



EFFECT OF AIRPORT NON-AERONAUTIC INFRASTRUCTURE ON ECONOMIC GROWTH IN NIGERIA: 1986-2020

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ABSTRACT

The study investigated the effect of airport non-aeronautic infrastructure on economic growth in Nigeria covering 1986-2020. Expost-facto research design was adopted to carry out the investigation. The data were collected from secondary source both internal and external which includes Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), Federal Ministry of Aviation (FMA) and International Civil Aviation Organization (ICAO). Neoclassical Cobb Douglas production model was adopted with modification for the study. The data were subjected to diagnostic test which include unit root, cointegration, before estimating the model. The findings of the study showed that the coefficients of rent and electricity infrastructure (REI) and Tollgate infrastructure (TGI) were statistically significant at $P \leq 0.05$. It can be concluded from the result analysis that rent and electricity infrastructure (REI) and Tollgate infrastructure has positive and strong influence on economic growth in Nigeria. The study recommends that Nigerian government and other stakeholders/ key players should ensure to have a proper maintenance culture on the infrastructure and make sure that the equipment is updated to global standard so as to compete with the global community. The study also recommended that professionals in the aviation industry be given free hand without interference in order to effectively and efficiently discharge their duty towards enhancing management confidence that would contribute immensely to economic growth in Nigeria.

Keywords: Airport, Cointegration, Economic growth, infrastructure, Non-aeronautic.

INTRODUCTION

It is a known fact that air transport is one of the world's marketable infrastructures and most important industry. Its development and technical service achievements make it one of the major contributors to the advancement of modern societal development. The contributions of airport infrastructure to economic growth cannot be matched by any other major form of transport due to its technicality and new innovations that is going on in the sector. The above has helped so much in economic and tourist development of the nation and the globe. Demand for air transport services has increased the influence of transport in the nation and global economy, thereby enhancing rapid movement of passengers, goods and services to the domestic and world market. This in effect helps to generate higher revenue to the economy by way of fast in and out flow of goods and services (Tsiotas and Polyzos, 2019).

In Nigeria, the regulatory authorities supervising the aviation sector are the Federal Ministry of Aviation which is the apex body, others are agencies such as the Nigerian Civil Aviation Authority (NCAA), Nigerian Airspace Management Agency (NAMA) and the Federal Airports Authority of Nigeria (FAAN) plays a supportive role (Nwakoby & Chukwujekwu, 2020). FAAN is empowered to develop and maintain the airports and other facilities within the airports. The role of NAMA is to oversee the provisions and safeguarding of air navigation facilities on the entire Nigerian airspace in Nigeria, while NACA is in charge



of licensing, restoring and regulating aircraft as well as accident control. The Civil Aviation Act of 2006 is charged with the duty to regulate aviation in Nigeria and makes provision for all aspects of air carriage and it domesticated the Montreal Convention of 1929 (Nwakoby & Chukwujekwu, 2020).

The aviation industry plays an important role in the aspect of work and leisure to people around the globe. The sector helps to promote and improve quality of life, living standards of people within the nation. All this helps to generate economic growth and poverty alleviation by way of providing employment opportunities, increasing revenues from taxes. The employment opportunity is generated through supply chain transformation from the airports (Tsiotas D. and Polyzos, 2019).

Air transport system is fully driven by the global economy; it is an important catalyst to the global economy. International Air Transport Association (IATA, 2017) noted that air transport directly employs four million people worldwide and generates \$400 billion in output. The efficiency and quality improvements in air passenger services contribute to the growth in government sectors such as hotel, tourism, etc. The free flow of people and information, together with improved air cargo operations, promote trade and improve the efficiency of the overall economy. That is to say that aviation sector imposes significant positive externalities to other industries, contributing to economic and employment growth to the nation (International Air Transport Association (IATA, 2020). Researchers examined the link between high technology employment in a region and whether the region is served by a hub airport (Button *et al.*, 1999). Button (2006) pointed out that in United States and Europe; more than 40% of air travels are for business purposes.

The remaining trips are either for leisure or for visiting friends and relative, trips provide the basis upon which socialties are retained and, as such, allow for an efficient and integrated labour market. The main objective of this paper was to investigate the effect of airport non- aeronautic infrastructure on economic growth in Nigeria. Specifically, the study sought to:

- i. Examine the effect of airport Rent and Electricity infrastructure on economic growth in Nigeria; and
- ii. Evaluate the effect of airport Tollgate infrastructure on economic growth in Nigeria.

Few studies have concentrated on some particular constraints; however, this research stands out as unique to strengthen the existing studies carried out closing the gap where airport aeronautic infrastructure failed to affect economic growth in Nigeria. An airport is a facility where passengers connect from/to ground transportation to air transportation. Descriptions of airports can be divided into landside and airside. Landside descriptions cover how passengers arrive/depart the airport terminal building and move through the terminal building to board the airplanes (International Air Transport Association (IATA, 2020). Airside describes the movement of the airplanes on the airports surface. At the very minimum, an airport consists of one runway (or helipad), but other common components are hangars and terminal buildings. Apart from these, an airport may have a variety of facilities and infrastructure, including fixed base operator services, air traffic control, passenger facilities such as restaurants and lounges, and emergency services (International Civil Aviation Organization [ICAO], 2019). The term airport refers to an aerodrome that is licensed by the responsible government organization (i.e FAA). Airports have to be maintained to higher safety standards. There are usually no minimum standards for a basic aerodrome (Herrera, 2017).

Airport infrastructure is part of the basic underlying foundation of an airport system. The existence of airport infrastructure, and associated ground infrastructure, is an essential



factor in regional development. It has been demonstrated that the presence of this infrastructure has a direct relationship on the overall economic functioning of the nation. Historically, industrial and commercial firms have tended to locate in clusters near transportation hubs (International Civil Aviation Organization [ICAO], 2019). With the agglomeration of such firms, economic growth is generated.

Basically, the following is a comprehensive list of airport infrastructure: runways, taxiways, aprons, terminal buildings, cargo buildings, maintenance buildings, administrative buildings, roadways, curb frontages, rental car areas, transit areas, taxi areas, limousine areas, fuelling systems, power systems, rescue units, air traffic control facilities, lighting, navigational aids, boarding devices, communications systems, security systems, parking lots, graphics, signage, landscaping, drainage, water supply, and sewer disposal. The above can be classified into two: a. Airside and b. Landside (International Civil Aviation Organization [ICAO], 2019).

The non-aeronautic infrastructure refers to those infrastructures at the airport that are not directly related to the flight, such as the services at the toll gate of the airport, taxi services, restaurant services, excursion, rent on building and etc. which facilitates the generation of revenue to the airport (Rud, 2012).

Non-aeronautical fees are often known as commercial revenues. Concession fees for fuel and oil are charged for the fuel sold to the airlines at the airport. Concession fees for commercial activities include small enterprises inside the facility such as duty-free shops, retail shops, bars, restaurants, banks and currency exchange (International Air Transport Association (IATA, 2017). Revenues from car parking and car rentals are charged for these facilities at the airport.

Rental of airport land, space in buildings, and assorted equipment mainly derive from space rented to airlines for offices and passenger “club” lounges, equipment rented to shippers, freight forwarders, advertising in space. Other fees are charged for airport tours, admissions, etc, and some of them are derived from provisions of engineering services and reimbursable utilities by the airport operator to airport users. Finally, non-airport revenues refer to the consulting, educational and training service to other airports (Neufville and Odoni, 2003; Nwakoby & Chukwujekwu, 2020).

Lewis (1915-1991) says that “economic growth means the growth of output per head of population. Lewsi (1983)” since the main aim of economic growth is to raise the standards of living of the people, therefore the second way of defining economic growth which runs in terms of per capita income or output is better. Another point which is worth mentioning in regard to the definition of economic growth is that the increase in national income or more correctly increase in per capita income or output, must be a “sustained increase” it is to be called economic growth. By sustained increase in per capita income we mean the upward or rising trend in per capita income over a long period of time. A mere short-period rise in per capita income, such as that occurs over a business cycle, cannot be validly called economic growth (Lewis, 2013).

Economic growth is defined by Amadeo (2019) as increase in the production of goods and services over a specific period. To be most accurate, the measurement must remove the effects of inflation. Economic growth creates more profit for businesses. As a result, stock prices rise. That gives company’s capital to invest and hire more employees. As more jobs are created, incomes rise. Consumers have more money to buy additional products and services. Purchases drive higher economic growth. For this reason, all countries want positive economic growth. This makes economic growth the most watched economic indicator. Gross domestic production (GDP) is the best way to measure economic growth. It takes income account the



country's entire economic output. It includes all goods and services produced by individuals, businesses, and governments in the country for sale. It doesn't matter whether they are sold domestically or overseas. Also, increase in capital stock, advances in technology and improvement in the quality and level of literacy are considered to be the principal causes of economic growth (Cheong & Tongzon (2018). Economic growth can be either positive or negative quantitative increase in gross national product. Negative growth can be referred to by saying that the economy is shrinking. Negative growth is associated with economic recession and economic depression (King & Levine, 1993).

For a proper conceptualization on the study, this research work has reviewed two theories in order to establish the effect of airport aeronautic infrastructure on economic growth in Nigeria using time series data during the period 1986-2020. Systems theory was propounded and introduced by a biologist, Bertalanffy in the 1930s as modeling device that accommodates the interrelationships and overlap between separate disciplines. The reality is that there can never be separate disciplines no matter how scientists and philosophers have tried to explain how things worked in the universe. The work of Bertalanffy (1973) recognized the need of any organization to interact with its external environment, unlike what was proposed by classical school theorists like Max Weber, F. Taylor and Fayol who viewed organization as closed system. To him, for a survival of an organization like the way living organism survives, should operate in open system and not closed system. This is what made his work to make system concepts become recognized world-wide as approach to be adapted by organization for their efficiency and effectiveness in the dynamic and changing environments. He was against reductionism, arguing that, real system is open and do interact with external environment, where he emphasized on holism while solving organization problems.

Katz and Kahn (1978) apply the concept of open system to the organization. The organization is seen as a system built by energetic input-output where the energy coming from the output reactivates the system. Social organizations are then open systems due to their material exchanges with the environment. Emery and Trist (1960) instead, address organizations as socio-technical systems, underlining the two main components of the firm seen as a system: a social component (people), and a technical component (technology and machines). Therefore, open system changed the way of thinking about organizational management from mechanical view to social view of the organization. It looks at management as an open-ended process. It emphasized detachment, objectivity and control Emery *et al.* (2015).

According to the viable systems approach, Polese *et al.* (2018) posit that, an organization has to be able to preserve its viability and stability, creating its own internal environment that is able to respond effectively to external stimuli at all levels. Organizations are considered viable systems if they are able to survive in a particular context due to continual dynamic processes and several kinds of internal changes (adaptation). Organizational management systems have to continually align with each other. As an organization grows, it develops more and more complex subsystems that must coordinate with each other in the process of transforming inputs to outputs (Mc Shane and Von, 2003). These interdependencies can easily become so complex that a minor event in one subsystem may amplify into serious unintended consequences elsewhere in the organization.

Every organization does not exist in a vacuum. It is rather known to depend on its external environment - which is a part of a larger system, such as the industry to which it belongs, the economic system and the society (Polese *et al.*, 2018). According to them, the organization receives inputs, transforms them and exports the outputs to the environment.



One of the primary criticisms of the Systems Theory is that it can be too broad in its focus. If everything is interconnected, the question of knowing what to study becomes a problem; what to focus on when trying to understand communication interactions becomes a problem; this can prove challenging considering the dynamic and changing nature of systems, particularly human systems built on changing relationships. It can be difficult to answer why things happen when the approach is used, making it problematic for generating further theories of human communication. Finally, because it is a relatively new approach for understanding communication, the paradigm has yet to produce a definitive body of research. Studies from this perspective tend to take significant time and money to accomplish (Mc Shane and Von, 2003).

Endogenous growth theory is ascribed to works of Romer (1990). It is an economic theory which postulates that economic growth is generated from a closed system as a result of internal processes. More importantly, the theory stressed that the enhancement of a Nation's human capital facilitates economic growth by way of the development of new forms of technology and efficient and effective means of production. The advocates of Endogenous economic growth theory believe that improvements in productivity are rooted directly on faster innovation and more investments in human capital. According to these economists, government and the private sector institutions should nurture innovation initiatives and offer incentives for individuals and businesses to be more creative, in the area of research and development (R & D) funding and intellectual property rights (Liberto, 2019).

The A K model, which becomes the simplest endogenous growth model, gives a constant-savings rate of endogenous growth and assumes a constant saving rate. It models technical progress with a single parameter (usually A). It uses the assumption that the production function does not exhibit diminishing returns to scales which will lead to endogenous growth. A lot of convincing rationales for these assumptions have been given, such as positive spillover effect from capital investment to the economy as a whole or improvements in technology leading to further improvements. However, the endogenous growth theory is further supported with models in which agents optimally determined the consumption and saving, optimizing the resources allocation to research and development leading to technical progress. The theory has been criticized on the ground that; technical progress is not only the determinant factor of quality product but also market conditions. It also fails to recognize the potential effect of external factors and competitors. More so, the assumption of fixed labour is not realistic (Acemoglu and Restrepo, 2018).

Abu and Abdullahi (2010) used data covering 1977 to 2007 based on secondary data, to establish the relationship between airport infrastructure and economic growth in Nigeria using Multivariate model to analyze the result. The dependent variable was GDP which represent Economic growth while independent variables proxy by airport Building, Rent and Electricity and Revenue from excursion (airport non-aeronautic infrastructure). The findings revealed that airport infrastructure economic growth nexus in Nigeria- is positively and significantly related to each other. The study concluded that airport non-aeronautic infrastructure has a positive and a significant impact on economic growth during the period under review.

Zhang and Graham (2020) carried out a study to examine the effect and causal relationship between air transport and economic growth in some developed and underdeveloped countries of the world. The study employed Error correction and Granger Causality models for the analysis. Time series data were collected for the period of 20 years to establish the impact of air transport on economic growth and to know the direction of the



causality between the dependent variable (economic growth) and independent variables (airport infrastructure). The findings from the analysis revealed a mixed result. It was found out that in the developed countries, air transport impacted positively and significantly on economic growth while the case in the underdeveloped nations is different; air transport impacted insignificantly and negatively on economic growth. The result of the Granger causality shows that, air transport Granger caused economic growth in the developed countries while reverse was the case in the underdeveloped countries. The justification for the mixed result was because of higher per capita income in the developed countries compared to the underdeveloped nations.

Pravakar *et al.* (2010), investigated the role of airport infrastructure in promoting economic growth in China for the period of 1975 to 2007 using GMM (Generalized Methods of Moment) and ARDL (Autoregressive distributed lag model) techniques. The data was time series from secondary sources. The result reveals that airport infrastructure has played an important role in economic growth in China. They concluded that, airport infrastructure has positive and significant impact on economic growth in Nigeria.

Tolcha (2019), carried out study to establish the impact of air transport demand on economic growth in Ethiopia using Cointegration and Granger causality model to analyze the data during the period 2000-2015. The study used airport aeronautic and airport non- aeronautic infrastructure as the independent variables and Gross Domestic Product, proxy for economic growth as the dependent variable. The study was intended to examine the long run relationship between the dependent and independent variables and to establish the direction of causality between the variables. The result of the co-integration analysis shows a long run relationship between airport infrastructure and economic growth. The causality test shows that there exists a unidirectional relationship between the dependent and independent variables with economic growth causing airport infrastructure during the period under review. It was concluded that economic growth has a positive and significant impact on air transport demand.

Abate *et al.* (2020) carried out a study during the period of Covid 19 to examine the impact of Government intervention on aviation sector towards economic growth. They researched to find out whether the involvement of Government on aviation sector through bailout funds will cushion the negative impact occasioned by the pandemic on the sector toward economic growth. Granger causality Model was employed to analyze the data. The study used time series data collected during the period of Covid 19. The independent variable was government bailout funds on aviation sector while economic growth as the dependent variable. The result of the study shows that, there is a causal relationship between the spending of government on aviation sector and economic growth during the period under review. According to their findings, government intervention on the aviation sector Granger caused economic growth. The study concluded that government bailout funds to the aviation sector have a positive and significant impact on economic growth.

Siyan *et al.* (2015) used both primary and secondary data to examine the impact of air transportation on economic growth in Nigeria. Probit model was used to analyze the primary data while multivariate model was used for analyzing the secondary data to determine the long run relationship between economic growth and air transportation. Their results show that air transport sector has a positive and significant impact on economic growth in Nigeria during the period under review.

Tsiotas and Polyzos (2019), studied the effect of air transport infrastructure on economic growth in Greece using Multivariate regression model. Time series data were collected during the period 1995- 2015. The study was carried to know whether airport



infrastructure has contributed significantly in urban areas in the country towards economic growth. The findings revealed that airport infrastructural investment has a major importance which influenced urban growth and has significantly impacted positively on the growth of the economy during the period under review. Moreso, investment in air transport infrastructure has a significant impact on the general economic activity of the state. Hence, it was concluded that investment in air transport should be key infrastructural consideration.

Stichhauerova and Pelloneova (2019) carried out study to establish the effect of airport infrastructure with low-cost carrier on economic growth in Iran using primary data. The study employed Multinomial Logit model to regress the data. The independent variables were Ticket fare (TF), Food and beverages (FB), Ground Services (GS) and Frequent Flyer Program (FFP) as proxies for airport non aeronautic infrastructure while the dependent variable is Gross Domestic Product as proxy for economic growth. The findings of the study reveal that airport infrastructure with these accessible services significantly and positively impacted economic growth. The study concluded that there is strong relationship between airport non-aeronautic infrastructure and economic growth; there exist a bidirectional causal relationship between the independent and dependent variables.

MATERIALS AND METHODS

Research Design

The study adopts ex-post facto research design to investigate the effect of airport aeronautic infrastructure on economic growth in Nigeria during the 1986-2020. The ex-post facto research is a kind of research in which the researcher predicts the possible causes behind an effect that has already occurred. It is an interesting point to note that, the researcher predicts a cause on the basis of a controlled effect (since no variation can be done on the effect which has already taken place on the basis of the independent variable or the cause). It should, however, be pointed out that the most serious danger of ex-post facto research is the conclusion that because two factors go together, one is the cause and the other is the effect.

Model for the Study

The study adopts a form of Neoclassical Cobb Douglas Production function as its model. The Cobb-Douglas (CD) production function is an economic production function with two or more variables (inputs) that describes the output of a firm. Typical inputs include labor (L) and capital (K). It is similarly used to describe utility maximization problem. The natural and functional form of the Cobb Douglas production function is:

$$Y = f(L,K) \quad Y=AL^\beta K^\alpha \quad \dots(1)$$

where;

Y is the output; L is the labor and K is the capital; A is the total factor productivity and is otherwise a constant. Alpha (α) represents the output elasticity of labor, beta (β) represents the output elasticity of capital, and ($\alpha + \beta = 1$) represents the constant returns to scale (CRS).

The Cobb Douglas production function can be converted to a linear model by taking the logarithm of both sides of the equation thus:

$$Y = f(L,K) \quad Y=AL^\beta K^\alpha \quad \dots(2)$$

$$\text{Log}(Y) = \log(A) + \alpha \log(L) + \beta \log(K) \quad \dots(3)$$

Thus, following the literature and the modeling approach above with a modification on the variables of interest in this study, the study adopts the model by Pravakar *et al.* (2010). The model of the study is specified in a functional form as:

$$\text{GDP} = f(\text{REI}, \text{TGI}) \quad \dots(4)$$



Taking the natural logarithm of both sides of this model produces a linear equation of the form:

Log GDP = f (Log REI, Log TGI) ... (5)

The stochastic form of the model which will explore a linear relationship between Economic growth and airport infrastructure are stated thus:

GDP = beta_0 + beta_1 REI + beta_2 TGI + U ... (6)

The study empirical model with natural logarithm is giving as follows:

Log GDP = beta_0 + beta_1 Log REI + beta_2 Log TGI + U ... (7)

where;

beta_1, beta_2 = Slope coefficients which show the rate of change in the value of GDP, when there is a unit change in the value of independent variables.

beta_0 = Intercept coefficient which shows the rate at which GDP will change independent of REI and TGI.

'U' = Error term which shows other external factors that might affect the magnitude of GDP that are not stated in the model.

GDP = Economic Growth (Annual Growth Rate of Export).

REI = Airport Rent and Electricity infrastructure (REI).

TGI = Airport Tollgate infrastructure (TGI).

The a priori expectations of this study are stated in a mathematical form as follows: beta_1 and beta_2 > 0. This implies that, there is a positive relationship between economic growth in Nigeria and the airport non-aeronautic infrastructure during the period of study

Method of Data Analysis

The data analysis was carried out using Unit root test and the Cointegration test before the regression in this study in order to establish the effect of airport non-aeronautic infrastructure on economic growth in Nigeria. Thus:

Augmented Dickey-Fuller (ADF) Test: Before any meaningful regression is performed with time series data, it is essential to test the existence of unit roots in the variables and hence establish their order of integration. The variables used in the analysis need to be stationary and/or should be cointegrated in order to infer a meaningful relationship from the regression. The test results of the Augmented Dickey-Fuller statistic for the time series variables used in the estimation are presented in the Table 1.

Table 1: Results of Unit Root Test (ADF)

Table with 6 columns: Variables, First Difference, Critical Values (1%, 5%, 10%), Prob., and Order of integration. Rows include LGDP, LREI, and LTGI.

Note: these critical values are computed from Mackinnon (1996). If Z (t)* >= ADF (t-statistic), it implies that unit root exists. If Z (t)* <= ADF (t- statistic), it implies that unit root does not exist.

Source: Author's computation, 2021 using E-views 10 plus



From the unit root test of the variables shown on table above, it revealed that all the values of the ADF test statistics are negative. This is because the ADF statistics of Gross Domestic Product (GDP), Rent and Electricity Infrastructure (REI) and Tollgate Infrastructure are -6.53, -4.890 and -6.813 which are greater than their critical values at 1%, 5% and 10%, implying that the variables are stationary at 1%, 5% and 10%. They are also integrated (at first difference) of order 1, i.e., I(1).

Johansen Cointegration Test: Since all the variables were found to be integrated of order 1, that is I(1) and stationary at 1%, 5% and 10%, the Johansen hypothesized Cointegration test is carried out to determine the number of stationary long-run relationships among the variables included in the study. It offers one test, the Trace test with a view to identify the number of cointegrating relationships. The result is presented in Table 2. From Table 2, it revealed that there is co-integration among the variables. That is because the Trace statistic of 33.73 is greater than the critical value of 29.79 at 5% level of significance. We reject the null hypothesis of none* of the hypothesized number of co-integrating equation(s). Accordingly, Trace statistics test indicates 1 co-integrating equations at 5 percent level of significance. For the remaining number of hypothesized co-integrating equations (at most 1 and 2), we do not reject the null hypothesized as their Trace statistics values are less than the critical values at 5% level of significance.

Table 2: Result of the Unrestricted Co-Integration Rate Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.464797	33.73822	29.79707	0.0167
At most 1	0.296555	13.10962	15.49471	0.1108
At most 2	0.044477	1.501379	3.841466	0.2205

Note: Trace test indicates 1 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values.

Regression Analysis and Results

Following the regression results presented on Table 3 above, it was found out that the coefficient of airport Rent and Electricity infrastructure (REI) is positive (1.182061), indicating positive relationship between rent and electricity infrastructure (REI) and gross domestic product (GDP) and this is in line with the a priori expectation. This means that a one percent increase in Rent and Electricity infrastructure will lead to 1.18 percent increase in gross domestic product. Therefore, there is a strong positive relationship between Rent and Electricity infrastructure (REI) and Gross Domestic Product (GDP) in Nigeria. Morso, the probability value (0.0125) is less than 5% (0.05) level of significance which means the variable is significant; hence, the null hypothesis (Ho) of no significance effect of Rent and Electricity infrastructure on Gross Domestic Product is rejected. The finding implies that there is a strong positive and significant impact of Rent and Electricity infrastructure on economic growth in Nigeria during the period of study. It can be concluded that Rent and Electricity infrastructure of the airport is a determinant of gross domestic product (economic growth) in Nigeria.

The result on Table 3 above revealed that Rent and Electricity infrastructure (REI) has a positive and a significant impact on Gross domestic product (GDP) in Nigeria during the



period 1986-2020. This result is in agreement with the study carried by Abu and Abdullahi (2010), which the study concluded that airport non-aeronautic infrastructure has a positive and a significant impact on economic growth during the period under review. These findings mean that Gross domestic product (economic growth) rises as the revenue generated from Rent and Electricity of the airport non-aeronautic rises and this signifies that Rent and Electricity infrastructure has contributed immensely to the growth of the Nigeria economy. Any amount expended on Rent and Electricity infrastructure will enhance the economic growth in Nigeria. This suggests that Rent and Electricity infrastructure is a good determinant of economic growth in Nigeria.

The coefficient of Tollgate infrastructure (TGI) is positive (0.734178), implying positive relationship between airport Tollgate infrastructure and gross domestic product in Nigeria. This finding is in agreement with a priori expectation. Also, airport Tollgate infrastructure was found to be significant as its p-value (0.0481) is less than 5% (0.05) level of significance. Thus, there is a positive and significant effect of Tollgate infrastructure on Gross domestic product; hence, the null hypothesis (H_0) of no significant effect of Tollgate infrastructure on economic growth is rejected. It can be concluded that airport Tollgate infrastructure is a good determinant of gross domestic product (economic growth) in Nigeria during the period of study.

It is obvious from the coefficient of multiple determinations (R^2) that the model has good fit as the independent variables (REI and TGI) were found jointly explain 0.96% of the movement in the dependent variable with R^2 - adjusted of 0.95%. The F-statistic was significant at 14.0911% which explains the overall significance of all the variables incorporated in the model as indicated by both R^2 and R^2 – adjusted. The value of Durbin –Watson (2.335655) indicates absence of spurious results and no presence of autocorrelation in the time series data.

Also, the coefficient of Tollgate infrastructure (TGI) has a positive and significant effect on Gross Domestic Product (GDP) in Nigeria during the period 1986-2020. This finding posits that, there is a positive and significant relationship between airport Tollgate infrastructure and Gross domestic product (economic growth) in Nigeria. The finding of the study is in agreement with the study carried out by Stichhauerova and Pelloneova (2019), which established the effect of airport non-aeronautic infrastructure on economic growth in Nigeria and concluded that there is a strong relationship between airport non-aeronautic infrastructure and economic growth in Nigeria. This finding implies that as Tollgate infrastructure revenue increases, gross domestic product rises, though not proportionate. It is expedient to say here that, investment on Tollgate infrastructure would contribute significantly to the growth of Nigeria economic, hence, it can be concluded that Tollgate infrastructure is a determinant of economic growth in Nigeria.



Table 3: Present the regression results of the model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.184867	0.417683	-0.442600	0.6613
LREI	1.182061	0.443827	2.663337	0.0125
LTGI	0.734178	0.352130	2.084963	0.0481
Mean dependent				
R-squared	0.960244	var	3.981295	
Adjusted R-squared	0.953390	S.D. dependent var	0.956781	
Akaike info				
S.E. of regression	0.206563	criterion	-0.161618	
Sum squared resid	1.237380	Schwarz criterion	0.105013	
Log likelihood	8.828311	Hannan-Quinn criter.	-0.069577	
F-statistics	14.0911	Durbin-Watson stat	2.335655	
Prob (F-statistics)	0.000000			

Source: Author’s computation, 2021 using E-views 10 plus

Test of Hypotheses

Ho1: The result coefficient of Rent and Electricity infrastructure is positive (1.18) and statistically significant. Therefore, the null (Ho1) hypothesis is rejected and hence the alternative hypothesis accepted that Airport Rent and Electricity infrastructure has significant effect on economic growth in Nigeria. It can therefore be inferred from this research finding and from the various studies cited in the literature that Rent and Electricity infrastructure has great effect on economic growth in Nigeria.

Ho2: The result coefficient of Tollgate infrastructure is positive (0.73) and statistically significant. Therefore, the null (Ho2) hypothesis is rejected and hence the alternative hypothesis that Airport Tollgate infrastructure has significant effect on economic growth in Nigeria. It can therefore be inferred from this research finding and from the various studies cited in the literature that Rent and Electricity infrastructure has great effect on economic growth in Nigeria.

CONCLUSION AND RECOMMENDATIONS

From the analysis of the results, it can be seen that airport Rent and Electricity (REI) and Tollgate infrastructure (TGI) were found to be significant and positively related to economic growth in Nigerian. Therefore, it can be generally concluded that, airport non aeronautic infrastructure is positively and significantly related to economic growth in Nigeria during the period of study. Also, the null (Ho1) and (Ho2) hypothesis was rejected and the alternative accepted that airport non-aeronautic infrastructure has positive and statistically significant on economic growth in Nigeria. Thus, this therefore, means that stakeholders should put more impetus towards galvanizing resource, technological innovation and human resource in order to accelerate the gains in airport non aeronautic infrastructure for a robust economy. Having established and discussed the findings of this study, the following recommendations were made:

1. Nigeria government and other stakeholders in the aviation industry should ensure to remodel the Rent and Electricity infrastructure to meet Global standard. This could be that the rentals facilities be giving befitting look that will attract user of the infrastructure. The electricity architecture should be modernized in such a way that billing on its usage, be electronically. Computerized gadget should be positioned to check-mate unnecessary



evasion from paying these bills or bridge any leakage from the revenue due on buildings of the airport. This would enhance revenue generation and contribute immensely to economic growth in Nigeria.

2. Government should ensure that Tollgate infrastructure should be structured to reflect Global standard. The old way of using manual barricade to control movement in and out of the airport is replaced with modern gadget. Computerized machine should be installed to monitor the frequency of vehicular movement and to ascertain the categories of vehicle for proper assessment, billing and collection of the access gate fee. By this method of checks at the airport Tollgate infrastructure, leakages would be curtailed or reduced to the barest minimum. With more revenue realization at the Tollgate infrastructure, this would affect economic growth positively in Nigeria.

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