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INCLUSIVE GROWTH IN SUB-SAHARAN AFRICA: THE IMPLICATION OF TRANSPORT INFRASTRUCTURE

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ABSTRACT

This study analyses the implication of transport infrastructure on inclusive growth in Sub-Saharan African countries.Transport infrastructure was measured by transport services, electricity generated and telephone usage. The study analyses a panel data of six low middle income West African countries for the period 1980 to 2018 based on a dynamic panel Generalized Methods of Moments (GMM) technique. It was found that transports services, electricity generated and telephone usage have a significant positive effect on inclusive growth but their contribution to inclusive growth is low in the region. The study submitted that transport infrastructure contribute positively to inclusive growth in Sub Saharan Africa. The need to diversify the transport system by developing other modes of transport to provide a wide range of options for the entire citizen in terms of costs, conformability, speed and reliability in the demand for transport services was recommended.

Keywords: Inclusive Growth, Transport Infrastructure, Transport Services; Electricity, Telephone Usage.

INTRODUCTION

Before the conceptualization of inclusive growth by Nanak and Ernesto in 2000, the concept of pro-poor growth, synonymous with inclusive growth, emerged in the 1950s. Pro-poor growth denotes a form of economic expansion that actively involves the poor and ensures they significantly benefit from growth. This is in contrast to the conventional "trickle-down" growth approach, where benefits flow primarily from the rich to the poor (Nanak and Ernesto, 2000). This conventional model exacerbated inequality, contributing to increased poverty and unemployment in developing nations.

The concept of inclusive growth has gained prominence due to its potential to counteract inequality and enhance social and political stability worldwide. It aims to alleviate poverty through income and non-income avenues, employing redistribution policies (Simone, Marleen, Frank & Loes, 2019). Inclusive growth ensures that everyone participates in the benefits of growth, covering productive inclusion, employment generation, territorial development, and systemic competitiveness (Anyanwu, 2013).

Infrastructure plays a pivotal role in social wellbeing, affecting education, health, and income (Obokoh & Goldman, 2016). It directly interfaces with the economy, influencing production processes, organizational output, income, profits, and employment (Obokoh & Goldman, 2016). Transport infrastructure, a key subset, accelerates access to services and markets, reduces wealth gaps, enhances social welfare, and lowers business costs (Farhadi, 2019). Well-developed transport infrastructure amplifies productivity across sectors and reduces production expenses (Siyan, Eremionkhale & Makwe, 2015). It brings economies of scale through market expansion, sparks private sector investments, and stimulates job creation in underserved regions (Kumo, 2012).

In Sub-Saharan Africa, despite periods of negative growth, positive performance has been observed since 1961. However, growth has been inequitable, failing to ensure widespread access to opportunities and protect the vulnerable (Claudia, 2017). Population growth often surpasses transportation infrastructure expansion, leading to inefficient services (Asafo-Adjei, Iyer-Raniga & Aranda-Mena, 2013). Rapid urbanization, inadequate planning, and insufficient transportation infrastructure characterize many African cities (Sietchiping, Permezel & Claude, 2012).

Though numerous studies link transport infrastructure with growth, many are country-specific and lack generalizability (Siyan, Eremionkhale & Makwe, 2015; Kumo, 2012; Obokoh & Goldman, 2016; Asafo-Adjei, Iyer-Raniga & Aranda-Mena, 2013). Most focus solely on economic growth without considering the dimensions of inclusive growth affected by transport infrastructure. This study bridges this gapby exploring the implication of transport infrastructure on inclusive growth in Sub-Saharan Africa. The specific objectives of the study are to:

a. assess the effect of transport services on in inclusive growth;
b. analyse the effect of electricity generated on in inclusive growth;
c. determine the effect of telephone usageon in inclusive growth;

This research intends to contribute to existing literature by informing policy decisions, expanding transportation services, and ensuring equitable access to infrastructure. The study is structured into four sections: background context (section one), theoretical foundation (section two), data sources and methodology (section three), and empirical findings and conclusions (section four).

LITERATURE REVIEW

The concept of infrastructure lacks a universally accepted definition in the literature, yet it is widely recognized as a foundational element of both culture and economy. The World Bank (1994) defines infrastructure as "social overheads capital," encompassing public goods such as electricity, water supply, telecommunications, sanitation, sewage systems, solid waste management, gas distribution, as well as transportation networks like roads, dams, railways, ports, and airports. Jacobson and Tarr (1995) characterize infrastructure as the framework linking modern cities and metropolitan areas, facilitating economic and social activities. Infrastructure entails the essential physical and organizational structures needed for societal functioning, firm operations, and overall economic functionality, often involving government and private sector investments that promote economic activities (Soneta, Bhutto, Butt, Mahar & Sheikh, 2012).

Transportation, a vital service, enables the movement of people and goods, significantly contributing to economic vitality and quality of life (Adeniran & Ben, 2017). Modes such as roads, railways, airways, waterways, canals, pipelines, and associated facilities like airports, railway stations, bus terminals, warehouses, and seaports constitute transportation infrastructure (Oni & Okanlawon, 2005). This encompasses the fundamental structures and component parts that underpin transportation systems, including rail tracks, road networks, airports, and seaports.

Historically, the concept of economic progress was rooted in national self-sufficiency, primarily aimed at state development and territorial defense, a concept aligned with the Mercantilism doctrine. In this framework, nations accumulated precious metals, notably Gold and Silver, through trade and agriculture, forming the basis of wealth to sustain military power and secure territorial integrity. This doctrine centered on stockpiling precious metals and a robust military system as measures of national growth. However, this approach was limited by its neglect of other nations' interests and led to the evolution of inclusive economic growth.

Inclusive economic growth denotes a quantifiable increase in output per capita accompanied by labor force expansion, consumption, capital accumulation, trade volume growth, and welfare enhancement (Jhingan, 2006). It signifies not just economic growth but also broader changes in the national economy, encompassing social, qualitative, and quantitative aspects (Haller, 2012). Recognizing the shortcomings of this model, which failed to improve citizens' well-being, the notion of inclusive growth emerged, aiming for pro-poor growth that actively involves the poor in the growth process and ensures they benefit (Kakwani & Pernia, 2000). This term is synonymous with "broad-based growth," "shared growth," and "pro-poor growth," aiming to prevent exclusion based on socioeconomic status, ethnicity, gender, disability, or religion (Ianchovichina & Lundstrom, 2009).

Various metrics gauge inclusive growth. Ali and Son (2007) propose a social welfare function tied to improved social opportunity, Klasen (2010) introduces income and non-income well-being indicators such as education, health, nutrition, and social integration, while Suryanarayana (2013) defines inclusion as elevating the proportion of those in the bottom half of the population above a defined threshold. Kolawole (2014) measures inclusive growth through GDP per capita based on Purchasing Power Parity (PPP), indicating participatory GDP growth with equitable distribution of benefits across all economic strata.

The literature has debated how transportation infrastructure affects development, with several theories proposed to calibrate the relationship between the two variables. Frischmann's infrastructure and commons management theory, as well as balanced and unbalanced growth theory, shed light on the relation. According to Frischmann's (2005) theory, giving the general public open access to infrastructure such as the road network would result in economic recovery and social change. The theory's bane is value development, and it was theorized that allowing the general public access to road networks would benefit the public and have a huge positive effect on society. As a result, giving everyone open access to transportation facilities will have a huge effect on economic growth by raising people's living standards and resulting in social change (Agbigbe, 2016).

Nurske (1961) and Hirshman (1958) introduce the notions of balanced and unbalanced development, respectively. Nurske's (1961) balanced growth theory posits that achieving growth necessitates simultaneous investments across all economic sectors, ensuring comprehensive infrastructure expansion that encompasses both social overhead and direct productive activities within various sectors. Contrarily, Hirshman's (1958) theory advocates for unbalanced economic growth through strategic sector-specific investments, setting the stage for future development. The theory particularly emphasizes substantial investments in social overhead capital (SOC), with the expectation that such investments will stimulate private investment in direct productive activities (DPA). Notably, infrastructure falls under the category of social overhead capital, playing a crucial role as the foundation for productive activities (Amadi and Amadi, 2013)

Previous research has extensively explored the influence of both aggregate and disaggregated components of transportation infrastructure on development. The existing body of literature presents a varied range of findings regarding the impact of disaggregated transportation networks on economic growth. Canning and Pedroni (2008), analyzing a panel of countries spanning from 1950 to 1992, revealed diverse effects of various infrastructure types on growth across nations. Their study found that while infrastructure has limited impact on long-term economic growth, the direction and significance of effects can differ due to uncertain heterogeneous short-run causal relationships. This approach robustly identified the sign and direction of long-term impacts. Moreover, the study demonstrated that globally, each type of infrastructure is typically provided at levels close to optimizing growth, yet there exist cases of under- and over-supply across countries.

Siyan, Eremionkhale, and Makwe (2015) employed the Probit model and multivariate analysis on primary and secondary data to determine a positive influence of the transportation sector on growth in Nigeria. Likewise, Kumo (2012) employed pair-wise Granger causality tests on South Africa's economic development, infrastructure investment, and job creation for the period 1960-2009. The study established bidirectional causality between economic infrastructure investment and GDP growth, along with a two-way causal relationship between economic infrastructure investment and public sector employment. It also identified a unidirectional effect from economic growth to public sector employment, and from private sector employment to economic growth. Bounds test results confirmed a steady-state long-run equilibrium relationship among the variables.

A similar mixture of outcomes is evident in research pertaining to aggregated transportation infrastructure and its influence on economic development. Obokoh and Goldman (2016) adopted a longitudinal approach involving semi-structured interviews with 500 SMEs in Nigeria during 2007 and 2011. Their findings indicated a negative impact of infrastructure deficiency on SMEs' profitability and efficiency. Additionally, a lack of significant improvement in electricity production in Nigeria was observed. Similarly, Odongo and Kalu (2016) employed the System GMM estimation methodology on a panel of 45 Sub-Saharan African countries spanning from 2000 to 2011, revealing that increased infrastructure connectivity and capital spending contribute to economic growth and development in the region.

Drawing upon GDP per capita estimates for eight Sub-Saharan African economies since 1885, Stephen (2019) argued that the growth experienced in most of SSA since the mid-1990s has historical precedents, while periods of negative growth have also occurred. Asafo-Adjei, Iyer-Raniga, and Aranda-Mena (2013) uncovered the favorable strategy of utilizing intermediate means of transportation (IMT) on rural roads, provided it is cost-effective and user-friendly. Qualitative research, including expert interviews and focus group discussions conducted across Ghana from 2015 to 2017, highlighted challenges related to accessibility and mobility, such as poor equipment quality, inadequate paths, high acquisition costs, and limited consumer appeal.

Cigu, Agheorghiesei, Gavrilut, and Toader (2019), utilizing panel data techniques, discerned a significant impact of transport infrastructure components on development within EU-28 countries from 2000 to 2014. After controlling for institutional and other factors, path analysis unveiled a unidirectional long-term causal relationship between development, transportation infrastructure, and public sector performance. The state of transportation infrastructure directly affects economic development, and public performance indicators influence the pathway to economic growth. The study revealed negative influences from corruption, regulatory climate, shadow economy size, child mortality, income inequality, inflation, and unemployment on economic development. Conversely, a positive correlation emerged between judicial efficiency, educational attainment, life expectancy, and economic growth.

METHOD

The research uses an ex post factor design, which is driven by the study's objective and the procedures for collecting and analyzing data quantitatively. The research design was chosen because it is useful when the set objective is to investigate the effect of explanatory variable(s) on the dependent variable in which the outcome of the explanatory variable(s) cannot be manipulated because their value is already established. Canning and Pedroni (2008) developed a theoretical framework based on Baro's (1990) model, which was employed in this research. Canning and Pedroni (2008) proposed a simple model in which aggregate production Y is generated at time t using infrastructure capital G, other capital K, and labor L, as follows:

$$Y_t = A_t \, K_t{}^{\alpha} G_t{}^{\beta} L_t{}^{t-\alpha}$$

Where A_t is total factor productivity at time t, A_t technical progress, K_t capital employ, G_t other capital proxy by infrastructure capital, L_t size of the workforce. In the exogenous growth model, technical progress is the driving force behind growth, and long-run infrastructure levels simply match income levels. In the endogenous growth model, however, shocks to infrastructure investment can have long-term effects on income, which can be positive or negative depending on whether it has been set above or below the tax rate that maximizes expected growth, which is maximized when the average share of infrastructure investment is set at the levelthat maximizes expected growth.In general, this is determined by the shock distribution. The average share of infrastructure investment maximizes the growth rate without shocks, as in Barro (1990), by assuming a fixed savings rate such that infrastructure investment represents a diversion from other forms of resources. In practice, setting a sub-optimal level of of the investment lowers the overall rate of return on capital, as well as the savings rate and the rate of growth (Canning and Pedroni, 2008).

Based on this context, this study uses the model established by Canning and Pedroni (2008), in which the dependent variable is GDP per capita (GDP), and the explanatory variables are paved road per capita in kilometres (PAV), electricity generating capacity per capita (EGC) in kilowatts, and number of telephones per capita (TEL). The scope of their research has been extended in this study, and the emphasis has shifted from a panel of OECD and selected developing countries to countries in Sub-Saharan Africa.

The study used countries from Sub-Saharan Africa, which are divided into four regions out of Africa's five: East Africa (8 countries), Central Africa (11 countries), West Africa (14 countries), and Southern Africa (13 countries), except North Africa. As a result, the 46 countries in Sub-Saharan Africa included in this report. Meanwhile, the scope has been narrowed to a group of six (6) low- and middle-income West African countries in the Sub-Saharan African region. Cabo Verde, Côte d'Ivoire, Ghana, Mauritania, Nigeria, and So Tomé and Principe make up this group. Lower middle-income economies were described as those with a GNI per capita of between $1,006 and $3,955 in the 2018 fiscal year, according to the World Bank's list of economies released in June 2019.

The data was gathered from the World Bank Development Index, which was based on internet data, and covered the years 1980 to 2018. The study time frame was chosen because it was necessary to capture the period from 2015 to 2018, when the region's population growth outpaced its productivity growth, posing a serious threat to infrastructure.

Panel data can be modeled in two ways in the literature: static panel models and dynamic panel models. Panel fixed effect and least square dummy variable (LSDV) are the two types of static panel models (Wilfred & Mbonigaba, 2019). The least square dummy variable, according to Rowland and Torres (2004), is an improvement over the fixed and random effects. In this research, however, the dynamic panel method, popularized by Arellano and Bond (1991), is used to improve the performance of the estimators in panel data analysis. The dynamic panel model that describes the relationship between GDP per capita (GDP), transportation services (TRAS) proxy by paved road per capita in kilometres, electricity generating capacity per capita (EGC), and telephones per capital (TEL) in low and middle-income West African SSA countries is as follows:

$$Y_{it} = \alpha_1 + \alpha_1 \mathrm{TRAS}_{it} + \alpha_2 \mathrm{EGC}_{it} + \alpha_3 \mathrm{TEL}_{it} + \mu_{it} \quad (1)$$

We introduced the lag of the dependent variable to the right-hand side in order to construct a dynamic model into the framework for TFP:

$$Y_{it} = \alpha_{1t} + \alpha_2 Y_{it-1} + \alpha_3 \mathrm{TRAS}_{it} + \alpha_4 \mathrm{EGC}_{it} + \alpha_5 \mathrm{TEL}_{it} + \mu_{it} \quad (2)$$

Equation (3) is a modified version of equation (2) in dynamic panel data format, which includes the lagged value of the dependent variable. Taking the first difference as a transformation of equation 3 yields:

$$\Delta Y_{it} = \alpha_{1t} + \alpha_2 \Delta Y_{it-1} + \alpha_3 \Delta \mathrm{TRAS}_{it} + \alpha_4 \Delta \mathrm{EGC}_{it} + \alpha_5 \Delta \mathrm{TEL}_{it} + \mu_{it} \quad (3)$$

GMM is a widely used approach for estimating dynamic panel models. It accounts for the endogeneity problem by using the lagged value of the dependent variable, which allows for input from previous or current shocks to the dependent variable's current value. The temporal autocorrelation in the residuals is removed using a dynamic model, which prevents a spurious regression from being performed, which could result in conflicting estimators (Wilfred & Mbonigaba, 2019). The dynamic panel mode of Arellano and Bond (1991) is used in this study based on these desirable panel properties, and the model is calculated using the Generalised Method of Moments (GMM).

RESULT AND DISCUSSION

If unit roots are not considered when choosing an estimation technique for a model, the results of an econometric analysis, as well as the actual inference and policy recommendations, may be invalidated. Unit root of the variables is tested using a Levin, Lin, and Chu (LLC) and Im, Pesaran, and Shin (IPS) at individual intercept, as used in previous studies.

Table 1.1: Panel Unit Root Results

	Levin, Lin and Chu			Im, Pesaran and Shin		
Variables	**P-value**		**Order**	**P-value**		**Order**
	Level	**1st Diff**		Level	1st Diff	
GDP	1.0000	0.0000	I(1)	0.9902	0.0000	I(1)
TRAS	0.0154	0.0000	I(0)	0.6441	0.0000	I(1)
EGC	0.3479	0.0000	I(1)	0.3515	0.0000	I(1)
TEL	0.7685	0.0000	I(1)	0.6222	0.0000	I(1)

Source: Author, 2019

The results in Table 1.1 established that all the variables are not stationary at level I (0) apart from transport services. However, all the variables were found to be stationary after first differencing since all the P-values are shown at 1% level of significance in the Table 1.1

The descriptive statistics based on pooled observations of panel data set is presented in Table 2 for all the variables used in the study.

Table 1.2. Summary Descriptive Statistics

	GDP	TRAS	EGC	TEL
Mean	1054.882	35.25033	2878.936	270887.4
Median	1177.484	29.06676	23.66892	214089.0
Maximum	2563.092	93.35171	65069.00	1687972.
Minimum	2.585270	2.878937	1.989004	971.5651
Std. Dev.	672.6346	21.52481	9919.105	346657.0
Skewness	-0.050102	0.841325	5.001522	2.291456
Kurtosis	2.501784	2.845883	28.28744	8.446943
Jarque-Bera	1.097603	12.13402	3142.941	215.3572
Probability	0.577642	0.002318	0.000000	0.000000
Sum	107597.9	3595.534	293651.5	27630519
Sum Sq. Dev.	45696173	46795.07	9.94E+09	1.21E+13
Observations	102	102	102	102

Source: Author, 2019

The average value and the standard deviation of all the variables in Table 2 tend towards the maximum rather than the minimum which indicate that their values are generally high. The standard deviations of most of the variables exhibit relatively high values, which show deviation of high amount of the actual data is obtained from their mean values. Specifically, in the case of GDP per capita which is the dependent variable, its maximum value is 2563.092 whereas the minimum is as low as 2.585270 with a mean of 1054.882 which is closer to the maximum rather than the minimum. The claim is strongly confirmed by the standard deviation since it is far away from the mean. This result corroborates the claim that that there instability in the growth rate of most of the countries in Sub Saharan Africa.

The correlation matrix presents the test result multi-collinearity problem in the estimations indicated by the degree of association among the variables.

Table 1.3. Correlation Matrix Analysis

	GDP	TRAS	EGC	TEL
GDP	1.000000	0.151055	-0.448867	0.668052
TRAS	0.151055	1.000000	-0.170937	0.212820
EGC	-0.448867	-0.170937	1.000000	-0.226171
TEL	0.668052	0.212820	-0.226171	1.000000

Source: Author, 2019

Table 1.3 indicates various forms of association with one another exist among the variables. A positive association was found between TRAS, TEL and GDP while a negative association was established between EGC and GDP, TEL and TRAS as well as between EGC and TEL. Generally, all the variables exhibit weak and moderate associations. There is a weak association between *TRAS*, *EGC* and GDP while that TEL and GDP is moderate. The results appear to be interesting as it indicates that the variables in the model do not suffer multi-collinearity problem.

The results from the dynamic panel data analysis are presented in Table 4.

variables→	Coefficients	t-statistics	P-values
GDP(-1)	1.365772	13.22120	0.0000
TRAS	0.412518	8.121456	0.0000
EGC	0.000575	21.63439	0.0000
TEL	1.21E-05	0.407758	0.6844

Source: Author, 2019

The results presented in Table 4 show that transport services, electricity generated and telephone usage are positively signed. Telephone usage is positively signed in both the static model and the dynamic model. Transport service and electricity generated is negatively signed in the static model but positively signed in GMM model. The additional information of the GMM is the significant and positive relationship flowing from the lag of inclusive growth to its dependent variable, indicating that there is consistent relationship from the past period of inclusive growth to the present.

Transport services, electricity generated, and telephone usage are significant and positively related to inclusive growth. This result is conforms to the a priori expectation and is in line with inclusive growth.

Thefindings on the over-identification test and the test for serial correlation arepresented in Tables 8.In addition, to the presence of autocorrelation ofserial correlation in the dynamic panel data

Table 5: Model Diagnostics

Number of Observations	95
Number of Groups	6
Number of Instruments	4
F-test of Joint Significance	F = 208.5363
Arellano-Bond test for AR(1)	z =--1.853, Pr > z =0.0638
Arellano-Bond test for AR(2)	z =2.345, Pr > z =0.0190
Hansen J-test of Overidentifying Restrictions	Chi^2 (4) = 3.45E-29; prob > chi^2 = 0.0000

Source: Author, 2019

Table 5 shows that there is first-order serial correlation because the null hypothesis of no first-order serial correlation is rejected (z = -1.853; p > 0.0638) at the 5% significance stage, but no second-order serial correlation because the measured z-value is not statistically relevant at the 5% level (i.e. z= 2.345; p 0.0190). The validity of the model specification is supported by these findings. The over-identified constraints based on Hansen J-statistic tests show that the null hypothesis cannot be rejected at any traditional level of significance (Chi2 > 3.45E-29; i.e. p = 0.0000), indicating that the model has accurate instrumentation. At the 5% significance mark, the F-statistic value also indicates that all of the independent variables together and substantially clarify the model.

CONCLUSION

The result on the impact of transportation infrastructure on inclusive development in Sub-Saharan Africa has implications for policymakers' in SSA and in particular the low- and middle-income West African countries. The policy recommendations are focused on the results of a Dynamic panel Generalised Method of Moment GMM estimation methodology, which could help correct discrepancies in the results of previous studies and provide a practical solution to the region's transportation infrastructure challenges. Most of the existing studies on transport infrastructure for inclusive growth do not cover the four years of growth experience in the area (from 2015 to 2018), during which economic growth lagged behind population growth, making their policy conclusions ambiguous to today's SSA transport infrastructure challenges. The result of the panel study found that transportation networks, electricity generated, and telephone usage all have a substantial positive impact on inclusive development in Sub-Saharan Africa's low-middle-income West African countries. Despite the fact that the impact of transportation services, electricity provided, and telephone usage is positive and signifcant, their contribution to inclusive growth is below average, according to the estimated coefficients. According to the report, transportation infrastructure in Sub-Saharan Africa has a significant positive effect on inclusive growth. As a result, the region's transportation system needs to be diversified by introducing other modes of transportation in order to provide a broad range of options for the entire citizenry in terms of cost, conformability, speed, and reliability in their demand for transportation services. This will reduce traffic congestion on the roads, reduce road traffic accidents, promote industry completion, and lower transportation costs, all of which will promote inclusive development. There is also a need to promote and facilitate public-private partnerships in the delivery of transportation services, especially in road construction. Individuals who indicate intention in the construction of road out of their pocket should be encourage by the government to accomplish the task instead of considering such action as political gimmick and discouraging them.

REFERENCES

1. Agbigbe, W.A, (2016) *The Impact of Transportation Infrastructure on Nigeria's Economic Developmeny*, Walden UniversityScholar Works, Walden Dissertations and Doctoral Studies Collection
2. Anyanwu, J.C. (2013), Determining the Correlates of Poverty for Inclusive Growth In Africa Working Paper Series N° *181 African Development Bank*, Tunis, Tunisia.
3. Arvin, M.B.; Pradhan, R.P. &Norman, N.R. (2015) Transportation Intensity, Urbanization, Economic Growth, and CO2 Emissions in the G-20 countries. *Util. Policy*, 35, 50-66. [CrossRef]
4. Asafo-Adjei, C.K, Iyer-Raniga, U. Aranda-Mena, G. (2013) Transport and Accessibility Challenges Facing the Rural People Living Along Feeder Roads in Ghana, *Civil Engineering and Architecture* 6(5): 257-267
5. Asongu, S.A,, Roux, S.L. &Biekpe, N (2017) Environmental degradation, ICT and inclusive development in Sub-Saharan Africa, *Energy Policy, 11, 353–361*
6. Barro, R.J. (1989) Government Spending in a Simple Model of Endogeneous Growth. J. *Political Econ.*, 98, 103-125.
7. Bougheas, S.; &Demetriades, P.O.; (2000) Mamuneas, T.P. Infrastructure, Specialization, and Economic Growth. *Can. J. Econ.*,33, 506–522.
8. *Canning, D.,&Pedroni*, P. (2008) Infrastructure, Long-run Economic Growthand Causality Tests for Cointegrated Panels, *The Manchester School, 76(5), 504–527*

9. Cigu, E., Agheorghiesei, D.T., Gavrilut, A.F & Toader, E. (2019) Transport Infrastructure Development, Public Performance and Long-Run Economic Growth: A Case Study for the EU-28 Countries, *Sustainability*, 11, 67, 1-22
10. Claudia, S (2017) Economic Prospects for Sub-Saharan- Africa and the Role of Urbanisation focus on Economics, *KfW Research*
11. Farhadi, M. (2019) Transport Infrastructure and Long-run Economic Growth in OECD Countries. *Transp. Res. A Policy Pract*., 74, 73-90.
12. Hu, A.;& Liu, S. (2010) Transportation, Economic Growth and Spillover Effects: The Conclusion based on the Spatial Econometric Model. *Front. Econ*. China 2010, 5, 169-186.
13. Kumo, W.L (2012) Infrastructure Investment and Economic Growth in South Africa: A Granger Causality Analysis, *African Development Bank Group*, Working Paper No. 160
14. Lakshmanan, T.R. (2007) The Wider Economic Benefits of Transportation: An Overview; OECD International Transport Forum; Discussion Paper, 08; *Joint Transport Research Centre*, *OECD*: Paris, France, 2007.
15. Mohmand, Y.T.; Wang, A.H. &Saeed, A. (2016) The impact of transportation infrastructure on economic growth: Empirical evidence from pakistan. *Transp. Lett*., 9, 63-69.
16. Nanak, K. & Ernesto, M.P, 2000) What is Pro-poor Growth, Asian Development Review, 18(1), 1-16
17. Obokoh, L.O., &Goldman, G. (2016), 'Infrastructure Deficiency and the Performance of Small and Medium-Sized Enterprises in Nigeria's Liberalised Economy', *Acta Commercii 16(1)*, a339. http://dx.doi.org/10.4102/ac.v16i1.339
18. Odongo, K & Kalu, O (2016) Does Infrastructure Really Explain Economic Growth in Sub-Saharan Africa? *Economic Research Southern Africa (ERSA)*working paper 653
19. Pierre-Richard, A. (2010) A Theory of Infrastructure-led Development, *Journal of Economic Dynamics & Control.*, 34, 932–950
20. Sietchiping, R., Permezel, M.J & Claude, N (2012) Transport and Mobility in Sub-Saharan African cities: An Overview of Practices, Lessons and options for Improvements, *Cities.*, 29, 183–189
21. Simone, R. Marleen, D., Frank, V.K & Loes, O. (2019) Inclusive Development in Africa, *INCLUDE Synthesis report series*
22. Siyan, P., Eremionkhale, R., & Makwe, E. (2015) The Impact of Road Transportation Infrastructure on Economic Growth in Nigeria, *International Journal of Management and Commerce Innovations*, 3(1), 673-680.
23. Stephen, B., (2019) Economic Growth in Sub-Saharan Africa, 1885-2008,*University of Oxford Oxford Economic and Social History Working Papers Number* 169, March 2019
24. Wilfred, A.G and Mbonigaba, J. (2019) Human Capital in the Sub Saharan African Countries: Productivity and the Policy Implications, *AUDOE*, 15(1), 163-189
25. World Bank. (1994) World Development Report (WDR); *Oxford University Press: Oxford, UK, 1994.*