



## RESILIENT INFRASTRUCTURE: IMPACTS OF ROADS ON POPULATION AND ECONOMIC GROWTH IN KADUNA METROPOLIS, KADUNA STATE, NIGERIA

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### ABSTRACT

Road infrastructure is one of the critical infrastructure because it shapes the spatial structure of socio-economic activities and the well-being of the people. This study aims to bring out the correlation of the impact of road infrastructure on population and economic growth in Kaduna metropolis. A qualitative method using a thematic approach was used to collect data and analyze them. 46 participants were interviewed. From the analysis or results, two schools of thought emerged in connection with road infrastructure and population and economic growth. The first school of thought opines that road infrastructure is directly correlated with positive population and economic growth. This group is dominated by government agencies and transport functionaries. The second school of thought dominated by traders and consumers of goods did not see correlation between road infrastructure and economic growth owing to the displacement of small businesses by the roadside and the increase journey to get or purchase goods. However, irrespective of individual and/or collective views, the government of Kaduna State is trying to meet up with the sustainable development goals eight, nine and eleven which are directly connected to decent work and economic growth; industry, innovation and infrastructure and sustainable cities and communities respectively. Thus, more findings reveal many roads either rehabilitated or constructed including underpass and overpass bridges across the metropolis including a four- hectare big shopping mall. It is recommended that government should be cautious when implementing this noble idea so that less injury is/will be inflicted on small-scale business owners and consumers.

**Keywords:** Economic growth, Kaduna metropolis, population, road infrastructure

### INTRODUCTION

The world population has continued to be urbanized, the urbanization rate can simply be described as "rapid". Only 30% of people lived in urban areas in the 1950s, and by 2000s, the population of people living in urban areas had reached 47%. Europe and North America have been urbanized with more than 75% living in urban areas (UN-Habitat, 2009). However, Africa is the fastest urbanizing continent at present. On average, the African urbanization rate was estimated to be 47% in 2020; and in Nigeria, the population of people living in urban areas is about 53% (statista.com, 2023).

Kaduna is one of the most populous urban centers in Nigeria. According to statista.com (2021), Kaduna is the sixth most populous city in Nigeria. With the increased population in the Kaduna metropolis, infrastructure must increase or improved. This is what the Kaduna State Government envisaged. In its urban renewal program, the road infrastructure takes center stage.

Miller (2013), stresses the importance of infrastructure and describes it, as a leading factor for prosperity and economic development across the world. There must be roads, railways, ports, water supply sewerage systems, energy, telecommunications and many more to facilitate economic convergence and divergence (Agyefi-Mensah, 2012).

Myres (2013) posits that, there is a significant correlation between economic growth and infrastructural provisions. That fact makes infrastructural development highly resource and capital-intensive (Agyefi-Mensah, 2012). Additionally, environmental quality, ecological and social impacts of infrastructure cannot be overemphasized. Thus, Fay et al. (2011) posit that investment in infrastructure in a developing country like Nigeria is essential to reduction of poverty. Unsurprisingly, Botric, et al. (2006) see the provision of infrastructure as the most important factor for local and

regional development. This underscores the need for sustainable infrastructural development.

In line with the above, the United Nations Sustainable Development Goals (SDGs) goals eight (decent work and economic growth), nine (industry, innovation and infrastructure) and eleven (sustainable cities and communities) are directly linked to infrastructure and economic growth.

According to Sarte (2010), many different but interconnected phases come together in infrastructural provision. That calls for precautions because decisions made at the initial stage significantly affect the subsequent applications and utilizations of the infrastructure. There are many studies conducted to analyze the impacts of infrastructure on economic growth on one hand, and the impacts of high population growth on infrastructure on the other. Asoka, et al. (2013), divide the impacts into two: that, the provision of infrastructure results in socio-economic development and that, the development potential leads to demand for infrastructure.

Despite the importance of infrastructural development studies in encouraging good governance, little or no such effort was ever made in Kaduna metropolis hence the development of this study.

### Hypothesis

**H<sub>0</sub>:** There is no significant correlation between infrastructure; economic growth and population increase

**H<sub>1</sub>:** There is significant correlation between infrastructure; economic growth and population increase

### Literature Review

#### Theoretical framework

According to Malthus (1798), population increase will outclass the world's ability to produce sufficient food, leading

to the impoverishment of humanity. Developing Malthus's argument, Solow (1956) posits that a country with higher population growth rates will have lower earnings and salaries per worker in the long run. Kremer (1993) on the other hand, disagrees with this view and argues that population growth leads to economic growth. Simply put, more people in the country means more geniuses, scientists and engineers, leading to faster technological progress. This study looked into two facets of the argument for better understanding.

#### ***Empirical literature***

Kodongo and Ojah (2016) used the Generalized Method of Moments (GMM) to estimate economic growth enhanced by infrastructure for 45 Sub-Saharan African countries from 2000 to 2011. The study discovered that infrastructure spending and increases in access to infrastructure had impacts on economic growth in the study area. In their study entitled, mobile telecommunications service and economic growth: evidence from China, Ward and Zheng (2016) found that telecommunications services contributed to economic growth. The study devised a way to determine the influence of telecommunications in terms of growth. The study revealed that mobile services contribute substantially to growth, but that the benefit reduces as the regional economy increases. Additionally, in his contribution entitled, the relationship between road infrastructure investment and economic growth in South Africa, Moeketsi (2017) used the vector autoregressive model and found that the influence of road infrastructure investment, ICT stock, and labor input will continue to have a favorable relationship with economic growth. Saidi et al., (2018) on the other hand, examined the influence of transportation energy consumption and transportation infrastructure on economic development using panel data from MENA nations (the Middle East and North Africa Area) from 2000 to 2016. GMM was the method used and the study found that transportation and energy use contribute considerably to economic growth among the MENA and other nations. In their contribution/study entitled, road infrastructure development and economic growth, Ng et al., (2019) examined the relationship between infrastructural development and economic growth. Using the fixed effects model for analysis, and annual panel data from 1980 to 2010, the results revealed that the growth in road length per thousand population, per capita exports, per capita education expenditure, and physical capital stock per worker contributed positively to economy growth. Finally, Banerjee et al. (2020) examined the influence of access to transportation networks on regional economic

outcomes in China. The study found that proximity to transportation networks has a somewhat large positive causal influence on per capita GDP levels across sectors but has no effect on per capita GDP growth. All these are positive relationships. The negative relationship was however handled by Fedderke et al. (2006) in their study of the relationship between investment in economic infrastructure and long-run economic growth in South Africa. The results revealed that investment in infrastructure does not lead to economic growth in South Africa. There was a weak evidence of payback from investment or expenditure on infrastructure.

## **MATERIALS AND METHODS**

### **Study Area**

Kaduna metropolis is the capital of Kaduna State. It is located between Latitudes 10° 22' 00''N to 10° 40' 00'' N, and Longitudes 7° 20'00''E to 7° 28' 00''E. It is situated at an altitude of 645m above sea level and occupies an area of about 260 km<sup>2</sup> with the distance between the eastern and western limits of the city, approximately 14 km. The metropolis is made up of four Local Government Areas (LGAs) namely: the whole of Kaduna North, the whole of Kaduna South, parts of Igabi and Chikun. (Sati & Muhammed, 2020). Figure 1. In terms of socio-economic activities, there are many commercial, residential, industrial, and institutional establishments. Manufacturing includes: automobile, ironworks, fertilizer, furniture, cable, and many more (Ibrahim, et al., 2018). In terms of agriculture, Kaduna is blessed with rich agricultural lands with crops produce along the Kaduna River, a tributary to River Niger cutting through the metropolis (urban agriculture). However, urbanization and socio-economic activities have greatly changed the land use pattern converting most to industrial, commercial, residential, public and semipublic land uses (Saleh, et al., 2014). Historically, migrating farmers were encouraged to settle in Kaduna during the colonial periods to curb food shortages (Shehu, 2011). This among other factors increased the population of the metropolis. According to statista.com, the population of Kaduna metropolis is close to two million now. Ibrahim et al., (2018), put the population of Kaduna and its environs at 2,004,282 in 2016 using the growth rate 2.47 as recommended in annual growth rate software world for population growth (2003), from the 2006 population census which was 1,570,331. Suleiman, etal. (2019) cited Abaje (2016) that rainfall decrease from 1733mm in Kafanchan to about 1500mm in Kaduna metropolis.

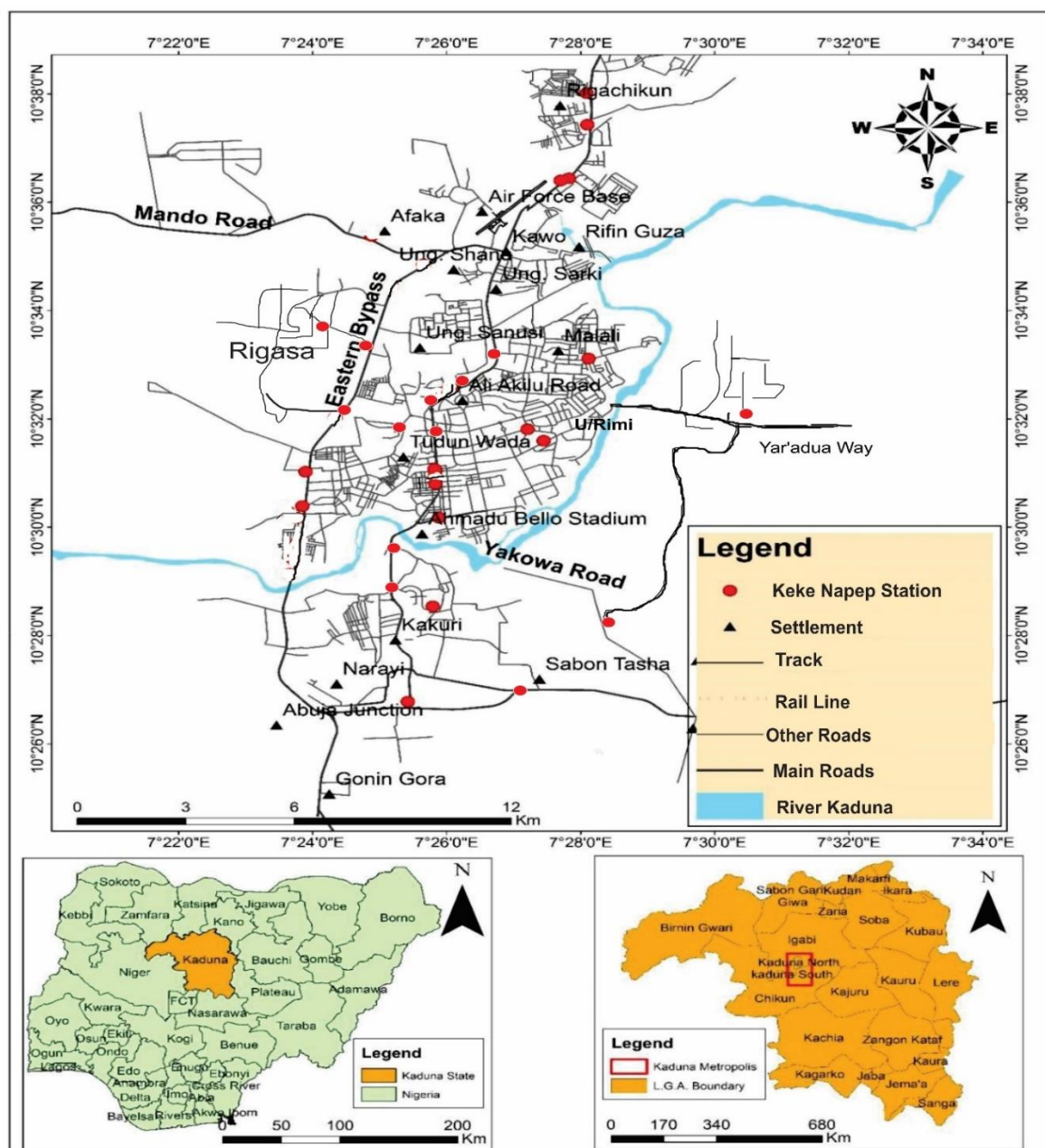


Figure 1: Kaduna Metropolis  
 Souce: Author's work, 2022.

## Methodology

### Data Collection and Analysis

The study adopted a qualitative approach for data collection using a semi-structured interview. Twenty-two (24) participants were, purposely, selected from different sectors. Klein (2013) suggests that purposive sampling is to be applied when a researcher has a good understanding of the population and the study. More so, purposive sampling is used where a researcher thinks the respondents have adequate knowledge or idea on the subject matter (Glen, 2015). Hence the selection of two interviewees from the following twelve groups except commuters where twenty two (22) were interviewed making a total of forty-six (46), they are: Kaduna State Urban Planning Development Authority (KASUPDA), Kaduna Geographic Information System (KADGIS) Kaduna State Internal Revenue Service (KADIRS), Kaduna State Traffic Law Enforcement Agency (KASTLEA) Federal Road Safety Corps (FRSC), National Union of Road Transport Workers

(NURTW), National Association of Transport Owners (NARTO), Kaduna State Internal Revenue Service (KADIRS), Tricycle Union Association, traders, estate developers and commuters. Additionally, covert observation was used to complement the data collection. The advantage of covert observation according to the US Department of Health and Human Services (2018) is that people behave naturally if they do not know they are being observed. The data were collected using a voice recorder, which was then transcribed verbatim.

Thematic coding was employed for data analysis. The analysis involves six stages: familiarization with the data (i.e. after transcription), coding, theme generation, theme review, theme definition, labelling and report (write-up). Thematic analysis can be used to assess different worldviews, or different theoretical frameworks (Braun & Clarke, 2006).

## RESULTS AND DISCUSSION

There are two major views found in the study, that: there was a strong or direct correlation between road infrastructure and economic growth; and the economic growth, influences population increase. The other view was that infrastructure does not directly influence economic growth and population. The first view above corroborates the view of Saidi, et al., (2018) in MENA countries where transportation energy use helps significantly to economic growth. And transportation infrastructure increases economic growth in all locations (multiple positive economic growth). A government participant had this to say:

“There is a relative increase in the number of registered tricycles in Kaduna metropolis, this can be attributed to the ban of motorcycle commercial operation on one hand, and increase in road infrastructure across the metropolis and increase rural to urban migration on the other. It is clear as one traverse from the Queen Amina Kawo underpass and overpass fly over-bridge to the city center around leventis roundabout which was upgraded to overpass and underpass with many roads built and some renovated” (A government stakeholder 02).

There is a sharp reduction in the number of kiosks, roadside shops and street hawking across the metropolis, but increase in supermarkets and shopping malls across the metropolis. This can be attributed to the state government’s effort to achieve the UN SDGs eight (decent work and economic growth), nine (industry, innovation and infrastructure) and eleven (sustainable cities and communities). A trader lamented:

“We used to sell commodities on the street as corner or street shop owners. But government has banned it and is promoting shopping malls to our disadvantage. In fact, this does not only affect us but also consumers because these shopping malls sell commodities expansively unlike us. (A trader stakeholder 08).

A consumer supported a trader’s argument and had this to say:

“We indeed purchase goods in the neighborhood prior to urban renewal program, but after the relocation and revocation of right of occupancy of shop owners, our journeys to purchase household goods greatly increase”. (A consumer stakeholder, 13)

The government report indicates that the Kaduna State Government’s internal revenue has increased over the years owing to some changes in the civil service. According to one of the reports, KADIRS, KADGIS and KASUPDA are the leading state governments’ agencies with the highest contributions/generations respectively (Kaduna State budget, 2021). A government agent had this to say:

“The number of jobs on the streets has reduced which may translate to increase unemployment especially rural-urban migrants, but government revenue has grown up owing to civil service reform, taxes and businesses reform among others.” (A government stakeholder, 12).

The multiplier impact of road infrastructure is what government considers economic growth. For instance, the

Kaduna galaxy mall is a partnership project between the state government and China Civil Engineering Construction Company on four hectares of land at the city center. This according to government will provide tens of jobs to teeming youths. This project might not be possible without improved road infrastructure. This is in agreement with Botric et al. (2006) who opine that improved infrastructure is a catalyst for the economic growth of many regions. This perception supports SDG goal eight.

“It is true that the galaxy mall is one of the best economic decision made by the government. If this investment operates at full capacity, many good (decent) jobs will be created”. (A government stakeholder, 21).

Botric, et al. (2006) further argue that there is no direct economic advantage generated from road infrastructure in some regions. Some road infrastructural developments are even harmful to people. Thus, there are three perceptions of road infrastructure and economic growth: a surplus road infrastructure, a deficit of road infrastructure and a balanced road infrastructure (Padjen, 1996). In the beginning, road will influence economic growth especially where there are none. But with time, the influence stops. Consumer perceived that these roads infrastructure are having a negative impact on them:

“We used to buy goods in the neighborhood at street shops or corner shops, but with the so-called urban renewal program, the price of commodities and goods have increased and our short journeys to get them have also increased. It is difficult to find all you need in the neighborhood now” (Consumer stakeholder, 16).

Many see economic growth in the increased number of materials or vehicles ownership. Others see it in the increase safety and aesthetics of towns and regions. One of the participants opines this way:

“When you look at the increased number of vehicles on roads especially tricycles, you have to agree with me that, the presence of good road infrastructure influences economic growth. We used to see fewer vehicles on the road and even the internal revenue generation was not this much, and the number of people coming for vehicle registrations and driving license have also increased. Not only that, despite the increased number of vehicles on roads, the safety of users has increased because there are traffic lights provided at each conflict point of roads and most intersections. If roads are not in good shape, the safety of users cannot be guaranteed” (A government stakeholder, 17).

In the same vein, vehicle owners especially tricycles have also added them on roads. A transport owner has this to say:

“I used to have fewer vehicles, but with the increased number of commuters and a number of road linkages across the metropolis, more people asked for a hire vehicle and we buy and issue them if we are satisfied with their honesty. I must agree that increased road linkages which are about 200 across the metropolis, might have improved the economy. (A government participant 07).

**Table 1: Hypothesis test**

Variables	N	Mean	SD	r	P
Road infrastructure	46	11.2	18.3	-.631	.0001
Economic growth	46	9.7	17.1		

Table 1 reveals that a significant inverse correlation exists between the provision of road infrastructure and increase economic growth and population.  $r = .631$  and  $p = .0001$ . This is because the p-value of .0001 is less than the 0.05 level of

significance. The correlation coefficient reveals that the higher the road infrastructure the better the economic growth and vice versa.

**Decision:**

From the results, there is a positive correlation between infrastructural provision and economic growth and population increase. Thus,  $H_0$  is hereby rejected.

**CONCLUSION AND RECOMMENDATIONS**

There are two schools of thought in connection with the impact of road infrastructure on population increase and economic growth in Kaduna metropolis. Many people believe that there is a multiplier effect of road infrastructure although it might not easily be measured or translated in GDP terms. However, government agencies often go with the first argument that economic growth is correlated with increase and improved road infrastructure. On the other hand, many traders and consumers see this as a negative impact given that road expansion and rehabilitation come with relocation and closure of roadside businesses. In summary, the advantages of road expansions, rehabilitations and constructions in Kaduna metropolis outweigh the disadvantages.

It is recommended that, while road expansion and rehabilitation is a welcome development, the government should implement with the utmost care, mercy and caution because small businesses help in the promotion of the security of lives and properties without the necessary presence of security agencies or functionaries. Many criminals are into crimes because they are jobless. When roadside trading or shops are relocated, many traders find it difficult to afford decent locations and often close down their businesses.

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