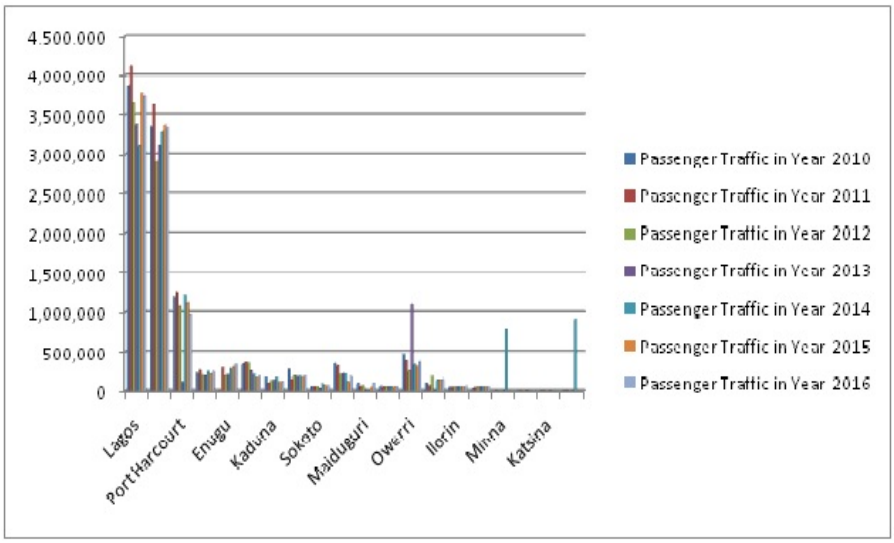

Fig1. Bar chart domestic air passenger traffic in different airports in Nigeria from year 2010 to 2016.

Table 1. The domestic air passenger traffic in Nigeria airport between year 2010 and year 2016 [13, 14].

AIRPORT	Passenger Traffic in Year 2010	Passenger Traffic in Year 2011	Passenger Traffic in Year 2012	Passenger Traffic in Year 2013	Passenger Traffic in Year 2014	Passenger Traffic in Year 2015	Passenger Traffic in Year 2016
Lagos	3,864,458	4,127,100	3,646,824	3,383,338	3,111,975	3,778,145	3,748,333
Abuja	3,361,107	3,624,862	2,904,491	3,116,634	3,274,986	3,375,823	3,344,164
Port Harcourt	1,198,668	1,256,266	1,077,517	125,377	1,225,135	1,116,885	974,028
Kano	234,996	272,911	213,949	207,485	257,927	227,038	255,568
Enugu	0	301,744	211,225	217,031	291,023	310,558	340,692
Osubi	343,333	365,875	355,661	267,532	221,250	187,430	203,133
Kaduna	185,297	109,622	140,800	141,841	174,216	123,827	127,233
Calabar	281,556	152,930	205,676	197,470	203,844	189,907	202,780
Sokoto	60,425	69,805	67,238	30,663	100,078	84,338	77,867
Benin	348,906	323,554	222,027	230,347	227,896	126,224	197,690
Maiduguri	107,200	74,824	79,753	13,025	11,103	43,079	110,613
Jos	75,525	47,794	50,964	54,798	48,938	48,199	58,990
Owerri	476,063	384,016	265,082	1,094,929	338,943	313,343	369,802
Yola	108,547	83,222	199,926	9538	145,588	149,940	153,157
Ilorin	43,761	46,990	65,517	63,379	66,205	67,439	74,721
Ibadan	27,843	38,979	52,286	61,072	64,743	67,911	69,797
Minna	8,896	0	5,406	8,105	787,811	5,379	2,529
Akure	6,640	6,073	7,612	10,742	6,113	2,786	9,873
Katsina	8,773	5,937	2,381	8,980	2,189	3,314	3,576
Makurdi	11,731	10,711	1,525	5,029	907,638	876	278

From the Table 1 and Figure 1, it can be depicted that Lagos Airport, Abuja Airports are the major domestic Airports in Nigeria, based on the high number of domestic passenger movement. In addition, Port Harcourt Airport is also improving. These Airports in Nigeria have contributed significantly to the economic development in Nigeria. From the Table 2, the highest number of domestic air passenger movement was recorded in the year 2014.

3.2. Steps Involved in Econometric Dynamic Model

In order to estimate passenger demand for domestic air travel, the major steps of econometric model are below:

3.2.1. Formulate or Specify the Appropriate Model

When formulating the model, mathematical model will be formulated before the econometric model. Without the mathematical model, there cannot be an econometric model. The difference between the mathematical model and the econometric model is the inclusion of stochastic disturbance term, otherwise known as unexplained variables or error term in the econometric model.

Mathematical model:

$DOM_{PAX} = \alpha + \beta_1(CPI_{\%}) + \beta_2(BDC_{\%}) + \beta_3(GDP_{\%})$

Econometric model:

$DOM_{PAX} = \alpha + \beta_1(CPI_{\%}) + \beta_2(BDC_{\%}) + \beta_3(GDP_{\%}) + Ui$, where
DOM_{PAX} = Domestic Passenger Traffic (Dependent variable),
$CPI_{\%}$ = Percentage change in Consumer Price Index or Inflation,
$BDC_{\%}$ = Percentage change in Exchange rate Bureau de Change,
$GDP_{\%}$ = Percentage change in Gross Domestic Product,
$CPI_{\%}$, $BDC_{\%}$ and $GDP_{\%}$ are independent variables.
$\boldsymbol{\alpha}$ = Intercept.
$\boldsymbol{\beta_1}$, $\boldsymbol{\beta_2}$, $\boldsymbol{\beta_3}$= Parameters.
Ui = Stochastic disturbance term or unexplained variables or error term which captures other economic indicators influencing domestic air travel demand in Nigeria.

Table 2. Relationship between % changes in domestic air passenger traffic and % change in economic [13, 14].

Year	Number of Passengers	% change
2010	10,753,725	
2011	11,303,215	5.11
2012	9,770,453	-13.56
2013	9,159,612	-6.25
2014	11,447,601	24.98
2015	10,222,441	-10.70
2016	10,971,608	7.33

Table 3. Data collected for the specified model (% change in domestic air passenger traffic (annual), % change in Consumer Price Inflation (CPI), % change in Naira Value to Dollar (BDC) and % change real Gross Domestic Product (GDP)).

YEAR	% Change Domestic Air Passenger Traffic	% Change Consumer Inflation Price (CPI)	% Change Naira Value To Dollar (BDC)	% Change Real Gross Domestic Product (GDP)
2011	5.1	3.2	4.1	5.31
2012	-13.6	2.1	1.0	4.21
2013	-6.3	1.5	1.0	5.49
2014	25.0	1.6	5.5	6.22
2015	-10.7	0.1	30.0	2.79
2016	7.3	1.3	67.4	-1.51

3.2.2. Collect the Appropriate Data in Line with the Already Specified Model

From the Table 3 and Figure 1, it can be deduced that the three variables, that is % change of domestic Air Passenger Traffic, % change of Nigeria Consumer Inflation Price (CPI), % change of Naira Value to Dollar (BDC) and % Change Real Gross Domestic Product (GDP), almost have the same trend in the year 2011, 2012, 2013, and 2014. At the end of year 2015 and throughout the year 2016, the exchange rate went high by 67.4% resulting into little or low demand of domestic air travel. The Fig 2 also

affirmed that there is little or no relationship between the economic variables and domestic air transport in the country, which is because the lines were not trended in the same direction.

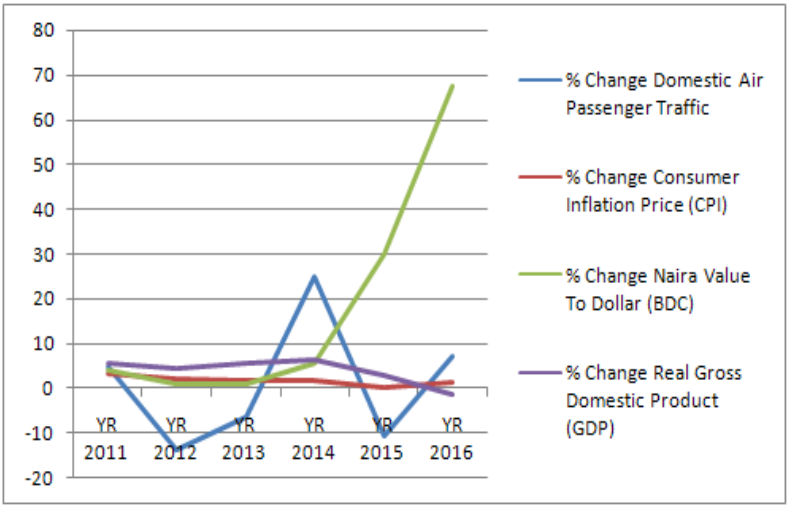

Fig 2. Line graph of % change.

3.2.3. Estimating of the Model to Enhance Satisfaction and Reliability of the Model

To estimate econometric model, the use of Ordinary Least Square (OLS) regression will be adopted in order to see the differences between the true line and the observed line (error or residual). Ordinary Least Square (OLS) regression, which is also referred to as regression, is a constructive and functional parametric tool that is majorly for examining the relationship between two or more variables (dependent and independent variables). It should be noted that the data type must be either interval scale of measurement or ratio scale of measurement, and the statistics involved would be inferential in nature. Ordinary Least Square (OLS) regression assumes that there is a linear relationship between the two or more variables, if the relationship is not linear, OLS regression will not be the ideal tool for analysis, or modifications to the variables may be required. The basic idea of linear regression is that, if there is a linear relationship between two variables, one variable can be used to predict or forecast the values of the other variable.

The econometric specified model:

$DOM_{PAX} = \alpha + \beta_1(CPI_{\%}) + \beta_2(BDC_{\%}) + \beta_3(GDP_{\%})$: True line.
The coefficients estimate of the regression model for the true line is: $DOM_{PAX} = -102.530 + 7.718(CPI_{\%}) + 1.793(BDC_{\%}) + 15.589(GDP_{\%})$.
$DOM_{PAX} = \alpha + \beta_1(CPI_{\%}) + \beta_2(BDC_{\%}) + \beta_3(GDP_{\%}) + Ui$: Observed line.
The coefficients estimate of the regression model for the observed line is: $DOM_{PAX} = -102.530 + 7.718(CPI_{\%}) + 1.793(BDC_{\%}) + 15.589(GDP_{\%}) + Ui$.

Table 4. Model summary.
(Predictors or independent variables are Real Gross Domestic Product, Consumer Price Inflation, and Naira to Dollar Exchange Rate).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897(a)	.805	.512	10.05132

Table 5. Analysis of variance.
(Predictors or independent variables are Real Gross Domestic Product, Consumer Price Inflation, and Naira to Dollar Exchange Rate. The dependent variable is Domestic Passenger Air Travel in Nigeria).

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	833.675	3	277.892	2.751	.278(a)
	Residual	202.058	2	101.029		
	Total	1035.733	5			

Table 6. Value of Coefficients.
Dependent Variable: Domestic Passenger Air Travel in Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B(?)	Std. Error	Beta	B	Std. Error
1	(Constant)	-102.530	36.392		-2.817	.106
	Consumer Price Inflation	7.718	5.115	.544	1.509	.270
	Naira to Dollar Exchange Rate	1.793	.643	3.302	2.787	.108
	Real Gross Domestic Product	15.589	5.776	3.077	2.699	.114

Given all the predictor variables constant at zero (0), Domestic Passenger demand will be -102.530. This negative value signifies that the predictors cannot give true estimate of the forecast regardless of the positive regression coefficient for the predictors. On the other side, the regression coefficient for Consumer Price Index is 7.718. This means that Domestic Passenger demand positively contributes to Consumer Price Index. In addition, the regression coefficient for Exchange rate is 1.793. This means that Domestic Passenger demand positively contributes to Exchange rate. Finally, the regression coefficient for Real Gross Domestic Product is 15.598. This means that Domestic Passenger demand positively contributes to Real Gross Domestic Product.

3.2.4. Examine the Validity of the Model to Enhance a True and Genuine Forecast.

Validity of the model can be done through the following:

a) Test of significance:

Significance testing is very crucial in research analysis. As methodology, which is the heart of a research work, significance testing is the heart of model estimation. It is generally assumed that the null hypothesis would be rejected and the alternate hypothesis would be affirmed. This assumption is true if the computed test statistics is less than the set significance level. Otherwise, the null hypothesis will not be rejected and the alternate hypothesis will be rejected. In the situation whereby the null hypothesis is rejected, the variables are statistically significant and can then give a good forecast. Hypothesis testing determines the validity of the assumption (technically described as Null Hypothesis) with a view to choose between two conflicting hypotheses about the value of a population parameter. Hypothesis testing helps to decide based on a sample data, whether a hypothesis about the population is likely to be true or false [15]. Statisticians have developed several tests of hypotheses (also known as the tests of significance) for testing of hypotheses, which can be classified as parametric tests or standard tests of hypotheses, and Non-parametric tests or distribution-free test of hypotheses.

They further state that parametric tests usually assume certain properties of the parent population from which we draw samples. Assumptions like observations come from a normal population, sample size is large, assumptions about the population parameters like mean, proportions, variance, etc., must hold good before parametric tests can be used. A common example of parametric test is regression analysis. However, there are situations where the researcher cannot or does not want to make such assumptions, in such situations, statistical methods are used for testing hypotheses, which are called non-parametric tests because such tests do not depend on any assumption about the parameters of the parent population. Besides, most non-parametric tests assume only nominal or ordinal data, whereas parametric tests require measurement equivalent to at least an interval or ratio scale. Common examples of the non-parametric tests are Chi-square and Charles Spearman's coefficient of correlation test [15]. In addition, common examples of parametric tests are regression analysis and Karl Pearson's coefficient of correlation. In addition, common examples of parametric tests are regression analysis and Karl Pearson's coefficient of correlation.

For more emphasis, this paper critically examines parametric test. Parametric test is best applicable for quantitative technique, based on inferential statistics, meanwhile the sampling must be probabilistic in nature, and the data type or data scale must be interval or ratio scale of measurement. On the other side, nonparametric test is best applicable for qualitative technique, based on descriptive statistics, meanwhile the sampling must be non-probabilistic in nature and the data type, or data scale must be ordinal or nominal scale of measurement. If this rules are not properly followed or the researcher fails to abide with the guidelines, the result of the research survey analysis will give a spurious or nonsense or problematic output which will be misleading. The explanation will be depicted in Table 7.

Table7. Summary of statistical guidelines.

Scale of Measurement	Sampling or Data Collection	Statistics	Technique	Test	Analysis
Interval	Probability	Inferential	Quantitative	Parametric	Regression analysis, Karl Pearson's coefficient of correlation
Ratio	Probability	Inferential	Quantitative	Parametric	Regression analysis, Karl Pearson's coefficient of correlation
Nominal	Non-probability	Descriptive	Qualitative	Non-parametric	Chi-square, Charles Spearman's coefficient of correlation
Ordinal	Non-probability	Descriptive	Qualitative	Non-parametric	Chi-square, Charles Spearman's coefficient of correlation

The steps involved in hypothesis testing

i. Stating the hypothesis. Null Hypothesis H_0: There is no statistical significant relationship between % change of domestic air passenger travel demand and % change in the select economic indicators. Alternate Hypothesis H_1: There is statistical significant relationship between % change of domestic air passenger travel demand and % change in the select economic indicators.
ii. Determining critical region or significance level or error term. The critical region is 5% or 0.05. The confidence level is 95% or 0.95. This is chosen based on the discretion of the researcher.

iii. Computing the test statistics using the parametric test. From the computed test statistics, determine the significance level. As shown in Table 4, the significance level of the computed test is 0.278.
iv. Stating the decision rule. The decision rule for the computed test states that if the significance level of the computed test statistics is less than the critical region (significance level) that is set by the researcher (0.05), the Null Hypothesis will be rejected and the Alternate Hypothesis will be affirmed. However, if the significance level of the computed test statistics is more than the critical region (0.05), the Null Hypothesis cannot be rejected but the Alternate Hypothesis will be rejected.
v. Concluding the test based on the decision rule earlier stated. The significance level of the computed test is 0.278, and the chosen critical region or significance level is 0.05. When comparing the computed test statistics to the significance level, the computed test statistics (0.278) is more than the significance level (0.05), hence the Null Hypothesis of the study cannot be rejected. This is a basis for not rejecting the Null Hypotheses, which states that there is no statistical significant relationship between % change of domestic air passenger travel demand and % change in the select economic indicators. Based on the insignificance, the model estimate cannot give a good forecast.

b) Test for multicollinearity

For a model that has more than one qualitative variable, as in this study, problems of multicollinearity can arise. In addition, since data are non-experimental, many explanatory variables tend to move together meaning that they may be collinear [16]. When two variables are highly or near perfectly correlated, their variances tend to infinity and as a result, hypothesis testing becomes weak so that diverse hypothesis parameter values cannot be rejected [14]. Standard errors and overall coefficient of determination may be used for testing for multicollinearity. [17] It is stated that if the coefficient of determination (R^2) is greater than 0.8, there is a high correlation among variables, and then multicollinearity is suspected. In this study, the coefficient of determination (R^2) is 0.805 which is greater than 0.8. This signifies that there is a problem of multicollinearity. Based on this problem, the estimated model cannot give a good forecast.

c) Goodness of fit test

The goodness of fit test can be referred to as the summary of statistics, which indicates the precision, and appropriateness of the estimated model. It is also referred to as the regression proper. The regression value or the explained variable is 833.675 and the unexplained variable or error term is 202.058, and the total variable is 1035.733. Further, the analysis revealed that

$R^2 = \frac{833.675}{1035.733}$, $R^2 = 0.805$ as shown in Table 4.

This mean the distance between the true line and the observed line is minimized; hence 80.5% of the dependent variable (Domestic Passenger demand) can be explained by the independent variables (Real Gross Domestic Product, Consumer Price Inflation, Naira to Dollar Exchange Rate). The regression value signifies that the model can give a true forecast.

4. Conclusions

Mobility is a very important aspect of human existence. It has been affirmed that no transport organization can operate profitably unless there is a demand for its services and the estimation of expected future demands is a key element in planning transport operations including air transport. Civil Aviation, through a complicated interaction with other econometric sectors, benefits from and contributes to the economic development of all nations. As incomes and production level increase, the demand for aviation services expands. The analysis of air travel demand is very essential to an airport for making decisions on capacity utilization and for designing airport facilities. This study enhances airline and airport management, and government should know the economic indicators that can be used to predict the behavior of the passenger demand for air travel. This study examined the relationship between domestic air travel demands and the select economic indices. Econometric model was adopted to achieve the aim. This study is a quantitative (inferential) study and it relied on information and data obtained from relevant government institutions and agencies in Nigeria. Ordinary Least Square (OLS) regression was used to estimate the model. From the estimate; the predictor variables constant at zero (0), Domestic Passenger demand was -102.530. This negative value signifies that the predictors cannot give true estimate of the forecast regardless of the positive regression coefficient for the predictors. On the other hand, the regression coefficient for Consumer Price Index is 7.718. This means that Domestic Passenger demand positively contributes to Consumer Price Index. In addition, the regression coefficient for Exchange rate is 1.793. This means that Domestic Passenger demand positively contributes to Exchange rate. Finally, the regression coefficient for Real Gross Domestic Product is 15.598. This means that Domestic Passenger demand positively contributes to Real Gross Domestic Product. When validating the model estimate, test of significance revealed that the Null Hypothesis of the study cannot be rejected. This means that there is no statistical significant relationship between % change of domestic air passenger travel demand and % change in the select economic indicators. Based on the insignificance, the model estimate cannot give a good forecast. In order to prevent confusion, when deciding for test of multicolinearity, it is assumed that if the R^2 is more than 0.8, there is a problem of multicolinearity. Based on this assumption, it was revealed that the coefficient of determination (R^2) is 0.805 which is greater than 0.8. This signifies that there is a problem of multicollinearity. The estimated model cannot give a good forecast. Goodness of fit test revealed that 80.5% of the dependent variable (Domestic Passenger demand) can be explained by the independent variables (Real Gross Domestic Product, Consumer Price Inflation, Naira to Dollar Exchange Rate). The regression value signifies that the model can give a true forecast. Finally, based on the issues of validation, it is therefore concluded that the model cannot give a true forecast. From the study, it can be concluded that economic indicators contribute little or no to air transport demand but rather air transport demand contributes significantly to economic indicators. Based on these issues, the researcher cannot forecast. Since economic indicators cannot influence the demand of air transport, hence it can be influenced by socioeconomic or pure socio-demographic variables. For proper airport and airline planning, the relationship between socioeconomic variables and air transport will give a true forecast.

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