

ASSESSMENT OF THE SOCIOECONOMIC AND OPERATIONAL IMPACTS OF COMMERCIAL MOTORCYCLE AND TRICYCLE TRANSPORTATION IN CONTRASTING ENVIRONMENTS OF KADUNA STATE, NIGERIA

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Abstract

This study assesses, examines and compares the socioeconomic impacts of commercial motorcycles and tricycles in the distinct rural and urban contexts of Giwa and Sabon-Gari Local Government Areas, Kaduna State, Nigeria. Utilizing a mixed-methods approach with data from 200 purposively sampled respondents, findings conclusively show that motorcycles are indispensable for overcoming rural infrastructural barriers and sustaining livelihoods in Giwa, while tricycles dominate as safer, higher-income urban transport in Sabon-Gari. Despite their critical roles, both modes face pressing challenges including safety risks, regulatory gaps, and inadequate infrastructure. These context-specific realities demand targeted infrastructure investments, regulatory harmonization, and comprehensive safety enforcement to ensure sustainable, equitable mobility solutions. This study not only fills a crucial knowledge gap in informal transport dynamics across heterogeneous settings but also lays a persuasive foundation for context-driven policy interventions essential for improving transport equity, economic resilience, and social well-being in Kaduna State and comparable developing regions.

Keywords: Informal Transportation, Livelihood Viability, Differential Impacts, Regulatory Friction, Context-Specific Policy.

Introduction

Transportation plays a vital role in the socioeconomic development of any society by enhancing mobility, improving access to essential services, and facilitating economic activities. In many parts of Nigeria, particularly in semi-urban and rural areas,

informal modes of transport such as commercial motorcycles ("Okada") and tricycles ("Keke") have emerged as critical solutions to transportation challenges. These modes have become prominent because of their affordability, accessibility, and ability to navigate difficult terrains where formal

transport systems are either inefficient or non-existent. UNDP. (2024)

Kaduna State, located in North-Western Nigeria, exemplifies this intricate dynamic. The state, like many others, grapples with the dual imperatives of managing a burgeoning population and fostering sustainable development, which necessarily includes an efficient transport sector. The Kaduna State Government has recently initiated efforts to modernize urban transportation, including the introduction of a Bus Rapid Transit (BRT) project, signalling recognition of the existing transport challenges and a strategic shift towards more structured systems (Anyanwu, S. 2025). However, the reality on the ground, particularly in diverse geographical contexts within the state, dictates continued reliance on informal transport.

Interestingly, both commercial motorcycles and tricycles roles differ based on local economic dynamics, infrastructure, and policy. Previous studies have highlighted the significant contributions of motorcycles to the local economy of the Giwa Local Government Area (LGA), particularly in stimulating commerce and providing employment. Similarly, tricycles have been recognized in Sabon-Gari LGA. for enhancing commuter

mobility and serving as a reliable means of daily transportation.

Despite their growing importance, both modes of transport face various challenges, including safety concerns, regulatory gaps, and inadequate infrastructure. As the state seeks to develop sustainable transport strategies, there is a need to comparatively assess how motorcycles and tricycles impact mobility, livelihood, and economic development across different local contexts.

Therefore, this study aims to conduct a comparative analysis of the economic and social impacts of commercial motorcycles and tricycles in Kaduna State, using Giwa and Sabon-Gari LGAs as case studies. The findings are expected to provide useful insights for transportation planning, policy formulation, and sustainable mobility initiatives in similar settings in the future.

Research Problem

The growing reliance on informal modes of transportation, such as commercial motorcycles and tricycles, in Kaduna State reflects the persistent gaps in formal public transport systems, particularly in semi-urban and rural areas. While these modes of transport have become vital to local economies, enhancing mobility, creating

employment, and facilitating access to services, their rapid growth has also introduced a range of challenges. These include safety risks, inadequate infrastructure, regulatory inconsistencies, and limited integration into broader transportation planning frameworks.

Despite their importance, there has been limited research evaluating the distinct contributions and challenges of motorcycles and tricycles in different local contexts in Nigeria. The Giwa and Sabon-Gari LGAs offer contrasting environments, where motorcycles and tricycles dominate, respectively. However, there is a lack of systematic analysis to understand how each mode influences economic activity, social well-being, and transportation efficiency in these areas. Without such insights, policymakers may struggle to design targeted interventions that balance the benefits of these informal systems with the need for regulation, safety, and sustainability.

This study seeks to address this gap by studying critically the socioeconomic impacts, operational challenges, and policy implications of commercial motorcycle and tricycle transportation in Giwa and Sabon Gari LGA of Kaduna State.

Aim and Objectives

This study aimed to assess the economic and social impacts of commercial motorcycles and tricycles on local mobility and livelihoods in the Giwa and Sabon-Gari Local Government Areas of Kaduna State.

Objectives

To achieve this aim, this study sets out the following specific objectives:

1. To examine and compare the livelihood contributions of commercial motorcycles in Giwa and tricycles in Sabon-Gari in terms of income generation and employment opportunities.
2. To analyze the role of both transport modes in enhancing mobility and accessibility, particularly in relation to rural infrastructural constraints and urban commuter preferences.
3. To identify and evaluate the major operational challenges and hazards affecting commercial motorcycle and tricycle operators across the two study areas.
4. To assess the level of awareness and compliance with government transport policies among operators in Giwa and Sabon-Gari.

Literature Review

The inadequacy of formal public transportation systems in many developing nations, particularly in sub-Saharan Africa, has driven the proliferation of informal transport. Among these, commercial motorcycles (“Okada”) and tricycles (“Keke Napep” or “Keke”) have become vital to urban and rural mobility, while also serving as significant sources of livelihood (Okada et al., 2017; Behrens et al., 2015; Jibrilla & Fashola, 2017). Although they enhance accessibility and employment, they also pose challenges related to road safety, environmental degradation, and weak regulatory oversight (Nwaob, 2025).

The rise of motorcycles and tricycles in Nigeria reflects broader socioeconomic conditions. Rapid urbanization has exceeded the capacity of formal transport planning (Olubomehin, (2012); Oshinowo, 2007: UNDP, 2024), while the structural adjustment programs of the 1980s pushed many workers into informal employment, including transport (Adeogun et al., 2020). Poor road infrastructure in rural areas and congestion in cities further underscore their role as practical “last-mile” solutions, valued for flexibility and affordability (Owoeye & Owoeye, 2018; El-Agroudy et al., 2022).

Economically, informal transport absorbs large numbers of unemployed and underemployed youth (Jibrilla & Fashola, 2017), providing viable daily income that sustains households (Gambo et al., 2017). Its economic ecosystem extends beyond operators to mechanics, fuel vendors, and spare-parts dealers (Eyo, 2023; Nwaob, 2025b), the function of tricycles in specific urban settings, such as their socio-economic impact on livelihood, has been consistently documented (Buba & Umar, 2019). Local governments also derive revenue from levies and licensing, though accountability in collection is often lacking (Eyo, 2023; Nwaob, 2025a). By connecting rural producers to markets and workers to jobs, these services underpin commerce and everyday mobility (Gambo et al., 2017).

Despite these benefits, the sector faces sustainability challenges. High acquisition and maintenance costs, alongside volatile fuel prices, reduce profitability (Eyo, 2023). The removal of fuel subsidies has further raised costs and fares (Kwaghgba & Tyozenda, 2024).

Socially, informal transport provides critical access for low-income earners, women, and the elderly, enabling them to reach education, healthcare, and other essential services (Funds

for NGOs, n.d.; UNDP, 2024; World Bank, 2024). Yet, it is also associated with disproportionately high accident rates caused by reckless driving, poor road infrastructure, and weak enforcement of safety regulations (Olojede et al., 2016; Yousif et al., 2020). These incidents impose heavy costs on households and health systems (National Bureau of Statistics, 2021). Security concerns; such as robbery and kidnapping; have prompted restrictions and bans in some states (Kogi Reports, 2025), metropolitan transport safety and security challenges are often compounded by the informal nature of these operations (Olorunfemi et al., 2016)..

Environmental impacts are also significant. Two- and three-stroke engines contribute to noise and air pollution, affecting public health and urban liveability (Adeogun et al., 2020; Nwaob, 2025; Tayo et al., 2023). The adhoc nature of operations complicates integration into formal transport planning frameworks (UNDP, 2024).

Gender dynamics add further complexity. While men dominate as operators, women are highly dependent users, facing risks of harassment and accidents. Cultural barriers often limit women's participation as drivers, though an increasing number are entering the

sector (Ogunrinola, 2011; Lawal, 2024; World Bank, 2024).

Overall, motorcycles and tricycles play a dual role; bridging mobility gaps and supporting livelihoods while also presenting safety, environmental, and governance challenges.

Local Context: Kaduna State, Giwa, and Sabon-Gari LGAs

Kaduna State, located in northwestern Nigeria, combines diverse rural and urban characteristics that shape transport demand. The government has introduced formal initiatives such as the Kaduna Bus Rapid Transit (KBRT) project to modernize mobility, yet informal transport remains deeply entrenched (Voice of Nigeria, 2025; Blueprint Newspapers, 2025).

Giwa LGA is predominantly rural, with an estimated population of 432,000 in 2022 (CityPopulation, 2022a). Agriculture dominates its economy, and commercial motorcycles and tricycles are vital for linking farms to markets and connecting dispersed settlements to essential services (Adewale & Ajibade (2018, Wikipedia, 2025a). Safety concerns are heightened by poor road infrastructure and limited regulation.

Sabon-Gari LGA, by contrast, is an urbanized part of the Zaria metropolis, with a

projected 2022 population of about 430,500 but with far greater density than Giwa (CityPopulation, 2022b). Historically a “strangers’ quarters,” it has developed into a major trading hub with large markets such as Sabon Gari Zaria and Samaru Zaria (Wikipedia, 2024b). Here, motorcycles and tricycles are integral for intra-city commuting, navigating congestion, and facilitating trade. Challenges are more urban in nature, including traffic accidents, noise, pollution, and security risks.

By comparing Giwa’s rural-agrarian setting with Sabon-Gari’s urban-commercial environment, this study highlights how differing levels of urbanization and economic

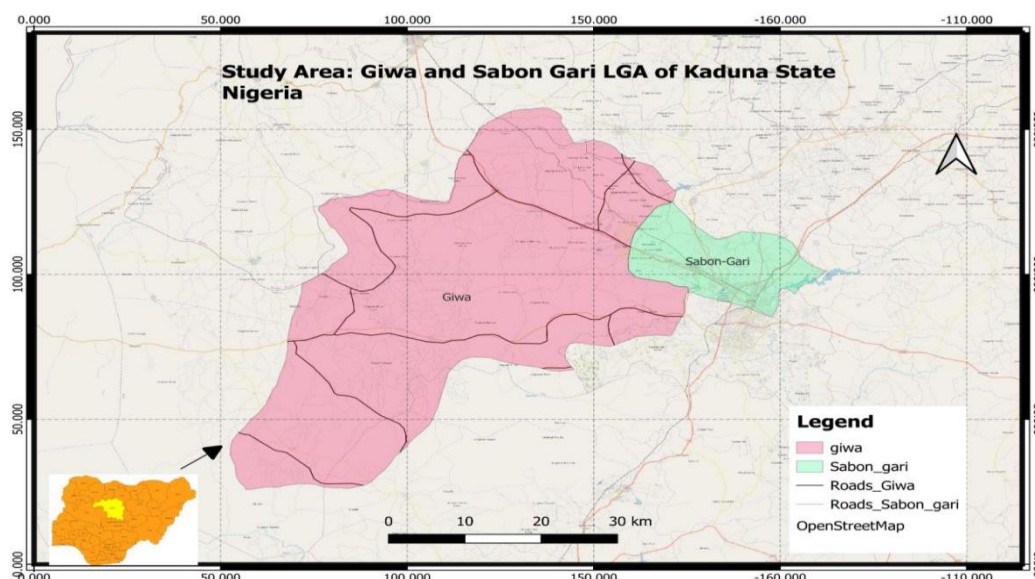
activity shape the impacts of informal transport, providing a nuanced basis for targeted policy interventions.

Methodology

This study adopts a descriptive research design to conduct a comparative assessment of the socio-economic impact of commercial motorcycles and tricycles in Kaduna State, focusing on Giwa and Sabon-Gari Local Government Areas (LGAs). The methodology provides a framework for collecting, analyzing, and interpreting data to understand how these two modes of transport influence mobility, employment, and economic activity in the selected areas.

Study Area: Sabon Gari and Giwa Local Government Areas, Kaduna State

Figure 1: Map of Giwa and Sabon Gari LGAs



This study focuses on Sabon Gari and Giwa Local Government Areas (LGAs) of Kaduna State, Nigeria, selected for their contrasting socioeconomic and geographical characteristics. The choice of these two LGAs offers a comparative perspective on how different forms of informal transportation, tricycles and motorcycles, contribute to local economies, mobility, and livelihoods in both urban and rural settings.

Sabon Gari L.G.A., located in the northern part of Kaduna State, is a highly urbanized area known for its commercial vibrancy, educational institutions, and diverse population. It serves as a major economic and transportation hub in the state. Public transportation in Sabon Gari is dominated by tricycles, commonly referred to as "Keke," which are favoured because of their affordability, manoeuvrability, and suitability for short-distance urban travel. The tricycle sector provides vital employment and supports small businesses involved in vehicle maintenance, fuel sales, and spare part trading. However, challenges such as road safety, traffic congestion, and regulatory compliance persist, particularly in the more densely populated parts of the LGA.

On the other hand, Giwa L.G.A. represents a predominantly rural environment, where

agriculture is the cornerstone of the local economy. It is used for the cultivation of crops such as maize, groundnuts, sorghum, and soybeans, as well as livestock rearing.

Data Collection Instruments

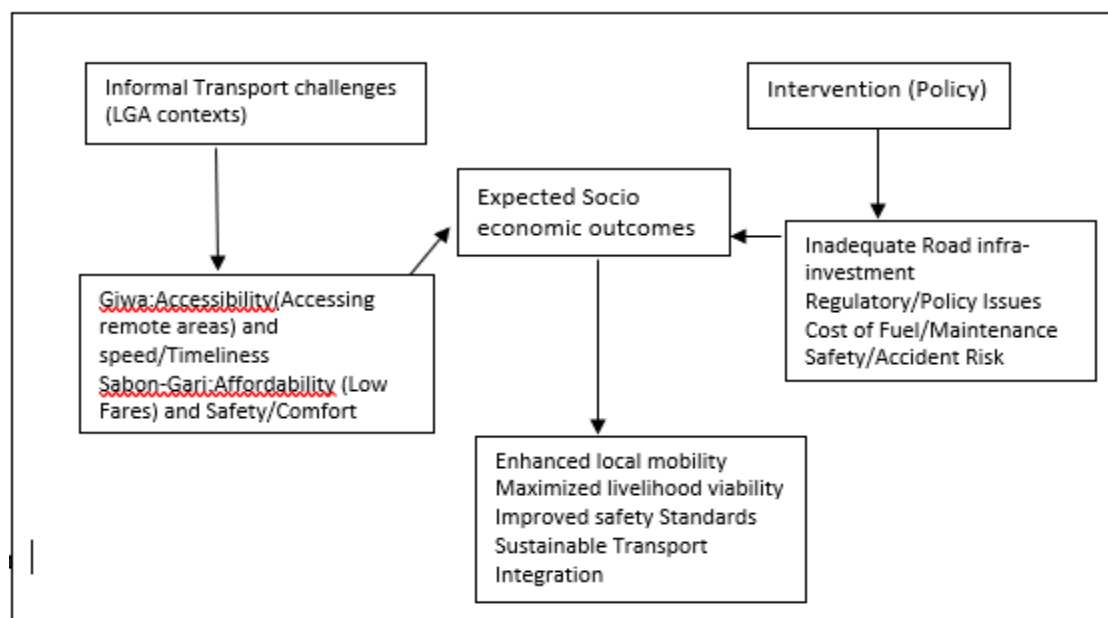
Three instruments were used to collect primary data:

1. **Structured Questionnaires:** These were administered to operators and commuters to gather quantitative data on income, usage frequency, travel time, and challenges.
2. **Semi-Structured Interviews:** Conducted with business owners, local officials, and union leaders to gather qualitative insights into economic impact, regulatory challenges and operational realities.
3. **Observation Checklists:** Used at transport terminals to assess infrastructure, compliance with safety measures, and efficiency of operations.

Method of Data Collection

Quantitative data were analyzed using descriptive statistics, including frequencies, percentages. These findings were presented in tables and charts to enhance clarity and interpret-ability.

Figure 2: Interdependent relationship between the identified challenges and the resulting policy outcomes within the informal transport sector.



Sample Size and Sampling Technique

The study population comprised individuals directly involved in or affected by informal transport operations in Giwa and Sabon-Gari Local Government Areas of Kaduna State, including transport operators, commuters, business owners, and government or union representatives. A total of 200 respondents were selected using a purposive sampling technique. This method was adopted to ensure that only participants with direct operational or experiential knowledge of commercial motorcycles and tricycles were included in the study. The total sample was evenly distributed

between the two LGAs to allow comparative analysis.

Within each LGA, respondents were purposively selected with assistance from local transport unions and community leaders to ensure representativeness across relevant stakeholder groups. The distribution reflects proportional involvement within the transport ecosystem: commuters (50%), operators (30%), business owners [local traders and small-scale entrepreneurs] (10%), and government/union representatives (10%). The business owner's category refers to traders and shop owners whose livelihoods depend on transport access for goods and customers.

This stratified purposive approach provides balanced insights from key stakeholders and

enhances the validity of the analysis between the two LGAs.

Table 1: Demographic Characteristics of Respondents

Category	Giwa	Sabon-Gari	Total
Transport Operators	30	30	60
Commuters	50	50	100
Business Owners	10	10	20
Government/Union Representatives	10	10	20
Total	100	100	200

Source: Authors field work (2025)

Table 2: Gender Distribution

Gender	Giwa (frequency)	Sabon-Gari (frequency)	Total	Percentage (%)
Male	100	100	200	100
Female	0	0	0	100
Total	100	100	200	100

Source: Authors field work (2025)

The finding of 100% male dominance among operators in both Giwa and Sabon-Gari (Table 2) is consistent with established Nigerian literature on the informal transport sector. While acknowledging the sector's crucial role in facilitating women's mobility (World Bank, 2024), this distribution confirms that the operation of motorcycles and tricycles primarily functions as a male-dominated

livelihood strategy. This demographic reality shapes the sector's operational and safety culture, directly influencing subsequent findings on regulatory compliance and accident risk.

Economic Impact of Motorcycle and Tricycle Transportation

Table 3: Average Daily Income of Operators of Motorcyclist in Giwa and Tricyclist in Sabon-Gari LGA of Kaduna State

Daily Income (₦)	Giwa frq	Sabon- Gari frq	Total Respondents (N=200)	Percentage (%)
Below ₦2,000	10	6	16	8
₦2,000 – ₦4,000	50	38	88	44
₦4,001 – ₦6,000	30	46	76	38
Above ₦6,000	10	10	20	10
Total	100	100	200	100

Source: Authors Field work (2025)

Analysis of the Average Daily Income confirms that both transport modes provide a viable, essential income, addressing the objective of livelihood contribution. However, the data reveals a context-dependent profitability structure:

Urban Advantage: Tricycle operators in the urban Sabon-Gari LGA demonstrate a higher concentration in the ₦4,001–₦6,000 income bracket (46.0%) compared to motorcycle operators in Giwa (30.0%). This disparity is directly linked to the urban environment's higher population density and intense commercial activity. Tricycles capitalize on frequent, short-distance intra-city trips, providing stable, high-volume income opportunities.

Rural Constraint: Conversely, the highest concentration in Giwa LGA is found in the ₦2,000–₦4,000 bracket (50.0%). This income constraint reflects the lower frequency and longer distances associated with serving dispersed settlements in an agrarian economy. While income is generated, the economic returns are more moderate, underscoring the sector's vulnerability to operational costs unique to the rural setting.

This comparison validates the first hypothesis: the economic function of informal transport is robust in both settings, but its financial structure is optimized in the urban commercial hub, aligning with the Livelihood Viability component of the Conceptual Framework.

Transportation Preference and Accessibility

Table 4: Commuters Preference for Transport Mode

Reason For Preference	Giwa (Motorcycle) frq	Giwa (Tricycles) frq	Total (200)%
Accessibility (Accessing remote areas)	40	12	52(26%)
Speed/Timeliness	35	18	53(26%)
Reason For Preference	Sabon Gari (Motorcycle)	Sabon Gari (Tricycles)	
Affordability (Low Fares)	15	15	30(15%)
Safety/Comfort	10	55	65(33%)

Source: Authors field work (2025)

The divergence in commuter preferences (Table 4) precisely illustrates how motorcycles and tricycles provide functionally specialized mobility solutions, directly addressing the objective of enhanced mobility:

Motorcycles as Access Enablers (Rural): In Giwa, the overwhelming preference is for Accessibility (40.0%) and Speed (35.0%). This priority is a direct consequence of the inadequate road infrastructure (as confirmed by 45% of operators, Table 3). Motorcycles are not simply a choice but an essential tool for overcoming infrastructural barriers, ensuring market access and connectivity for marginalized rural populations. This confirms

their role in addressing the infrastructural hazard identified in the Conceptual Framework.

Tricycles as Safety Enablers (Urban): In Sabon-Gari, the dominant preference is Safety/Comfort (55.0%). This shift in priority reflects the demands of the urban setting, where commuters prioritize the security and stability of the enclosed tricycle over the speed of the motorcycle. This preference validates the need for the Regulatory Harmonization intervention, as safety and perceived reliability are prerequisites for sustainable urban integration.

Operational Challenges Faced by Operators

Table 5: Common Challenges

Daily Income (₦)	Giwa Frq (%)	Sabon-Gari Frq (%)	Total Respondents (N=200)	Percentage (%)
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Below ₦2,000	10	6	16	8
₦2,000 – ₦4,000	50	38	88	44
₦4,001 – ₦6,000	30	46	76	38
Above ₦6,000	10	10	20	10
Total	100	100	200	100

Source: Authors field work (2025)

The analysis reveals that while safety risks are a high, shared challenge in both LGAs, the contextual severity of infrastructure and regulatory issues diverges sharply, underscoring the need for differentiated policy responses.

Rural Giwa: Dominance of Infrastructure Gaps

In Giwa LGA, Inadequate Road Infrastructure is the overwhelmingly dominant concern, cited by 45.0% of motorcycle operators.

Critical Analysis: This finding directly substantiates the literature on rural transport deficits. Poor road quality increases operational costs (maintenance and repair) and is a primary factor behind the necessity of motorcycles for accessibility. The high concentration of this concern in Giwa (more than double the priority given in Sabon-Gari) mandates that infrastructural investment be the immediate policy priority for maximizing the developmental potential of rural informal transport.

Urban Sabon-Gari: Regulatory Pressure and Congestion

In Sabon-Gari LGA, the highest priority is given to Safety/Accident Risk (32.0%), followed closely by Regulatory/Policy Issues (28.0%).

Critical Analysis: The high concern over Regulatory/Policy Issues is a direct consequence of the urban environment. Denser traffic and the presence of formal urban planning frameworks mean tricycles are subject to greater control, restrictions (e.g., specific routes, curfews), and informal taxes than motorcycles operating in dispersed rural areas. This highlights a need for transparent and harmonized regulatory enforcement that balances public safety with operator livelihood.

Shared and Common Ground

Safety/Accident Risk: This risk is statistically similar in both LGAs (30.0% in Giwa; 32.0% in Sabon-Gari), making it a universal challenge. This shared priority necessitates

broad interventions like mandatory operator training, vehicle inspection, and aggressive enforcement of helmet use, regardless of the urban or rural setting.

Economic Strain (Fuel/Maintenance): The cost of fuel and maintenance is a significant, shared concern (15.0% and 18.0%), reflecting the vulnerability of the informal sector to macroeconomic shocks, such as volatile fuel prices and high vehicle acquisition costs.

Context-Specific Challenges and Policy Alignment

The comparative analysis of operational challenges (Table 5) strongly reinforces the study's foundational argument for context-specific policy interventions:

Defining Rural Hazard: Inadequate Road Infrastructure is the single greatest inhibitor in Giwa LGA, cited by 45.0% of operators. This finding is the primary justification for prioritizing Targeted Infrastructure Investment; the key policy recommendation for maximizing rural transport potential.

Defining Urban Hazard: In Sabon-Gari LGA, while safety remains a high concern, Regulatory/Policy Issues (28.0%) rank significantly higher than in the rural context. This friction arises from the clash between the flexible, informal mode and the rigid demands

of urban planning. This validates the need for the Regulatory Harmonization intervention to integrate tricycles without compromising their operational utility.

Universal Hazard: The virtually identical concern over Safety/Accident Risk in both LGAs (approximately 30%) confirms this as a universal social cost of informal transport. This hazard necessitates a Universal Safety Enforcement intervention that transcends rural and urban boundaries, focusing on training and inspection across the entire state.

Discussion of Findings

The major findings of the study reveal clear spatial and functional distinctions between the operations of commercial motorcycles and tricycles across the two study areas. In Giwa Local Government Area, motorcycles were found to be the dominant mode of transport, serving primarily as accessibility enablers in rural communities with poor road infrastructure. Their use was driven by necessity rather than preference, as they provided vital connectivity to dispersed settlements and markets. In contrast, tricycles were more prevalent and economically viable in the urbanized Sabon-Gari Local Government Area, where they benefited from higher population density, shorter travel

distances, and stronger commuter demand for safety and comfort. This urban advantage translated into higher daily income levels among tricycle operators and greater awareness of transport regulations. Despite these contextual differences, both transport modes shared similar safety and accident concerns, which emerged as a universal hazard across the informal transport landscape of Kaduna State.

The implications of these findings are multifaceted. Economically, they highlight the sector's indispensable role in sustaining livelihoods, particularly for low-income earners excluded from formal employment opportunities. Socially, they underscore the sector's contribution to spatial equity by providing affordable and flexible mobility options to both rural and urban populations. However, the persistence of safety risks and inadequate regulatory oversight exposes systemic weaknesses that threaten the sustainability of these gains. The findings therefore imply that without strategic intervention—such as improved infrastructure in rural areas, stronger enforcement of safety standards, and harmonized regulatory frameworks in urban centers—the sector's developmental benefits may continue to be

undermined by preventable hazards and operational inefficiencies.

When compared with previous studies, the findings align closely with those of Adeniji (2020), Adeyemi & Olaoye (2020), and the World Bank (2024), all of which emphasize that informal transport serves as a critical livelihood and accessibility mechanism in developing contexts, especially where formal public transport systems are weak or absent. The observed male dominance among operators corroborates earlier findings by Olagunju (2019), who reported that the informal transport industry in Nigeria remains overwhelmingly male due to cultural norms and the physical demands of vehicle operation. Similarly, the higher income levels recorded among urban tricycle operators resonate with the conclusions of Abubakar and Dabo (2022), who found that urban-based operators benefit from higher ridership turnover and improved market access. However, the study diverges slightly from the observations of Adekoya (2018), who argued that rural motorcycle operations often yield comparable profits to urban transport under efficient cooperative management systems. This divergence may be attributed to contextual differences in road infrastructure,

settlement patterns, and fuel costs between Kaduna State and other regions examined

Table 6: Awareness of Government Policies

Response	Giwa (%)	Sabon-Gari (%)	Total Freq	Total %
Aware	38	54	92	42%
Not Aware	62	46	108	54%

Source: Authors field work (2026)

Awareness of government transport policies is higher among tricycle operators in Sabon-Gari, suggesting better communication or regulatory enforcement in urban areas.

Conclusion and Recommendations

The study demonstrates that commercial motorcycles and tricycles constitute indispensable components of the informal transport system in Kaduna State, yet their economic performance, functional roles, and regulatory challenges are markedly shaped by spatial context. In the rural Giwa Local Government Area, motorcycles primarily function as accessibility enablers, mitigating infrastructural deficiencies and sustaining dispersed agrarian livelihoods. Conversely, in the urban Sabon-Gari Local Government Area, tricycles exhibit greater income-generating potential and are preferred for their

relative safety and comfort, aligning with the demands of a dense, commercially active environment. The comparative analysis further reveals that while urban operators benefit from higher profitability and stronger policy awareness, rural operators remain constrained by infrastructural inadequacies and limited institutional engagement. Despite these contrasts, safety-related risks persist as a universal operational hazard across both settings. Overall, the findings underscore the need for context-sensitive and empirically grounded policy interventions; emphasizing targeted rural infrastructure development, urban regulatory harmonization, and comprehensive safety enforcement; to enhance the sector's contribution to sustainable mobility, livelihood security, and social equity in Kaduna State.

In light of the study's findings, it is recommended that policy interventions for the

informal transport sector in Kaduna State be designed to reflect the contextual differences between rural and urban environments. In rural areas such as Giwa, efforts should prioritize the rehabilitation and maintenance of access roads to enhance mobility and reduce operational costs, while in urban centers like Sabon-Gari, attention should be directed toward regulatory harmonization and the structured integration of tricycles into formal transport planning frameworks. Addressing the universal challenge of safety requires the implementation of a comprehensive state-wide safety and training program that includes compulsory rider education, regular vehicle inspections, and continuous public awareness campaigns on road safety practices. Formalization of the sector is equally critical, necessitating the establishment of a registration and identification system that promotes accountability, reduces harassment, and

provides access to institutional benefits such as micro-credit, insurance, and cooperative support schemes. In addition, effective communication channels should be developed to bridge the observed gap in policy awareness between rural and urban operators through regular engagement sessions, information campaigns, and community-based outreach programs. The integration of environmental sustainability measures, such as the gradual introduction of cleaner fuel technologies and the promotion of gender-inclusive practices, will further strengthen the sector's contribution to equitable and sustainable mobility. Finally, a continuous monitoring and evaluation framework should be institutionalized to assess the effectiveness of interventions across safety, income generation, accessibility, and compliance dimensions, thereby ensuring adaptive management and the long-term sustainability of the informal transport system.

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