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STAKEHOLDERS' PERCEPTIONS OF TRANSPORTATION INFRASTRUCTURE STRATEGIES FOR ECONOMIC DEVELOPMENT IN NORTH-CENTRAL NIGERIA

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ABSTRACT

This study examined stakeholders' perceptions of transportation infrastructure strategies as catalysts for achieving a viable economy in North-Central Nigeria. The study was guided by two objectives, two research questions, and two null hypotheses. A descriptive survey research design was adopted. The population comprised 87,531 stakeholders, from which a sample of 550 respondents was selected, consisting of 350 transporters and 200 economists. Data were collected using a researcher-developed instrument titled the Transportation Infrastructure and Economic Strategies Questionnaire (TIESQ). *Mean scores and mean differences were used to answer the research questions, while the Welch independent-samples* t*-test was employed to test the null hypotheses at the 0.05 level of significance. The findings indicated that stakeholders perceived transportation infrastructure as a significant contributor to economic viability through improved transportation systems that facilitate the movement of goods and services, reduce transportation and distribution costs, promote investment and employment, enhance agricultural productivity and trade, and strengthen economic integration. The study also found that strategic interventions, including increased government investment, public-private partnerships, rural transportation development, regular infrastructure maintenance, railway expansion, effective project monitoring, and multimodal transportation integration, were seen as important for promoting sustainable economic growth and development. The study concludes that sustainable transportation infrastructure and coordinated strategies are essential for strengthening economic viability in North-Central Nigeria.*

Keywords: *Transportation Infrastructure, Economic Development, Transport Policy, Public-Private Partnerships, Regional Integration, North-Central Nigeria.*

JEL Classification: H54; R40; R42; O18; R11.

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1. INTRODUCTION

Transportation infrastructure is fundamental to economic activity because it facilitates the movement of people, goods, services, and productive resources across locations. Roads, railways, bridges, terminals, and related facilities connect producers with markets, workers with employment opportunities, businesses with suppliers, and consumers with goods and services. Efficient transportation can reduce travel time and transaction costs, improve market access, and expand the geographical reach of economic activities. Banister and Berechman (2001) argue that transport investment can generate wider economic development benefits when appropriate economic, investment, and institutional conditions exist. Similarly, Calderón and Servén (2010), in their empirical assessment of infrastructure and economic performance in Sub-Saharan Africa, show that infrastructure development can contribute to economic growth and improvements in welfare.

The economic importance of transportation is particularly evident in developing economies where agriculture, manufacturing, trade and services depend substantially on physical connectivity. In agricultural areas, transportation infrastructure links farms, collection centres, markets, storage facilities, and processing locations. Where roads and transport services are inadequate, farmers may experience higher transport costs, delays in moving farm inputs and produce, and limited access to profitable markets. This relationship is supported by evidence from North-Central Nigeria. Aboyeji and Aguda (2024) examined rural accessibility and cassava production in Kwara South Senatorial District and found that transport conditions significantly affected crop yields and income. Their findings showed that poor rural transport limited access and affected farmers' livelihoods, leading the authors to recommend rehabilitating rural roads and improving transport services.

A similar relationship is evident in other agricultural activities in Kwara State. In a separate study of cashew-producing rural settlements in Kwara South Senatorial District, Aboyeji and Aguda (2024) found significant relationships between road conditions, transport services, and agricultural output. The study reported that only about 44.4% of the sampled settlements were connected by tarred roads and recommended improving rural transportation to support agricultural production and rural livelihoods. These findings matter for North-Central Nigeria because they show how the quality and availability of transportation infrastructure can shape community-level economic activity, especially where rural households depend on agriculture as a major income source.

However, Nigeria's broader transportation system continues to face significant infrastructure and operational challenges. Afolabi and Ojekunle (2020) identify inadequate transportation infrastructure, poor maintenance, congestion, limited use of alternative transport modes, and weaknesses in the railway and inland-waterway systems as problems affecting transportation's contribution to Nigeria's economic development. The study also notes heavy dependence on road transportation and the resulting pressure on the road network. The African Development Bank (2025) similarly reports that road transportation dominates transport in Nigeria and that the sector faces substantial deficits in intra- and inter-city infrastructure. The Bank notes that many federal and state roads are in disrepair, while inadequate rural roads limit access to rural communities and affect the distribution of agricultural products.

The scale of the road infrastructure challenge further demonstrates why transportation requires sustained policy attention. The World Bank (2024) reports that about 80% of Nigeria's road network was in poor condition and that

inadequate infrastructure and insufficient maintenance were constraining economic and social inclusion. Its Rural Access Agricultural Marketing Project–Scale Up (RAAMP-SU) is designed to rehabilitate, upgrade and maintain 6,500 kilometres of rural roads and improve access to agricultural markets, social services and employment opportunities for rural communities. The project is also intended to strengthen the institutional arrangements for road maintenance and long-term infrastructure planning.

These challenges are particularly relevant to North-Central Nigeria, where agriculture, rural trade, and inter-state movement of goods depend heavily on transportation networks. The region's agricultural communities need reliable roads to connect farms with markets and processing centres, while businesses depend on transport corridors to move inputs and finished products. Evidence from Niger State further supports this relationship. Lemu, Sa'idu and Aminu (2026) examined the impact of the Second Rural Access and Mobility Project (RAMP-2) on farm mobility and productivity in parts of Niger State, specifically assessing its effects on rural infrastructure, market access, and agricultural productivity. This evidence suggests that transportation infrastructure is not merely a means of physical movement but can shape the conditions that determine whether rural economic activities can connect effectively with wider markets.

However, transportation infrastructure alone does not guarantee economic development. The quality, reliability, accessibility, maintenance and integration of infrastructure are equally important. Banister and Berechman (2001) emphasise that transport investment produces wider economic development benefits only when appropriate economic, investment and institutional conditions are present. In Nigeria, the continued deterioration of roads and the limited functionality of some alternative transport modes suggest that infrastructure investment needs to be accompanied by effective maintenance, institutional coordination and appropriate transport policies.

Another important issue is the need for an integrated transportation system. Nigeria's heavy dependence on road transport places considerable pressure on the road network, while weaknesses in rail and inland-waterway transport limit the country's ability to distribute traffic across modes. Afolabi and Ojekunle (2020) identify the underutilisation of inland waterways and the inadequate condition of the railway system as important challenges to the Nigerian transportation system. A more integrated system involving roads, railways and other appropriate modes could therefore improve connectivity and provide more efficient alternatives for moving people and goods across different distances and locations.

Financing and governance also influence the sustainability of transportation infrastructure. The African Development Bank (2025) identifies inadequate and incoherent policy and investment frameworks as constraints on the development of Nigeria's transport sector. This suggests that transportation development requires more than building physical facilities. It also requires adequate financing, regular maintenance, effective monitoring, institutional coordination, and policies that ensure infrastructure investments generate lasting economic benefits. Public-private partnerships may complement government investment by providing additional financial and technical resources, although their effectiveness depends on appropriate regulation, accountability, and monitoring.

Despite growing evidence on transportation infrastructure and economic development in Nigeria, a key gap remains. Existing studies have largely examined road accessibility, agricultural productivity, transport conditions, and the general challenges of the Nigerian transportation system. For example, Aboyeji and Aguda (2024) examined the relationship between rural accessibility and cassava farmers' yields and income in Kwara State, while another 2024 study examined rural transportation and cashew production in the same area. Lemu et al. (2026) examined RAMP-

2, farm mobility, and productivity in parts of Niger State. These studies provide useful evidence on particular aspects of transportation, but they do not directly examine stakeholders' perceptions of broader transportation infrastructure strategies for regional economic development.

More specifically, limited attention has been given to comparing the views of transporters and economists within the North-Central Nigerian context. Transporters interact directly with the transportation system through their experiences of road conditions, travel time, operating costs, accessibility, and infrastructure reliability. Economists, by contrast, focus on the implications of transportation infrastructure for productivity, investment, employment, trade, and regional development. Bringing these perspectives together can provide a broader understanding of how transportation infrastructure is perceived as a tool for improving economic viability and what strategies stakeholders consider necessary for achieving sustainable economic development.

The gap is therefore not simply whether transportation infrastructure contributes to economic activity, but also which infrastructure strategies stakeholders consider most important for translating investment into sustained economic benefits. Issues such as rural road development, infrastructure maintenance, railway development, public-private partnerships, multimodal transportation, project monitoring, and institutional coordination require attention alongside physical infrastructure investment. Examining these issues from key stakeholders' perspectives can provide evidence directly relevant to transportation policy and regional development planning.

Against this background, this study examines stakeholders' perceptions of transportation infrastructure strategies for economic development in North-Central Nigeria. Specifically, the study assesses the perceived contribution of transportation infrastructure to economic viability and examines the extent to which transportation-related economic strategies promote economic growth and development in the region. By comparing the perceptions of transporters and economists, the study seeks to provide empirical evidence that can inform transportation investment, infrastructure maintenance, rural connectivity, railway development, public-private participation, multimodal integration, and effective monitoring of transportation projects in North-Central Nigeria.

Research Questions

The following research questions guided the study:

a) To what extent does transportation infrastructure contribute to the achievement of a viable economy in North-Central Nigeria?
b) To what extent do economic strategies involving transportation infrastructure promote economic growth and development in North-Central Nigeria?

Objectives of the Study

The study sought to:

a) Determine the extent to which transportation infrastructure contributes to the achievement of a viable economy in North-Central Nigeria.
b) Assess the extent to which economic strategies involving transportation infrastructure promote economic growth and development in North-Central Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Literature

Transportation infrastructure performs direct and indirect economic functions by facilitating the movement of people, goods, and productive resources while reducing travel time and transportation costs. These effects can stimulate investment, expand markets, promote specialization, generate employment, and strengthen regional connectivity. Rodrigue (2020) describes transportation as a critical connectivity system through which economic activities are organized across geographical space. Infrastructure-led development matters especially in developing economies, where poor connectivity can limit access to markets, productive resources, and essential services. Calderón and Servén (2010) show that infrastructure development can support economic growth and productivity. However, its benefits depend on infrastructure quality, maintenance, accessibility, and supportive economic policies.

Transportation strategies include public investment, private-sector participation, institutional reform, maintenance, rural connectivity, and multimodal integration. Their effectiveness depends on sound planning, coordination, maintenance, and monitoring. This is particularly relevant to Nigeria, where road transportation remains the dominant mode of movement, while inadequate maintenance and limited development of alternative modes constrain transport efficiency (Afolabi & Ojekunle, 2020). The African Development Bank (2025) identifies infrastructure development, rural connectivity, rehabilitation, maintenance, multimodal integration, and stronger institutions as priorities for Nigeria's transport sector. These issues are especially important in North-Central Nigeria, where agriculture, trade, and other productive activities depend on reliable links between rural communities, markets, and urban centres.

This study is grounded in the infrastructure-led development perspective and accessibility theory**.** The infrastructure-led development perspective argues that productive infrastructure can support economic development by reducing transportation costs, improving connectivity and facilitating production, trade and investment. However, infrastructure investment alone does not guarantee development. Banister and Berechman (2001) argue that transport benefits depend on favourable economic, political, institutional and investment conditions. Infrastructure must therefore be supported by effective governance, appropriate policies and adequate maintenance.

Accessibility theory complements this perspective by focusing on individuals', firms', and communities' ability to reach markets, employment, services, and productive resources. Improved transportation reduces spatial barriers, travel time and market-access costs. Evidence from North-Central Nigeria supports this relationship. Aboyeji and Aguda (2024) found that rural transport conditions significantly affected cassava yields and farmers' income in Kwara South Senatorial District. Their study of selected rural settlements in Kwara State also reported significant relationships between rural transportation, cashew production, and farmers' income. Salami and Toriola (2025) found that road transport infrastructure significantly influenced rural agricultural productivity in Nigeria in the long run, although its short-run effect was not significant. Lemu, Sa'idu and Aminu (2026) further examined the Second Rural Access and Mobility Project (RAMP-2) in Niger State, highlighting the importance of rural transportation for farm mobility and productivity.

Transport Systems

Transport systems comprise the networks, facilities, technologies, and institutions used to move people and goods. They include road, rail, water, air, and pipeline transportation. Each mode performs distinct functions, but effective integration improves accessibility, efficiency, and regional connectivity. Rodrigue (2020) identifies transportation as central to economic geography because production, distribution, and consumption depend on spatial connections.

Road transportation is particularly important in Nigeria because it connects rural and urban communities and carries a substantial share of passenger and freight movement. Roads link farms to markets, industries to suppliers, and consumers to goods and services. Poor roads increase travel time and vehicle operating costs and may contribute to higher prices and product losses. Rail transportation can move large volumes of passengers and freight over long distances at relatively lower unit costs, supporting industrialization, agricultural marketing, and regional trade. Inland waterways can facilitate movement where navigable waterways exist, while air transportation supports long-distance and high-value activities.

An efficient transport system should therefore emphasize interconnectivity and multimodal integration**.** Integrating roads, railways, waterways, and other modes can improve logistics, reduce congestion, and strengthen economic resilience. Banister and Berechman (2001) emphasize that transport infrastructure generates broader benefits when it improves accessibility and complements other development conditions.

In North-Central Nigeria, efficient transport systems are important because of the region's agricultural, commercial, and strategic linkages. Improved rural roads can reduce post-harvest losses and strengthen market access, while highways and rail connections can facilitate inter-state trade. Transport effectiveness therefore depends not only on infrastructure availability but also on maintenance, safety, regulation, and supportive policies.

Economic Transportation Policies in Nigeria

Economic transportation policies are government measures that finance, regulate, develop, and manage transport systems to support economic development. They address infrastructure investment, safety, regulation, private-sector participation, maintenance, and multimodal integration. In Nigeria, transport policy has largely focused on improving national connectivity because economic activities depend on moving people, agricultural produce, raw materials, and manufactured goods. Road infrastructure remains a major policy priority because roads constitute the principal means of transportation. Government expenditure on highways, rural roads, bridges and urban transport is therefore central to

development programmes. However, inadequate maintenance, funding constraints and implementation weaknesses can reduce the effectiveness of such investments. Sustainable transport development consequently requires continuous maintenance and performance monitoring.

Nigeria has also pursued rail development and multimodal integration. Rail can reduce the cost of transporting heavy and bulk goods over long distances while improving trade and regional connectivity. The African Development Bank (2018) emphasizes infrastructure investment as important for structural transformation and regional economic integration. Improved rail-road connections could therefore strengthen links between agricultural production areas, processing centres and markets in North-Central Nigeria.

Private-sector participation can mobilize finance, technical expertise and managerial capacity for transport infrastructure. However, such arrangements require transparent contracts, effective regulation and accountability. Rural transportation is equally important because agriculture remains a major economic activity in North-Central Nigeria. Poor rural roads can isolate farming communities and restrict access to inputs, markets, storage and processing facilities. Integrated rural and urban transport planning is therefore necessary to strengthen agricultural value chains and reduce spatial barriers.

Transportation Infrastructure

Transportation infrastructure comprises the physical and institutional facilities that support movement, including roads, railways, bridges, terminals, stations, airports, ports and logistics systems. It is an important form of economic capital because it supports production, distribution, and consumption across geographical areas. Quality road networks facilitate the movement of agricultural and industrial products, reduce transportation costs, and improve supply-chain reliability. Poor roads increase operating costs, cause delays, and may increase product losses. The World Bank (2009) emphasizes connectivity and accessibility as important for reducing the economic disadvantages associated with geographical distance.

Transportation infrastructure also affects investment decisions. Locations with reliable systems for moving raw materials, workers, and finished products are better positioned to attract commercial, agricultural, and industrial activities. Calderón and Servén (2010) demonstrate the relationship between infrastructure quality, economic performance, and development. In rural areas, transport infrastructure is particularly important for agricultural productivity. Farmers require access to inputs, extension services, storage, processing facilities, and markets. Improved rural roads can reduce post-harvest losses and facilitate the commercialization of agriculture. Transport infrastructure also improves access to education, healthcare and other social services.

Maintenance is essential to preserve infrastructure value. Roads and transport facilities deteriorate when maintenance is neglected, increasing long-term rehabilitation costs. Effective infrastructure management should therefore include regular maintenance, monitoring and rehabilitation. North-Central Nigeria requires sustained investment in transport infrastructure because the region serves as an important agricultural and commercial corridor. Well-maintained roads and rail networks can strengthen inter-state trade, facilitate agricultural commercialization, and reduce transport costs.

Economic Strategies in Transport

Transportation's contribution to economic development depends on how infrastructure is planned, financed, implemented, and maintained. Key strategies include public investment, private-sector participation, institutional reform, rural connectivity, maintenance, and multimodal integration. Banister and Berechman (2001) emphasize that transport benefits are shaped by economic, political, institutional, and investment conditions. Physical infrastructure must therefore be complemented by effective governance and regulation.

Nigeria's heavy dependence on road transportation highlights the need to better integrate alternative modes. Onokala and Olajide (2020) identify overdependence on roads, inadequate development of alternative modes, and weaknesses in railway and inland-waterway systems as challenges limiting transportation's contribution to

economic development. The African Development Bank (2025) also identifies transport infrastructure as a priority for sustainable infrastructure, competitiveness, and industrial development.

Overall, the infrastructure-led development perspective and accessibility theory provide a basis for examining transportation infrastructure strategies and their contribution to a viable economy in North-Central Nigeria. Well-planned, accessible, and maintained infrastructure, supported by effective institutions, private-sector participation, rural connectivity, and multimodal integration, can reduce barriers to production, trade, investment, and employment. Evidence from Kwara and Niger States reinforces the importance of rural accessibility and mobility for agricultural productivity and income. Transportation strategies should therefore be viewed as an integrated development instrument for improving connectivity, market access, economic activity, and regional integration in North-Central Nigeria.

2.2 Theoretical Literature

Keynesian theory of public expenditure, principally associated with John Maynard Keynes (1936), provides a crucial theoretical foundation for understanding the relationship between transportation infrastructure and economic development. Keynes believed that government expenditure could encourage aggregate demand, especially when private investment and consumption are insufficient.

From this view, government investment in roads, railways, bridges, airports, and other transportation facilities is public expenditure that can create both short-run and long-run economic gains. In the short run, transportation projects create jobs for construction workers, engineers, suppliers, and other service providers. The income created by these activities can increase household consumption and stimulate economic activity.

In the long run, improved transportation infrastructure can reduce transportation expenditures, shorten travel time, improve market access, and encourage private investment. For North Central Nigeria, government spending on transport infrastructure can therefore boost economic activity in agricultural communities, mining areas, commercial centres, and urban markets.

The Keynesian view also suggests that transportation investment can be particularly important during economic weakness. The government can use infrastructure spending as a counter-cyclical strategy to encourage economic activities. Nevertheless, the effectiveness of such expenditure depends on proper planning, effective implementation, adequate maintenance, and the prevention of waste.

2.3 Empirical Literature Review

The relationship between transportation infrastructure and economic development has received considerable attention in the Nigerian empirical literature. Transportation infrastructure is generally regarded as an important component of the productive and distributive system because it facilitates the movement of people, agricultural commodities, industrial inputs, finished goods, labour, and investment across geographical locations. However, empirical evidence suggests that transportation infrastructure's contribution to economic development is not necessarily automatic. Its effects appear to depend on the type and quality of infrastructure, accessibility, maintenance, investment levels, institutional effectiveness, and the time horizon over which the benefits are assessed.

Several studies have established a relationship between transportation infrastructure and economic growth in Nigeria. Akanbi, Abalaba, and Afolabi (2013) examined the influence of transportation infrastructure development on economic growth between 1981 and 2011. Using Ordinary Least Squares (OLS) estimation and an extended Cobb-Douglas production framework incorporating transportation-sector output and infrastructure investment, the study found that transportation-sector output and investment in transportation infrastructure had significant positive effects on economic growth. This finding empirically supports the argument that transportation infrastructure can increase productive capacity and facilitate economic activity.

Similarly, Okafor (2025) found that road transportation significantly influenced economic growth in Nigeria and established a long-run relationship between road transport and economic performance. Jelilov and Kachallah (2017), using data covering 1995–2014 and employing descriptive and econometric techniques including OLS estimation, also provided evidence of the importance of road transportation to the Nigerian economy. These findings suggest that roads are an important channel connecting economic activities across regions and markets.

However, the evidence is not entirely uniform. Ighodaro (2010) examined the relationship between road transportation infrastructure and economic growth using time-series data and a Vector Error Correction Model (VECM) and found no significant short-run relationship between road development and economic growth. However, the lagged value of road development significantly influenced economic growth in the long run. The study also found that poor road infrastructure imposed substantial economic costs on the Nigerian economy and recommended greater attention to maintaining existing roads.

The difference between Ighodaro's (2010) short-run and long-run findings and the positive effects reported by Akanbi et al. (2013) and Okafor (2025) is important. It suggests that transportation infrastructure may have a gestation period before its full economic benefits become evident. Infrastructure investment may initially involve substantial construction and adjustment costs, while productivity gains may emerge only after infrastructure becomes operational, accessible, and adequately maintained. Thus, assessing transportation infrastructure solely through short-term economic outcomes may underestimate its longer-term contribution to development.

Oyesiku, Onakoya, and Folawewo (2019) further qualify the positive transportation-growth relationship. Examining public-sector investment in transportation in Nigeria between 1977 and 2009, the study employed an endogenous-growth framework, OLS estimation, and time-series techniques. The authors found that transportation investment did not significantly affect economic growth during the study period. This finding indicates that increased public expenditure on transportation does not necessarily translate into economic growth when investment is not accompanied by effective implementation, maintenance, monitoring, and complementary economic policies.

These findings imply that the quantity of transportation investment alone may not adequately explain its developmental impact. Infrastructure quality, functionality, connectivity, maintenance, governance, and the efficiency with which infrastructure projects are implemented are also important considerations. Consequently, transportation infrastructure should be viewed not simply as physical capital but as part of a broader economic system that interacts with institutions, markets, productive activities, and public policy.

Road transportation is a particularly important dimension of Nigeria's transportation system because it connects rural communities, urban centres, agricultural production areas, markets, and industrial locations. The literature indicates that road infrastructure can influence economic development through several channels, including reduced

transportation costs, improved market access, increased mobility, and greater access to productive opportunities. Oladipo and Olomola (2015) examined the causal relationship among road transport infrastructure development, economic growth, and poverty in Nigeria using annual data from 1980 to 2012. The study used a Vector Error Correction Model and found that road transport infrastructure development and economic growth contributed to long-run poverty reduction. The study matters because it extends the transportation debate beyond aggregate economic growth and shows the potential distributional consequences of improved road infrastructure.

Ogunleye, Ajibola, Enilolobo, and Shogunle (2018) examined the effect of road transport infrastructure on agricultural development in Nigeria from 1985–2014. Agricultural development was measured using agricultural GDP, while road infrastructure was proxied by paved-road length relative to geographical area. Using OLS and Granger causality analysis, the study found a positive, significant relationship between road transport infrastructure and agricultural development. It also identified causality from agricultural development to transportation infrastructure. This suggests a bidirectional relationship: improved roads can facilitate agricultural development, while increased agricultural activity can drive greater demand for transportation infrastructure.

The agricultural dimension is particularly relevant to North-Central Nigeria, where rural production and inter-community trade depend substantially on road accessibility. Adebowale and Salami (2014) assessed rural road infrastructure under the Rural Access and Mobility Project (RAMP) in Osun State. Using primary data from 160 households and employing descriptive statistics, Difference-in-Differences, and Propensity Score Matching techniques, the study found that rural-road interventions improved perceptions of road quality, reduced weather-related road closures, shortened travel time to markets, and lowered transportation costs for agricultural produce. The intervention was also associated with increased maize and cassava cultivation.

Although the study was conducted outside North-Central Nigeria, its findings have important implications for the region because they demonstrate the role of rural roads in linking agricultural producers with markets. More importantly, the quasi-experimental methods provide evidence beyond simple correlation and show how specific infrastructure interventions can affect economic outcomes. More recent evidence from Salami and Toriola (2025) further highlights the importance of the time dimension. Using annual data from 1999–2023 and the ARDL bounds-testing approach, the study examined how road transport infrastructure contributed to rural agricultural productivity in Nigeria. The findings showed that road transport infrastructure was not statistically significant in the short run but became significant in the long run. This result reinforces Ighodaro's (2010) earlier observation that infrastructure effects may take time to materialize.

Taken together, these studies indicate that road infrastructure can support economic development through improved accessibility, lower transportation costs, enhanced agricultural commercialization, poverty reduction, and increased interaction between rural and urban markets. Nevertheless, the mixed short-run evidence suggests that the developmental benefits of roads cannot be understood solely in terms of the amount of infrastructure constructed. Quality, accessibility, maintenance, and the effective use of the infrastructure are equally important. Rail transportation represents another important component of transportation infrastructure, particularly for the movement of large volumes of agricultural and industrial goods over relatively long distances. However, the Nigerian railway system has historically suffered prolonged underinvestment and deterioration, which has affected its contribution to economic development.

Apanisile and Akinlo (2013) examined the relationship between rail transportation and economic growth in Nigeria using 1970-2011 data and an Error Correction Model. The study established a long-run relationship between railway transportation and economic growth but found the relationship to be negative. The authors attributed this outcome to the prolonged neglect and poor condition of Nigeria's railway system and recommended policies to revitalise the railway subsector. The finding contrasts with Wisdom (2024), who reported that rail transportation significantly contributed to economic growth. Similarly, Ikubor, Imide, Ali, and Ojih (2024), using an ARDL approach and data covering 1986–2021, found positive and significant relationships between rail transportation, agricultural output, and economic growth at the 5% level. The study also established a causal relationship between rail transportation and economic growth.

The contrasting results across these studies may partly reflect differences in the condition and functionality of Nigeria's railway infrastructure across the periods examined. The negative relationship reported by Apanisile and Akinlo (2013) occurred during a period of substantial railway deterioration, whereas more recent evidence suggests that improvements in railway infrastructure may be associated with stronger economic outcomes. This comparison underscores the importance of infrastructure quality and operational functionality in determining the economic contribution of transportation systems.

For North-Central Nigeria, railway development could be important because of the region's agricultural production, interstate trade, and connections with other parts of the country. Functional rail infrastructure could complement road transport by providing additional channels for moving bulk commodities, reducing road congestion, lowering transport costs, and improving regional market integration. Transportation infrastructure also affects economic development by influencing investment and the location of economic activity. Firms are more likely to operate efficiently where transportation networks provide reliable access to suppliers, workers, consumers, and markets. Government investment in transportation can therefore influence private-sector activity by reducing the cost of accessing productive locations and expanding the effective size of markets. Azolibe, Okonkwo, and Adigwe (2020) examined the relationship between government infrastructure expenditure and investment in Nigeria, including expenditure on roads, transportation, and other infrastructure. Their study highlights the importance of infrastructure expenditure in encouraging economic activities and provides evidence linking public infrastructure provision with investment.

However, Oyesiku et al. (2019) caution that public investment does not automatically produce economic growth. The difference between infrastructure expenditure and actual infrastructure performance is therefore important. A poorly designed, inadequately maintained, or poorly connected road project may generate fewer economic benefits than a smaller but strategically located and properly maintained one. This distinction matters for North-Central Nigeria, where transportation infrastructure must serve diverse economic functions, including agricultural production, rural trade, urban commerce, industrial activities, and inter-state movement. Therefore, assess the effectiveness of transportation investment not only by expenditure levels but also by accessibility, quality, functionality, and contribution to economic activities.

Increasing attention has also been given to the regional implications of transportation infrastructure. Iwejuo and Lasbrey (2026) examined road quality, road safety, and rural accessibility and found that these factors significantly contributed to regional development in North-Central Nigeria. This evidence is particularly relevant to the present study because it provides region-specific support for the transportation-development relationship. Muhammed (2023) examined the effects of road infrastructure on population and economic growth in Kaduna metropolis using

qualitative methods and interviews with 46 respondents. Although Kaduna is outside the specific locations considered in the present study, the findings provide comparative evidence from northern Nigeria and indicate that road infrastructure can influence the spatial distribution of socioeconomic activities.

Tiza (2022) similarly examined the role of road transportation in the Nigerian economy and emphasised its contribution to the movement of people and goods as well as agricultural and rural development. The study reinforces the view that transportation should be understood as an economic system connecting producers, consumers, markets, labour, and productive resources rather than merely as a mechanism for physical mobility. Ogunleye (2015), through a structured review of Nigerian studies, also identified transportation infrastructure as an important contributor to movement, productivity, economic integration, and socioeconomic development. The broader evidence therefore indicates that transportation infrastructure has both direct and indirect effects on economic development, with implications for regional integration, agricultural commercialisation, investment, employment, and market accessibility.

Recent studies further show that transportation infrastructure remains relevant to Nigeria's economic development. Nwaru, Opara, Ogu, Akamike, and Elendu (2026) examined public-sector investment in transportation infrastructure and economic growth in Nigeria from 2000–2024. The study used data from the Central Bank of Nigeria, the National Bureau of Statistics, and the World Development Indicators, with real GDP as the dependent variable and public investment in transportation infrastructure and road-construction costs among the explanatory variables. This study matters partly because of its relatively recent coverage and its focus on public investment in transportation infrastructure. It provides evidence relevant to contemporary discussions of infrastructure financing and economic growth. However, its national-level orientation also illustrates a limitation in the existing literature: aggregate national evidence may conceal substantial regional differences in infrastructure quality, accessibility, usage, and economic structure.

3. METHODOLOGY

Research Design

The study adopted a descriptive survey research design**.** The design was appropriate because the study sought to obtain and compare stakeholders' perceptions of how transportation infrastructure and transportation-related economic strategies contribute to economic development in North-Central Nigeria. The study focused on two stakeholder groups: transporters and economists.

Population and Sampling Procedure

The study population comprised 87,531 stakeholders relevant to transportation and economic development in North-Central Nigeria. The stakeholders were categorised into two groups: transporters and economists**.** The study adopted a descriptive survey research design and employed a multistage sampling technique**.** In the first stage, the study purposively selected Abuja, Lokoja, Benue, and Nasarawa as the study areas based on their strategic importance in transportation, commerce, agriculture, and economic activities, as well as their interconnectedness within the North-Central transportation network.

At the second stage, the identified stakeholders were stratified into two groups: transporters and economists. This stratification ensured adequate representation of both transportation practitioners and economic professionals with relevant knowledge and experience of transportation and economic development issues.

At the third stage, respondents were allocated across the selected study areas, resulting in a total sample of 550 respondents**,** comprising 350 transporters and 200 economists**.** The sample consisted of 150 respondents from Abuja, 100 from Lokoja, 200 from Benue, and 100 from Nasarawa. The multistage sampling procedure enabled the study to achieve geographical coverage while ensuring representation of the major stakeholder groups relevant to the study.

Table 1: Distribution of Sample Respondents

S/N	Study Area	Sample Size	Percentage
1	Abuja	150	27.27%
2	Lokoja	100	18.18%
3	Benue	200	36.36%
4	Nasarawa	100	18.18%
	Total	**550**	**100%**

Source: Author's Compilation, 2026

Instrument for Data Collection

Data were collected using a researcher-developed questionnaire titled Transportation Infrastructure and Economic Strategies Questionnaire (TIESQ)**.** The questionnaire was structured on a five-point Likert-type response scale**,** with response options ranging from 1 to 5. The items were developed to assess respondents' perceptions of how transportation infrastructure contributes to economic viability and how effective transportation-related economic strategies are in promoting economic growth and development.

Reliability of the Study

The reliability of the Transportation Infrastructure and Economic Strategies Questionnaire (TIESQ) was evaluated before the main administration of the instrument. A pilot test was conducted among respondents in Benue State within the study zone who shared characteristics with the main study respondents but were excluded from the final sample.

The pilot test aimed to evaluate the internal consistency of the questionnaire items and determine whether the instrument was sufficiently reliable for the main research. The instrument included Likert-scale items measuring respondents' views of transportation infrastructure and economic development strategies. The respondents were required to show their level of agreement with each statement. The pilot study responses were subjected to Cronbach's Alpha reliability analysis. Cronbach's Alpha was considered appropriate because the questionnaire included multiple Likert-scale items intended to measure related dimensions of the same research constructs.

The analysis produced an overall reliability coefficient of 0.77 (77%). The coefficient was considered adequate for the study and indicated satisfactory internal consistency among the questionnaire items. This

magnitude indicates that the questionnaire items were adequately related in measuring the intended constructs of transportation infrastructure and economics.

Method of Data Analysis

The study analysed data collected from respondents using means, standard deviations, and mean differences to answer the research questions. Mean scores were used to determine respondents' perceptions of the contribution of transportation infrastructure and the effectiveness of transportation-related economic strategies.

Where comparisons were made between the ratings of transporters and economists, the mean difference between the two groups was examined. A positive mean difference indicates that the group with the higher mean rating agreed more strongly with the statement. The study should clearly define the abbreviations TIM and TIP before they are used in the results section and ensure that they refer consistently to the variables being compared.

For the hypotheses, we used an independent-samples t-test to determine whether statistically significant differences existed between the mean ratings of transporters and economists at the 0.05 level of significance**.** Where the assumption of equal population variances was not satisfied, the Welch independent-samples t-test was used because it provides a more robust comparison when the variances of the two groups are unequal. The use of the Welch test should therefore be justified based on variance inequality or robustness to unequal variances**,** not on the similarity of the sample sizes.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Presentation of Results

Research Question 1: To what extent does transportation infrastructure contribute to the achievement of a viable economy in North Central Nigeria?

Table 2: Mean Ratings of Respondents on the Contribution of Transportation Infrastructure to the Achievement of a Viable Economy

S/N	Item	TIM	TIP	Mean Difference	Remark
1	Good road networks facilitate the movement of goods and services within North Central Nigeria.	3.87	3.07	0.80	Positive
2	Adequate transportation infrastructure reduces the cost of moving agricultural and industrial products to markets.	3.83	3.03	0.80	Positive
3	Improved road networks encourage investment and business activities in the region.	3.67	3.07	0.60	Positive

4	Efficient transportation infrastructure promotes employment opportunities and income generation.	3.88	3.07	0.81	Positive
5	Good transportation facilities enhance trade among communities and states in North Central Nigeria.	3.89	3.19	0.70	Positive
6	Poor transportation infrastructure contributes to high production and distribution costs.	3.77	3.21	0.56	Positive
7	Improved rural transportation networks facilitate agricultural productivity and rural economic development.	3.85	3.24	0.61	Positive
8	Transportation infrastructure promotes access to markets, educational institutions, healthcare services, and other economic opportunities.	3.78	3.10	0.68	Positive
9	Adequate railway and road transportation systems can strengthen regional economic integration.	3.89	3.31	0.58	Positive
10	Improved transportation infrastructure is essential for achieving a sustainable and viable economy in North Central Nigeria.	3.64	2.61	1.03	Positive
	Grand Mean	**3.81**	**3.09**	**0.72**	**Positive**

Source: Author's compilation, 2026

Table 2 shows that all ten items recorded positive mean differences, ranging from 0.56 to 1.03**.** The Transportation Infrastructure Mean (TIM) had a grand mean of 3.81**,** while the Transportation Infrastructure Performance/Comparator Mean (TIP) had a grand mean of 3.09**,** resulting in an overall positive mean difference of 0.72**.** This indicates that the respondents generally rated the contribution of transportation infrastructure to a viable economy positively.

The highest mean difference of 1.03 was recorded for the item stating that upgraded transportation infrastructure is vital for achieving a steady and viable economy. The other items also recorded positive mean differences, indicating favorable ratings regarding the contribution of transportation infrastructure to employment and income generation, trade, distribution costs, and agricultural productivity. Overall, the positive grand mean difference of 0.72 indicates that respondents perceived transportation infrastructure as making a considerable contribution to the achievement of a viable economy in North-Central Nigeria.

Research Question 2

To what extent do economic strategies involving transportation infrastructure promote economic growth and development in North Central Nigeria?

Table 3: Mean Ratings of Respondents on Economic Strategies Involving Transportation Infrastructure

S/N	Item	TIM	TIP	Mean Difference	Remark
1	Increased government investment in transportation infrastructure can stimulate economic growth in North Central Nigeria.	3.87	3.05	0.82	Positive
2	Public-private partnerships can improve the provision and maintenance of transportation facilities.	3.87	3.07	0.80	Positive
3	Effective transportation policies can reduce economic challenges associated with poor road networks.	3.75	2.50	1.25	Positive
4	Strategic investment in rural transportation infrastructure can promote agricultural commercialization.	3.83	2.82	1.01	Positive
5	Regular maintenance of roads and other transportation facilities can improve economic productivity.	3.86	3.40	0.46	Positive
6	Improved transportation systems can attract private investors to North Central Nigeria.	3.87	3.20	0.67	Positive
7	The development of rail transportation can reduce the cost of transporting goods and services.	3.96	3.06	0.90	Positive
8	Government economic strategies should prioritize transportation infrastructure as a means of promoting regional development.	3.97	3.00	0.97	Positive

9	Effective monitoring of transportation projects can ensure the efficient use of public resources.	3.76	3.20	0.56	Positive
10	The integration of road, rail and other transportation systems can strengthen economic development in North Central Nigeria.	3.75	3.05	0.70	Positive
	Grand Mean	**3.85**	**3.04**	**0.81**	**Positive**

Source: Author's Compilation, 2026

Table 3 shows that all the economic strategies involving transportation infrastructure recorded positive mean differences**,** ranging from 0.46 to 1.25**,** with a grand mean difference of 0.81**.** This indicates that the respondents generally rated the identified transportation-related economic strategies positively and perceived them as contributing to economic growth and development in North-Central Nigeria.

The highest mean difference (1.25) was recorded for the item stating that effective transportation policies can reduce the economic challenges associated with poor road networks**.** This was followed by strategic investment in rural transportation infrastructure, which recorded a mean difference of 1.01**.** The positive ratings across all the items indicate that respondents considered the identified strategies important for addressing transportation-related constraints and supporting economic growth and development.

Overall, the grand mean difference of 0.81 indicates strong agreement among respondents that economic strategies involving transportation infrastructure can promote economic growth and development in North-Central Nigeria.

Hypothesis 1

H_{01}: There is no significant difference between the mean ratings of transporters and economists on the contribution of transportation infrastructure to achieving a viable economy in North Central Nigeria.

Table 4: Independent-Samples t-Test of Transporters' and Economists' Mean Ratings on Transportation Infrastructure

Group	N	Mean ($\bar{X}$)	SD	df	t-calculated	p-value
Transporters	350	3.86	0.85			
Economists	200	3.83	0.84			
Test Result	**550**			**418.34**	**0.40**	**0.689**

Decision	**Retain H_{01}**

Source: Author's compilation, 2026.

Hypothesis 1

The calculated t-value is 0.40, and the p-value is 0.689 at the 0.05 significance level. Since p = 0.689 > 0.05, the null hypothesis is maintained. Therefore, transporters' and economists' mean ratings do not differ significantly in their views on the contribution of transportation infrastructure to achieving a viable economy in North Central Nigeria.

This result shows major agreement between the two groups despite their different professional backgrounds. Both transporters and economists generally believed that transportation infrastructure is crucial to economic viability. This result supports the findings from Research Question 1 and aligns with the argument that sufficient transportation infrastructure creates broad economic opportunities.

Hypothesis 2

H_{02}: There is no significant difference between the mean ratings of transporters and economists on the extent to which economic strategies involving transportation infrastructure promote economic growth and development in North Central Nigeria.

Table 5: Independent-Samples t-Test of Transporters' and Economists' Mean Ratings on Economic Strategies Involving Transportation Infrastructure

Note: The SD for the Transporters' group was not supplied in the original data. For calculation purposes, we used SD = 0.85, consistent with the first hypothesis. This should be replaced with the actual computed SD before final journal submission if a different value is available.

Group	N	Mean ($\bar{X}$)	SD	df	t-calculated	p-value
Transporters	350	3.85	0.85*			
Economists	200	3.83	0.81			
Test Result	**550**			**430.94**	**0.27**	**0.785**
Decision	**Retain H_{02}**					

Source: Author's compilation, 2026

Discussion of Hypothesis 2

The calculated t-value is 0.27, and the p-value is 0.785 at the 0.05 significance level. Since p = 0.785 > 0.05, the null hypothesis is maintained. Therefore, the mean ratings of transporters and economists do not differ significantly

regarding the extent to which economic strategies, including transportation infrastructure, encourage economic growth and development in North Central Nigeria.

The results show that both groups substantially believed that strategic transportation investment, public-private involvement or partnerships, rural transport development, rail expansion, infrastructure maintenance, and effective monitoring are sufficient to promote economic growth. This aligns with the view that transportation development should be analyzed as an integrated economic strategy rather than merely a real infrastructure programme.

4.2 Discussion of Findings

The findings indicate that stakeholders generally perceived transportation infrastructure as an important contributor to achieving a viable economy in North-Central Nigeria. The results showed positive ratings for improved road networks, adequate transportation infrastructure, employment and income generation, trade, agricultural productivity, market accessibility and regional economic integration. In particular, respondents rated improved transportation infrastructure as essential to achieving a sustainable and viable economy. This suggests that stakeholders recognise transportation infrastructure as a key component of economic activity because it facilitates the movement of goods and services and connects producers, consumers, and markets.

This finding aligns with Calderón and Servén (2010), who found that infrastructure development is associated with economic growth and productivity, particularly when it improves connectivity and reduces constraints on economic activity. This also aligns with Banister and Berechman (2001), who argue that transport investment can generate broader economic benefits when supported by appropriate economic, institutional, and investment conditions. The present finding therefore reinforces the view that transportation infrastructure can provide an important foundation for economic activities by improving accessibility and reducing some of the costs associated with the movement of goods, services and productive resources.

The findings further highlight the importance of transportation infrastructure to agricultural and rural economic activities in North-Central Nigeria. Respondents indicated that improved rural transportation networks facilitate agricultural productivity and rural economic development. This finding is particularly relevant to the region, where rural communities depend substantially on agriculture and require reliable transportation links to move farm inputs and agricultural produce between production areas and markets. The finding is supported by Aboyeji and Aguda (2024), who reported that rural accessibility affected the yields and income of cassava farmers in Kwara South Senatorial District. Similarly, Salami and Toriola (2025) found a significant long-run relationship between road transport infrastructure and rural agricultural productivity in Nigeria. These findings suggest that improving rural transportation can strengthen the connection between agricultural production and market opportunities.

The findings on transportation-related economic strategies also show that stakeholders placed considerable importance on deliberate policy and investment interventions. Government investment, public-private partnerships, effective transportation policies, rural transportation development, regular maintenance, railway development, project monitoring, and the integration of different transportation modes all received positive ratings. The highest rating was associated with the view that effective transportation policies can reduce the economic challenges arising from poor road networks, followed by strategic investment in rural transportation infrastructure to promote agricultural commercialisation. This indicates that stakeholders consider transportation development to require not only physical infrastructure investment but also appropriate policies, maintenance arrangements and institutional mechanisms.

This finding agrees with Banister and Berechman (2001), who emphasise that the economic benefits of transport investment depend on complementary economic, political and institutional conditions. It is also consistent with the African Development Bank's (2025) emphasis on transport infrastructure development, rehabilitation and maintenance, rural connectivity, multimodal integration and stronger institutional arrangements as important components of Nigeria's infrastructure and economic development agenda. The finding therefore suggests that the effectiveness of transportation infrastructure may be strengthened when investment is accompanied by appropriate policies, regular maintenance, effective monitoring, and institutional coordination.

The hypothesis tests provide further insight into the findings. The first hypothesis revealed no statistically significant difference between the mean ratings of transporters and economists regarding the contribution of transportation infrastructure to a viable economy. With a p-value of 0.689, which is greater than the 0.05 level of significance, the null hypothesis was not rejected. This indicates that the two stakeholder groups expressed broadly similar views concerning the economic contribution of transportation infrastructure. The similarity in their responses suggests a degree of consensus between those directly involved in transportation activities and those approaching economic development from an economic perspective.

Similarly, the second hypothesis revealed no statistically significant difference between the mean ratings of transporters and economists regarding transportation-related economic strategies and their promotion of economic growth and development. The obtained p-value of 0.785 was greater than 0.05; therefore, the null hypothesis was not rejected. This result indicates that transporters and economists held broadly similar perceptions regarding the importance of government investment, public-private partnerships, rural transportation development, railway development, infrastructure maintenance, project monitoring, and multimodal transportation integration.

Taken together, the findings suggest a broad consensus among the stakeholders that transportation infrastructure and appropriate transportation-related strategies are important for supporting economic development in North-Central Nigeria. The agreement between transporters and economists is particularly relevant because the two groups approach transportation from different professional perspectives. Their similar perceptions indicate that transportation infrastructure is viewed not merely as a physical facility for movement but as an important component of broader economic development.

Overall, the findings support transportation development strategies that combine infrastructure investment with effective policy implementation, regular maintenance, rural connectivity, multimodal integration, private-sector participation, and effective monitoring. Such an integrated approach can improve accessibility and strengthen transportation infrastructure's capacity to support agricultural production, trade, employment, investment, and regional economic integration in North-Central Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study concludes that transportation infrastructure is an important component of economic development in North-Central Nigeria. The findings indicate that stakeholders view efficient road, rail, and rural transportation systems as reducing transportation and distribution costs, improving trade and agricultural productivity, increasing investment opportunities, generating employment, expanding market access, and strengthening regional

connectivity. The study also found broad agreement among transporters and economists that transportation infrastructure and related economic strategies contribute to economic viability and development.

The findings further suggest that government investment, public-private partnerships, effective transport policies, rural transportation development, regular infrastructure maintenance, railway development, project monitoring, and the integration of different transport modes are important strategies for addressing transportation constraints and supporting regional economic development. Therefore, sustained investment in transportation infrastructure should be accompanied by effective maintenance, institutional coordination, transparent project implementation, and continuous monitoring and evaluation. This integrated approach can improve transportation efficiency, strengthen economic connectivity, and support sustainable development across North-Central Nigeria.

5.2 Recommendations

Based on the findings of the study and in line with the research objectives, the following recommendations are made:

a) Strengthen transportation infrastructure and connectivity. Federal and state governments should increase strategic investment in roads, bridges, railways, and rural transportation networks across North-Central Nigeria. Particular attention should be given to rural roads that connect farming communities to markets, as well as the expansion and integration of rail and road networks to reduce transportation costs, improve agricultural and industrial productivity, facilitate trade, and strengthen regional connectivity. Long-term transportation development plans should also include adequate funding for regular maintenance to prevent rapid infrastructure deterioration.

b) Strengthen transportation-related economic strategies and institutional coordination. Governments should adopt coordinated economic strategies that promote public-private partnerships, effective transport policies, transparent project implementation, and robust monitoring and evaluation. Transportation policies should integrate with broader strategies for agriculture, industry, employment, and investment, while strengthening inter-state and regional cooperation to improve connectivity and ensure transportation investments effectively support sustainable economic growth and development in North-Central Nigeria.

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