Assessment of tricycles as a commercial passenger transport means in Kaduna metropolis

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Abstract
The primary aim of this study is to investigate the factors that contribute to the general acceptance of the tricycle as a means of transportation among the public in the economic context of a developing nation like Nigeria. Well-structured interviews and questionnaires were administered to users and consumers of tricycle services, focusing on major routes in the Kaduna metropolis. A total of 330 tricycle operators and 200 users were interviewed. Descriptive statistics were used for the analysis. The results revealed that flexibility, speed, and ease of accessibility are the primary factors for choosing tricycle services. 45% of respondents expressed average agreement on the importance of flexibility and speed, 29.5% averaged their agreement on easy accessibility as a key factor influencing their choice of tricycle services in the Kaduna metropolis. The study also found that tricycle services are the most preferred means of public transport within the Kaduna metropolis. Consequently, the Kaduna State Transport Regulatory Authority aims to develop a Zone Licensing project, grouping tricycle operators, bus drivers, and taxi drivers into specific routes or zones, distinguished by particular colors. The sole aim of the Kaduna State Transport Regulatory Authority will be to regulate the movement of tricycles beyond the designated routes. Therefore, the study concluded that stakeholders should implement stricter safety regulations, improve road infrastructure, and provide proper training for tricycle operators.
Keywords: Commercial passenger, Kaduna metropolis, transport demand, tricycle service.

1. Introduction

The essential role of transportation on the economic, social, environmental and political development of any human settlement implies that the livelihoods and activities of people revolve around transportation (Tucho, 2022). The societal transformation and the accompanying change in demand for Transport, especially in meeting developmental needs, imply that transport systems are usually in a state of flux (Wong, Hensher, & Mulley, 2020).

Pokharel et al. (2021) opined that transportation is one of the dynamic activities in the developing nations of the world because of its essential impact on economic growth and development, spatial expansion of towns and cities, social interaction, industrial location, information flow, and political movement and integration. The mobility gap between the rich and the poor, and between urban centers and rural areas, results from accessibility to work, jobs, services, and quality of life.

In developing nations, poor international and intermodal accessibility to transport facilities, due to inadequate and poorly maintained transportation infrastructure and vehicles, remains a primary factor in Africa, and Nigeria is not exempted (Osunkoya, 2021; Emodi et al., 2022). Aderibigbe et al. (2024) asserted that since the era of colonial rule in Nigeria, the emphasis has been on personal mobility, which has been supported by bicycles, motorcycles, and cars for various categories of workers in the country.

As a result of the economic meltdown in 2002, due to inflation and naira devaluation, a preponderant number of individuals could not afford cars with any government loans. The inflation and naira devaluation resulted in immobility and perpetuating poverty, knowing that an immobile nation is far from being developed. Hence, the government has tried to ease transportation hassles for the populace by introducing

a commercial tricycle service popularly known as the para-transit Transport service. Agheyisi (2021) submitted that tricycle services have become a cheap and alternative mode of transportation, coupled with the ban on motorcycles in the Federal Capital Territory in 2009.

Inadequate transportation facilities, poor maintenance of intra-city roads, and inadequate spare parts, coupled with a lack of vehicle maintenance culture, have profound implications for tricycle workers' productivity. The changes in cultural, political, and economic situations in Nigeria have forced Transport workers to meet the challenges of inadequacies of transportation facilities in Kaduna metropolis through various means. Mobility in Kaduna metropolis is dominated by taxis, buses, bicycles, motorcycles, and tricycles (Onokala & Olajide, 2022; Auwalu & Bello, 2023).

This paper aimed to assess the factors that lead to the general acceptance of the tricycle as a commercial means of transportation by the general public in Kaduna metropolis.

2. Conceptual Review

2.1 Mobility and Development

According to Lyon (2021), mobility is the force that propels movement and the ability to change position from one region to another using different modes of Transport to meet daily activities. As such, it differs from accessibility, which refers to the ability to reach desired services or a particular destination. Mobility and accessibility are the overall goals of urban and regional transportation systems. Ceder (2021) mobility is the ability of any person to move between points in a community by private or public means of transportation. Long distances, bad weather, steep hills, scarcity of services and high fares are major mobility challenges (Ferreira et al., 2022).

Taghvaee et al. (2022) Transport has played a critical role in the development and growth, and sustainability of global economies. It is an agent of growth, change, and development in every sector of the economy. Thus, as an agent of change, it has brought about significant transformation in every facet of human existence, be it social, economic, political, recreational, religious, cultural, geographical, and even in the distribution of information to all economies of scale (Oludele, 2020).

Spatial interaction provides the means for the satisfaction of certain needs arising from the locational separation of producers and consumers. It all depends on the reciprocal relations between different places on the Earth's surface, based on the principles of complementarity, intervening opportunities, and transferability (Alzoubi et. al, 2022). Complementarity connotes that the demand and supply of transport services must exist first. Transferability connotes that goods in question must be capable of being moved from the place of origin to the place of destination to be able to overcome the distance friction; at the same time, the absence of intervening opportunity implies that there must not be any intervening circumstance between the demand and supply locations. The concept of intervening opportunity is shown in the diagram below:

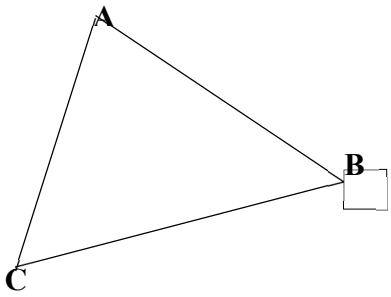

Figure 1. Intervening Opportunity,
Source: Authors Computed (2025)

Assuming that A gets his supply of products from B, and C is between A and B, and also supplies the same type of products as B and at a shorter distance, reducing cost. Then C is an intervening opportunity for B.This analysis, therefore, connotes that these three transport components meaningful interaction to take place, as postulated by Edward Ullman (1956). The intervening variable here indicates that there must be an intervening circumstance between the demand and supply of products and services. The intervening variable is of great importance in value to transport management issues. Also, it supports that intervening circumstances must exist between supply and demand to ease interaction between urban and intra-city movement. Therefore, while complementarity generates interaction, the factor of intervening opportunity results in a substitution of areas, and the factor of transferability results in a substitution of products (Ochiche et al., 2020; Scheweiki & Obermaier, 2023).

2.2 Transport Demand

Atombo et al. (2021) stated that transport demand is driven by the level of satisfaction passengers expect from the service provided. Similarly, Hörcher and Tirachini (2021) noted that transport is rarely desired for its own sake, but rather for the value or benefit it delivers at a given time. Andam et al. (2020) emphasised that the demand for goods and services is largely influenced by consumers' income and the price of those goods or services compared to others. Thus, travel demand and transport mode choice vary depending on each mode's characteristics and the specific services offered to meet passengers' needs.

2.3 Tricycle as a Commercial Passenger Transport

Agbiboa (2022) submitted that tricycles have emerged as a popular and efficient mode of commercial passenger transport in the African Metropolis, revolutionising how people navigate the bustling city streets. These three-wheeled vehicles, also known as Keke Napep or Keke Marwa, have quickly gained popularity due to their affordability, manoeuvrability, and convenience.

One of the primary advantages of tricycles is their tendency to maneuvre through traffic gridlock and narrow streets, ensuring just-in time delivery of passengers and goods. Tricycles can access areas not accessible to big wheel vehicles because of their small size and agile maneuvrability, supplying a last-mile connectivity solution for users.

According to Musa (2024), in Nigeria, Tricycles are designed to carry both passengers and goods. The rear seat can comfortably carry two or more passengers, providing a more convenient and comfortable journey experience than traditional buses.

However, tricycles provide a less service fare option for commuters. The charges are generally affordable, making it service accessible to many residents and visitors in the Kaduna Metropolis. Ahijo (2022) submitted that the provision of fewer service fare options coupled with its convenient and flexible service rendering has made tricycles a preferred choice for short-distance travel within the city.

In recent years, tricycle operators in Kaduna Metropolis have taken measures to enhance the passenger experience. Many tricycles now have comfortable seating, protective covers against weather elements, and even entertainment systems. Aderibigbe et al. (2024) subscribed that tricycle Transport is a popular commercial transport option for both passengers and goods in Nigeria, because of its affordability, manoeuvrability characteristics, and the conveniences of door-to-door service delivery.

3. Methodology

3.1 Sample Size and Procedure

This paper sectioned Kaduna metropolis into nine (9) major passenger locations based on tricycle operations. These include Ungwan Rimi (along KASU), Tudun Wada (along KADPOLY), Gowon Way (along ENT), Kawo by overhead bridge, Command junction, Rigasa junction, Ahmadu Bello way by Alhaji Gumi central market, Mando (along market), Kaji junction (along Yakowa Road), and in all, 330 tricycle operators and 200 tricycle users were selected and interviewed, respectively. These passenger locations were divided into two (2) corridors, and these include the operators of the tricycle and the users of the tricycle. At the end of the field surveys, 530 questionnaires were found to be analyzable in the Kaduna Metropolis.

3.2 Data Collection

Primary data was sourced using structured interviews and questionnaires administered to the users and consumers of tricycle services. Information such as socio-economic characteristics, cost and problems of operations, marital status, and the educational background of the operators was sought. Basic descriptive statistics were employed to analyse the collected data using percentages, proportions, and frequency distributions. Additionally, the researcher gathered insights on the perceived significance of various factors influencing the choice to use tricycles for public transport in Kaduna Metropolis. The study also examined the extent to which tricycle services impact consumer behaviour in the Kaduna area. Key elements of tricycle use as a commercial transport mode in the study include motivations for operating tricycles for passenger transport and the reasons behind their patronage by commuters.

3.3 The Study Area

Kaduna ranks as the fifth largest city in Nigeria, following Lagos, Kano, Ibadan, and Abuja in descending order. The city's population growth rate aligns directly with the rise in urban population (Qurix et al., 2020). Situated in the northern Guinea savannah zone, Kaduna lies between latitudes 10° and 11° North and longitudes 7° and 8° East, with an elevation of 645 meters above sea level. Kaduna serves as the administrative capital of Kaduna State and hosts major military institutions, including the Nigerian Army's 1st Mechanised Division, the Nigerian Defence Academy, the Nigerian Air Force Base, and the Defence Industries Corporation of Nigeria. The city is equipped with essential socio-economic and political infrastructure. Abdulyakeen et al. (2023) noted that Kaduna attracts a diverse population from various ethnic groups across Nigeria, now totalling nearly 200. About 70% of Kaduna's residents are traders, retirees, civil servants, or private sector employees, while 3% are peasant farmers (Nuhu et al., 2020).

Many squatter settlements developed without proper access roads, yet trade, both wholesale and retail, has thrived. Tricycles serve as the primary means of reaching these areas. Due to the poor condition of intra-city roads and the local habit of establishing markets within walking distance, tricycles (Keke NAPEP) have increasingly replaced taxis and buses. Figure 2 below illustrates the map of Kaduna Metropolis, indicating the study locations.

4. Results and Discussion

Table 1. Reason for Operating Tricycle as a Commercial Passenger Transport Means

S/N	Reasons	No of Respondents	Percentage
1	To bridge the supply/demand gap of intercity transport services	10	3.03
2	To augment the rider's salary	70	21.21
3	To minimise the interaction problem of the trip maker.	15	4.55
4	To earn a living	170	51.51
5	For employment purposes	65	19.7
6	Total	330	100

Source: Authors' Field Survey (2025).

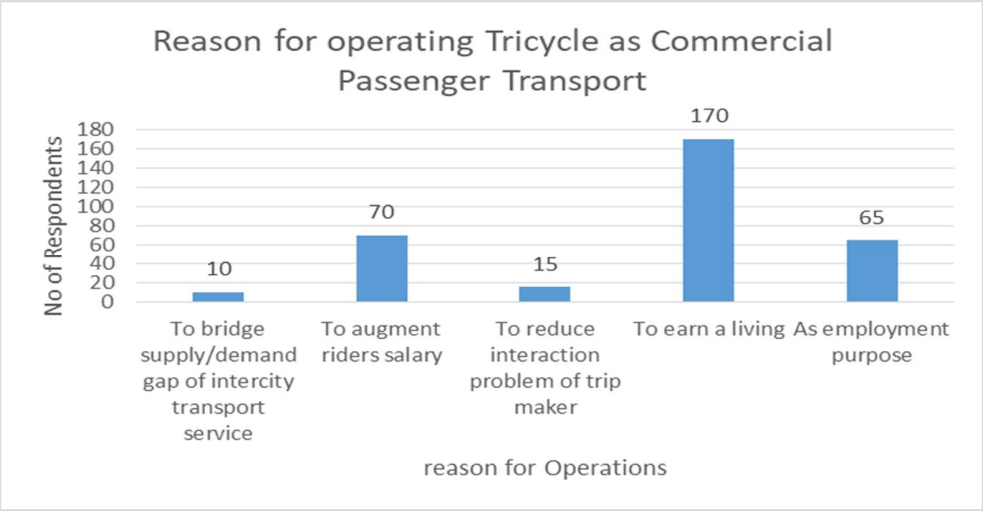

Figure 2. Reason for operating Tricycles as Commercial Passenger Transport

Figure 2 above revealed that the majority of tricycle operators got engaged in the operation to earn a living, having the highest figure standing at 170 respondents, with a percentage of 51.51%. In contrast, other respondents said it to augment riders salary, which stood at 21.21% of 70 respondents, then as an employment purpose and lastly to bridge supply/demand gap of intercity transport service which has 10 respondents at 3.03% and to reduce interaction problem of trip maker stood at 15 respondents (4.55%).

Table 2. Average Daily Earnings of Tricycle Operators before and after Joining the Tricycle Business

S/N	Operations Area	Before (₦)	After (₦)

1	Kaduna State University (KASU)	3,500	6,000
2	Kaduna Poly Ungwan Rimi	2,600	5,400
3	Kawo by an overhead bridge	3,000	3,800
4	Mando Market	2,000	3,000
5	Alhaji Gunmi Central Mosque (CBD)	4,500	7,000
6	Karji Junction	3,000	5,000
7	Rigasa (train station)	4,000	5,600
8	Kaduna Poly Tudun Wada	2,800	4,200
9	Refinery Junction	2,700	6,000
10	SMC Junction (Malali)	2,000	4,000
	Total	30,100	50,000

Source: Authors' Field Survey (2025)

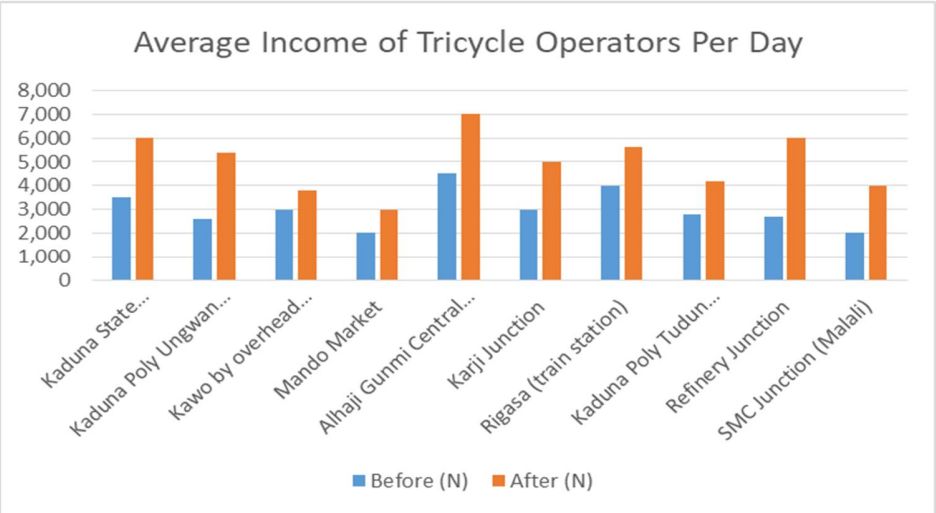

Figure 3. Average Income of Tricycle Operators per Day

Figure 3 above depicts the average income a tricycle operator earns daily, moving further the study revealed that the operators that ply within Alhaji Gumi central area earned the highest even before now, which was four thousand five hundred Naira (₦4, 500) only and after stood at Seven thousand Naira (₦7, 000), this could be as a result of the presence of the central market, KASU operators earned six thousand Naira (₦6, 000) only just because of the presence of the students who board tricycle and Refinery junction also stood at Six Thousand Naira (₦6, 000), Kaduna poly route operators earn Five thousand Four Hundred naira (₦5, 400) only just because of the presence of the students. Karji Junction also earns five thousand naira (5,000) because most KASU students reside within Karji Junction. Income determines the choice and nature of vehicles acquired to satisfy the demand for convenience and class by members of society (Sparrow et al., 2020).

4.3 Tricycle Users' Income Level

Table 3. Analysis of Income Level of Users

Income range per week (₦)	No of Respondent	Percentage
8,000 – 10,000	125	62.5
10,500 – 11,000	43	21.5
11,500 – 12,000	16	8.0
12,500 – 13,000	13	6.5
13,500 – 14,000	3	1.5
Total	200	100

Source: Authors' Field Survey (2025)

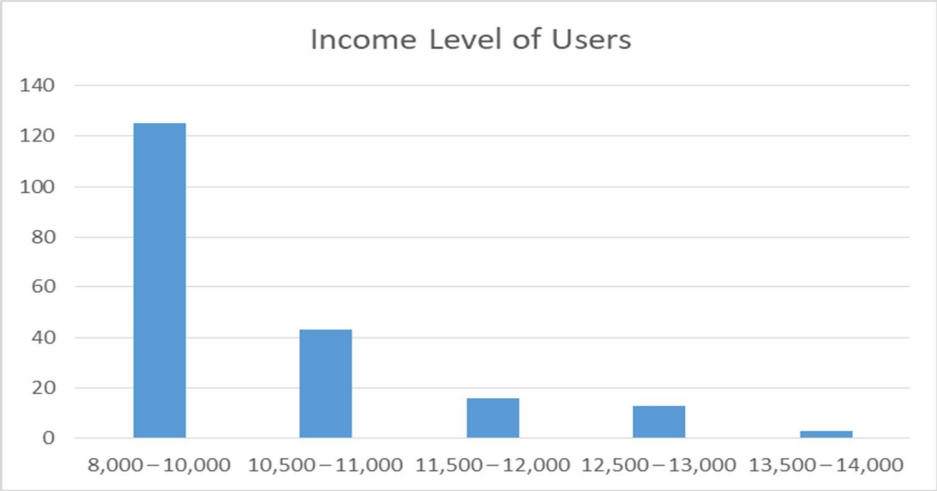

Figure 4. Income Level of Users

Figure 4 above illustrates the income levels of tricycle users, highlighting that the ranges of ₦8,000–₦10,000 and ₦10,500–₦11,500 recorded the highest concentration. Over 60% of Kaduna residents who visit the market daily fall within these income brackets. In contrast, other income groups showed relatively low user traffic.

4.4 Factors Influencing Tricycle Patronage

Table 4. Perception of Reasons for Patronage by Tricycle

S/N	Patronage Factors	No of Respondents	Average
1	Flexible and fastness	90	45
2	Easy accessibility	59	29.5
3	Convenient and comfortable than motorcycles	8	4

4	Affordability	12	6
5	There is no alternative	24	12
6	Availability of luggage space	7	3.5
	Total	200	100

Source: Authors' Field Survey (2025)

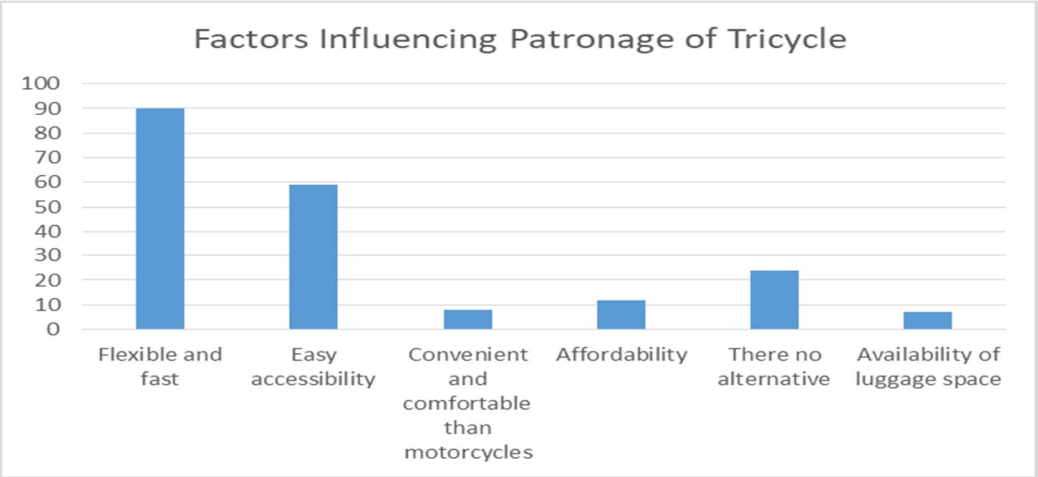

Figure 5. Factors Influencing Patronage of Tricycle

Figure 5 above presents the key factors influencing users' preference for tricycles over public buses within the Kaduna State metropolis. The findings show that flexibility, speed, and easy accessibility are the major reasons for this preference. Flexibility and speed accounted for an average of 45% of respondents, while easy accessibility had an average response rate of 29.5%, as depicted in Figure 6. The study further noted that tricycles have become the most favoured mode of public transport in Kaduna metropolis. Consequently, the Kaduna State Transport Regulatory Authority plans to implement a Zone Licensing project, grouping tricycle, bus, and taxi operators by route, with specific colours to distinguish them. The primary goal is to control tricycle movement outside assigned routes.

5. Conclusion

Tricycle services have a strong and positive influence on passengers' choice of commercial transport within the Kaduna metropolis due to their unique features and the quality of service they offer. The demand for tricycle transport depends on the satisfaction passengers expect from the service, the type of service it provides at a given time, and the comfort passengers anticipate. This aligns with the findings of Pangbourne et al. (2018), who assert that transport is not desired for its own sake but for the benefits it offers through its services at specific times. The study recommends that the government and stakeholders enforce stricter safety rules, enhance road infrastructure, and offer proper training to tricycle operators. Furthermore, incorporating tricycles into the wider public transport network and promoting the use of eco-friendly tricycle models can enhance urban transportation in Kaduna Metropolis.

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