

An Appraisal of The Socio-Economic Impact of Commercial Tricycles in Yola Metropolis, Adamawa State, Nigeria

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Abstract

This study examines the socio-economic impact of commercial tricycles in Yola metropolis, Adamawa State. The study was conducted using cross-sectional data, which were collected using well-structured questionnaires. A sample of 366 was drawn from a population of over 9000 tricycle riders in Yola metropolis using multi-stage sampling techniques. The data collected were analyzed using logistic regression analysis techniques. The results of the analysis suggests that that age, marital status, level of education, place of residence, ownership of tricycle and being a tricycle rider are significantly more likely to have significant impact on the overall income of the tricycle riders in Yola metropolis, Adamawa State. The study recommends among others that the government of Adamawa State consider the introduction of an empowerment program where people will be given tricycles, either on hire purchase or people should provide at least 40 percent of the total cost. This should be done under a strict supervision and condition in addition to severe penalties in case of default by the beneficiaries so as provide income generation employment for some youths of Yola metropolis and Adamawa State entirely.

Keywords: Transportation Tricycles, Income, Poverty Reduction, Logit Regression.
JEL CODES: L91, L92, D31, I32 C31

Introduction

Tricycles have emerged as the prevalent means of urban public transportation in developing regions like Africa and Asia due to shortcomings in formal transport systems, unable to keep up with the escalating travel needs (Adetunji, 2017; Priye & Manjo, 2020). This in addition to the roles they serve as feeder modes or gaps fillers created by poor public transport services. Similarly, the acceptability of tricycle in Nigeria might not be unconnected with its flexibility and affordability, door-to-door services for urban commuters, maneuverability during traffic congestions, ease of movement on poor roads as well as employment generation capacity to operators (Obioma, Nwaogbe, & Ukaegbu, 2012; Dorado, Fabros, & Rupisan, 2015; Bamidele, 2016; Adetunji, 2017; Priye & Manjo, 2020).

It is pertinent to stress that commercial tricycle is called by different names in various countries, such as Auto-rickshaw in India (Subendiran, 2014; Kaul, Gupta, Sarkar, Ahsan & Singh, 2019), Habal-Habal in Phillipine (Guillen & Ishida, 2004), Tuk-Tuks in Thailand (Kumar & Saputra, 2014), Trishaws or Three-Wheelers in Sri Lanka (Kumarage, Bandara, & Munasingh, 2010). Similarly, it is called by different names in Nigeria such as Keke NAPEP, Keke Marwa, *Adaidata* (Obioma et al., 2012; Muktar, Waziri, Abdulsalam, & Dankani, 2015; Bamidele, 2016). In Adamawa State, where cost of transportation is high and a large proportion of the residents prefer to use public transport services, many people rely on commercial tricycle for transportation from one place to another. Therefore its patronage is increasing in Adamawa State and indeed in many Nigerian states, especially by people who are eager to get to their destination or workplace with minimal delay and waste of time (Abichuela, 2016; Bello, Jikan-Jatum, & Inuwa, 2017). Against this backdrop, this study aims to examine the socioeconomic impacts of commercial tricycle in Yola metropolis, Adamawa State of Nigeria.

Unarguably, road transport now is the most dominant means of transportation for both freight and passenger in Nigeria especially because the rail transport system is just being resuscitated. The dominance of road transport in most of the urban centers in Nigeria is partly the reason for the collapse of the public transport system with severe suffering on commuters (Bello et al., 2017). This has led to the emergence of alternative means of transportation particularly commercial tricycle (popularly known as *Keke NAPEP*) in Adamawa State and many urban areas in Nigeria.

In spite of the advantages offered by commercial tricycle as an alternative means of transportation in solving the problems of intra-city mobility in Adamawa State, it has also introduced some challenges. Some of these challenges include traffic congestion, accidents and safety on the roads, poor safety conditions for passengers, noise and air pollution, as well as low security for the operators (Inuwa, Jikan-Jatum, & Bello, 2017).

Although studies have been conducted on commercial tricycle as an alternative means of intra-city public transportation and its associated effects such as Raji (2015); Muktar, Waziri, Abdulsalam, and Dankani (2015); Bamidele (2016); Ipingbemi and Adebayo (2016); Adetunji (2017); Nuhu, Shehu, and Yusuf (2017); Sharfadden and Ibrahim (2019); and Priye and Manoj (2020). However, little has been done on the socio-economic impact and occupational income in Yola metropolis, Adamawa State. Therefore, this study intends to fill the void in the literature by examining the socio-economic impact of tricycle transport, with specific interest on income generation and poverty reduction. It is against this background that this study seeks to examine the

impact of commercial tricycle on income generation in Adamawa state. The rest of the study will be decomposed into literature review, methodology, results and discussion of findings, conclusion as well as policy recommendations.

Literature Review

Recently, the growing demand by urban commuters especially in most of the urban centers of developing countries of Africa and Asia, where there is poor or absence of formal urban public transport system have necessitated the use of other alternative modes of transportation such as tricycle. The Tricycle is a quick solution to urban transport problem; therefore, various studies were conducted on the socioeconomic effect of commercial tricycle in different parts of African and Asian cities. For instance, Muktar et al. (2015) assessed the socio-economic importance of tricycle as tool of poverty alleviation in Maiduguri, Borno state, Nigeria. The study applied multi-stage sampling technique to collect the data from 120 respondents out 130 population and the descriptive statistics were applied as tools of data analysis. The findings of the study revealed that the male gender with no formal education dominated the tricycle operation in the study area. It also promoted economic activities and reduces poverty level, and consequently increased income (₦13,000 to ₦30,000) monthly to the tricycle operators in the state. Similarly, Raji (2015) assessed tricycle riding business as a means of poverty alleviation in some selected areas of Lagos Metropolitan city in Nigeria. The study used both primary and secondary sources of data. The study also applied stratified sampling technique to select a total of 200 auto-rickshaw operators from a total of 319 operators in 24 loading points in the study area. Data generated were analyzed using both descriptive and inferential statistical techniques in inform of frequency tables, percentages and averages as well as Chi-square and student-t test. The findings revealed that tricycle riding business is mainly a male dominated (97.3%) business. The study also recorded a significant improvement in the financial and welfare situations of tricycle operators who were engaged in the programme.

In another recent study on tricycles economic potentials, Nuhu et al. (2017) examined its contribution on rider's income in Kaduna Metropolis - Nigeria. The study used cluster sampling technique, and almost 400 questionnaires were administered to tricycle riders operating within the four metropolitan local governments of Kaduna state. The study analyzed the data collected using the Foster, Greer, and Thorbeck (FGT) model of poverty measurement. The study found that most of the tricycle riders within the study area are men. The study also found that tricycle operators earned higher wages than those in the public service, when compared with ₦18,000 national minimum wage in Nigeria. Moreover, Modibbo and Fashola (2017) applied simple percentage and multiple regressions analysis to analyze the impact of tricycle operation on the income of youth in Mubi local government areas of Adamawa state, Nigeria. The study purposively and conveniently sampled 100 tricycle riders and structured questionnaire was designed and administered to them, but out only 57 were correctly filled and returned to the researchers. The results revealed that most of the tricycles riders are men within the age of 20-35 years with basic level of education. The study found that tricycle riding in Adamawa state has significantly increased the income of youth in Mubi local government areas of the state.

However, other studies have examined the effect of related occupational hazard on commercial tricycle riders. Specifically, Shinha and Shashikala (2015) assessed the stress among auto-

rickshaw drivers in Bangalore city. A sample of 480 auto-rickshaw drivers was randomly selected from a total of 10,000 auto-rickshaw drivers' unions in Bangalore city. The data gathered for the study were presented and analyzed using frequency distribution table, percentages as well as the Chi-square technique. The study's finding of shows that about 29.2% of the respondent representing 140 drivers had a mild stress while 2% equivalent to 10 drivers were found to have moderate stress. Moreover, the study revealed that the entire drivers were married; males and they are within the age bracket of 21-40.

Furthermore, Odivwri (2014) applied descriptive statistics to examine the extent and patterns of substances abuse among tricycles operators in Kano metropolis. The study sampled a total of 365 using a snowball sampling technique. Data used in the study were generated with the aid of interview. Findings from the study suggests that most tricycle riders in the study area consumed one or another type of substance. The results also discovered that most of the respondents (36.5%) who abuse substances are within the age bracket of 24-29 years. The findings also discovered that most respondents take substance abuse to increase their productivity at work.

Debbarma and Mitra (2017) investigated the health problems facing the auto-rickshaw drivers of Nagerjala Motor park of Agartala city. The study used a questionnaires and interview sessions to collect data from about 80 auto-rickshaw service providers in the study area. The study used cluster sampling technique, to draw a sample of 84 service providers. The data collected were analyzed using descriptive statistics in the form of averages, standard deviations, tables, and percentages to identify the most prevalent medical challenges among the auto-rickshaw service providers in the study area. The findings of the study suggests that muscular-skeletal problems that comprises of knees, back, wrist, and shoulder pains were the most prevalent and frequently occurring medical challenges among all age groups of the auto-rickshaw service providers in the study area.

Sharfadden and Ibrahim (2019) examined the occupational hazards among tricycle riders in Tarauni local government area of Kano state. The study used purposive and convenient sampling technique to select 211 respondents from a total of 2894 tricycle riders. The study applied descriptive statistics, cross-tabulation, and charts and found absence of relationship between educational qualification and driving school attendance of the riders. In addition, the study showed that most of the respondents have experienced back pain that worked for 5-8 hours per day. However, the study found evidence suggesting that most of the respondents did not suffer from breathing difficulties. In a more recent study, Priye and Manoj (2020) examined the passengers' perceptions of three wheeled electric rickshaw safety in Patna, India. The study applied simple random sampling technique to draw 388 respondents from a total of 410 populations. The study employed descriptive analysis and inference statistics in the form of ordinal logistic regression analysis. Findings from the descriptive statistics suggests that most of respondents are not satisfied with the overall safety of electric rickshaw. However, ordinal logistic results showed that safety of small children, females, and elderly people are at the higher risk. Finally, the study revealed that respondents' perception about electric rickshaw suggests that safety is not guaranteed with the design of the vehicle.

As for its sustainability as an alternative mode of transportation, Adetunji (2017) applied descriptive statistics in form of frequency distribution tables and percentages to analyze the characteristics of tricycle and its sustainability for public transportation in Lokoja, Kogi State, Nigeria. The study collected the data from both primary and secondary sources. The primary data

were gathered using questionnaires and interview techniques, whereas the secondary data were collected from the crime Inspection units at Nigerian Police Divisions. The study applied purposive sampling technique to select the respondents for the study. The study discovered that a relatively large proportion of the tricycle operators selected for the study earned income of about ₦ 2000 to ₦ 4000 daily. Similarly, findings from the study suggests that majority of the tricyclists are into the business due to unemployment in the other areas of the economy.

Operational characteristics of the riders have also been examined by Bamidele (2016) applied descriptive in the form of simple percentages to examine the socioeconomic and political factors of tricycle riders in Osogbo metropolis, Osun State, Nigeria. The study sampled five hundred (500) respondents with the aid of simple probability sampling technique for the study. But four hundred and fifty (450) were correctly filled and returned. The result revealed that most of the tricycle riders acquired their tricycle through their previous savings made in the business. The study showed that, 61.6 % of the respondents revealed that they are engaged in tricycle business because they dumped other trades and businesses, not only because of expanding tricycle riding business and also because higher income is guaranteed and assured. Furthermore, Ipingbemi and Adebayo (2016) applied descriptive statistics in the form of simple percentages to examine the operational characteristics of tricycle as means of public transport system in Ibadan, Oyo state, Nigeria. The multi-stage sampling techniques was used in selecting 147 tricycles registered operators from 10 strategic tricycle parks within the study area. The authors administered questionnaire and in-depth interview to the respondents, and the findings revealed that tricycle business is a male dominated business with secondary level of education. Also, the study revealed that most of the respondents earned between ₦3001-4000 daily. Finally, the findings suggests that most of the respondents have agreed to ride tricycle because they are unemployed.

Aikins and Akude (2016) applied descriptive statistics in the form of frequency tables, percentages, pie charts, and bar graphs to assess the impact of tricycles on the transportation of farm produce by farmers, middlemen/women, and market women in Pru district of the Brong Ahafo region of Ghana. Data for the study were obtained through administration of well-structured questionnaire and interviews to a randomly selected 173 respondents comprising of farmers and market women in the study area. The study evidenced a significant improvement in the area of transporting agricultural produce and standards of living of the respondents in Pru district. Specifically, the findings revealed that more than 90% of farmers and middlemen/women can transport their agricultural produce within the day of harvest as compared to just 50% before the emergence of commercial tricycles.

Kumar and Saputra (2014) analyze the relationship between socio-demographic factors and going green attitude of Tuk-Tuk drivers in Bangkok, Thailand. A total sample 176 Tuk-Tuk drivers were randomly selected using a well-structured questionnaire. The study analysed the data collected data, with the aid of descriptive statistical tools (tables and percentage), correlation and regression analyses. The study found a significant relationship between socioeconomic factors and going green attitudes of “Tuk-Tuk” drivers in Thailand. The finding from the regression analysis also indicates a positive and significant relationship between socio-demographic factors and the going green technology in Thailand.

Methodology

Study Area

Yola metropolis doubled as headquarter of Yola South and North Local Government Area is the capital city of Adamawa State. It is located between latitude $10^{\circ} 17' N$ and longitude $11^{\circ} 10' E$, with an altitude of 435.13 meters above the sea level with a total land coverage of $5,200 \text{ km}^2$. It has a total human population of 268,536, consisting of 183,142 males representing 68.2 percent and 85,392 females representing 31.7 percent, respectively (Saleh, Kolo, & Garba, 2017). It is important to note that many people in the state engaged in service industries of the informal sector such as fashion designing and tailoring, hair dressing, catering, transportation, entertainment, are among the numerous small-scale business activities in the state (Bello et al., 2017). Similarly, Yola metropolis has a warm climate with diurnal temperatures of 35°C to 40°C during the hottest months of (March to May) and about less than 30°C harmattan with an average annual rainfall of 850mm (Saleh, et. al, 2018). The choice of Yola metropolis is justified because it is the main area where the tricycle riding business really flourishes.

Research Design

This study employed the survey research design because of its ability to describe and explain the characteristics of a large population. Thus, information related to the research questions will be obtained from the tricycle riders via a well-structured questionnaire.

Population of the Study

The population of this study comprised of all the commercial tricycles in Yola metropolis registered with the Adamawa State Board of Internal Revenue. Their total number as at 18th September, 2020 is three thousand, nine hundred and one (3901), but the point worth noting is that, their number keep on increasing as the registration is continuous.

Sample Size and Technique

The study applied the multi-stage sampling technique. Firstly, loading points of the tricycles in the metropolis were stratified into ten (10) loading points. Secondly, a well structured questionnaire was administered in each of the loading points using convenience/accidental sampling technique. The total number of tricycle riders representing the sample size was found to be (363) as obtained from the Yamane (1967) formula expressed in equation (1) as follows;

$$n = \frac{N}{1 + N(e)^2} \text{-----(1)}$$

Where:

n = Sample Size

N = Size of Population

e = Precision level

The total population is 3901 with precision level of 0.05, the sample size is determined as:

$$\begin{aligned}
 &= \frac{3901}{1 + 3901(0.05)^2} \\
 &= \frac{3901}{1 + 3091(0.0025)} \\
 &= \frac{3901}{1 + 9.7525} \\
 &= \frac{3901}{10.7525} \\
 &= 362.79934899 \\
 &\approx 363
 \end{aligned}$$

Method of Data Collection

Primary data were collected from the tricycle operators based on each stratum identified in the sampling technique. The researchers and some research assistants distributed the questionnaires to the tricycle operators, waited and collected the instruments from the respondents.

Model Specification

The following model was specified to achieve the specified objective, of the study which was stated in section one of this paper.

$$\text{Log} \left[\frac{\text{Pr}(\text{Income})}{1 - \text{Pr}(\text{Income})} \right] = \alpha_0 + \sum_{i=1}^n \beta_i X_i + \mu_i \dots \dots \dots (1)$$

Where Poverty = a dichotomous variable indicating whether a household is poor or not.

β_i = are the slop parameters to be estimated.

X_i are the vector of explanatory variables,

μ_i = error term

Variables and their Measurement

The independent variables are divided in demographic and labour characteristics, each of which are explained as follows:

Demographic: Include demographic variables like Age, Msts,

Age: Age of commercial tricycle rider.

Agsqr: Age Square of commercial tricycle rider.

Marital Status: of commercial tricycle rider is married=1 otherwise=0.

Labor: Include labor characteristics like educ and rural.

educ: Highest education qualification of commercial tricycle rider.

Rural: commercial tricycle rider is in the rural area=1 otherwise=0.

Own Tricycle (Otcyc): commercial tricycle rider is the owner of the tricycle=1 otherwise=0.

Tricycle Rider (Tcyrd): commercial tricycle rider =1 otherwise =0.

Method of Data Analysis

Given the objective of the study, an econometrics model was employed, specifically discrete choice models rather than classical regression analysis due to the nature of the data, which entails qualitative response and the dependent variable in the model is a non-continues variable. Thus, the assumptions of classical regression have been violated and consequently Ordinary Least Square (OLS)estimation technique is not appropriate for the analysis of such discrete choice models (Wooldridge, 2002; Cameron & Trivedi, 2009).

Results and Discussion

The results of the logistic regression analysis of the primary data collected from the field are summarized in table 4.1.

Table 4.1: Logistic Regression Result of the impact of Tricycle

	Model 1	Model 2	Model 3	Model 4
Age	0.032 (3.29)**	0.001 (0.001)**	0.017 (3.55)**	0.001 (0.001)**
Agsq	0.001 (4.95)**	0.001 (0.001)**	0.000 (5.10)**	0.001 (0.001)**
Mstat	0.130 (15.53)**	0.005 (0.001)**	0.059 (13.85)**	0.005 (0.001)**
Educ	0.406 (7.47)**	0.016 (0.002)**	0.203 (7.70)**	0.018 (0.001)**
Rural	-0.731 (7.18)**	-0.029 (0.004)**	-0.336 (6.95)**	-0.031 (0.004)**
Otcyle	0.558 (5.05)**	0.021 (0.001)**	0.270 (5.28)**	0.024 (0.001)**
Tcyed	0.816 (4.83)**	0.025 (0.004)**	0.393 (5.11)**	0.029 (0.001)**
_cons	-2.805 (12.80)**		-1.538 (14.63)**	
N	354		354	

Source: Authors computation using Stata 17.

Note *** indicate significance at 1 percent and standard errors in parenthesis

From the Table 4.1, Model 1, 2, 3 and 4 are the logit regression, marginal effect of the logit regression, probit regression and its marginal effect respectively. The interpretation is based on the results of model one and two while the probit model serves as a robust check. From Table 4.1, model 1, the result of the analysis suggests that as the age of the tricycle driver increases by one year, his income will significantly increase by about 3.2 percent. This is confirmed by the coefficient of marginal effects, which suggest that increase in age of the tricycle rider is significantly more likely to increase his income by about 0.1 percent. This implies that young people are more likely to earn higher income from tricycle business than their elder counterparts in Yola metropolis, Adamawa State. This is in line with the economic theory, which posit that young people are more active than aged people are.

More so, from the Table 4.1 model 1, the coefficient of age-squared, shows that as the age of the tricycle rider exceed certain threshold, his income from the tricycle business though significantly increased by about 0.1 percent but below the earnings of the younger counterpart. This is confirmed by the coefficient of the marginal effect in model two that shows that as age of the tricycle rider increase beyond certain age limit his income from the business is significantly more likely to increase by about 0.1 percent. This implies that age plays a significant role in the tricycle business in Yola metropolis, Adamawa State.

Marital status of the tricycle rider as presented in model one in Table 4.1, revealed that marriage increase the tricycle riders' income by about 13 percent. This is confirmed by the coefficient of the marginal effects in model two, which suggests that marriage is significantly more likely to increase the tricycle riders' income by about 0.5 percent compared to their unmarried counterparts. This implies that married tricycle riders due to burden of dependency tend to be more committed to the business and hence, earn more income than unmarried counterparts.

The coefficient of education as shown in model one, reveal that education play a significant role on the level of income of a tricycle rider, as presented in Table 4.1, the coefficient of education reveal that educated tricycle riders earn 40.6 percent more than their uneducated counterparts. This is confirmed by the coefficient of the marginal effect in model two in Table 4.1, which shows that the level of education is significantly more likely to increase the tricycle riders' level of income by about 1.6 percent. This is in line with the economic theory, which suggest that education increase an individual level of productivity and income.

As revealed in the Table 4.1, model one, tricycle riders that do not reside in the rural areas are more likely to earn about 73.1 percent less than those operating in the urban areas. This is confirmed by the coefficient of the marginal effect, which suggest that tricycle riders in the urban areas are significantly more likely to earn 2.9 percent income more than their counterpart in the rural areas. This is because of the population density of the urban areas and most of the economic activities are taking place in the urban areas.

Ownership of the tricycle coefficient as presented in Table 4.1 model one significantly increases the tricycle riders' income by about 55.8 percent than those on hire purchase. This is further confirmed by the coefficient of the marginal effect, which suggests that being the owner and the rider of the tricycle is significantly more likely to increase the income of the tricycle rider by about 2.5 percent. This is in line with the a priori expectation.

More so, the coefficient of being in the tricycle rider business reveal that it increases the probability of increase income of the rider by about 81.6 percent than people who are living idle. This is confirmed by the marginal effect, which shows that being a tricycle business rider is significantly more likely to increase the rider's income by about 2.5 percent

Conclusion and Recommendations

This study examines the socioeconomic impact of tricycle business in Yola metropolis, Adamawa State, using cross sectional data that were collected using questionnaire and analyzed using logistic regression. From the findings, it was concluded that age, marital status, level of education, place of residence, ownership of tricycle and being a tricycle rider are significantly more likely to have significant impact on the overall income of the tricycle riders in Yola metropolis, Adamawa State.

On the basis of the results and findings of the study, the following recommendations are drawn;

- (i) The study recommend that the government of Adamawa State should consider the

- introduction of an empowerment program where people will be given a tricycle either on hire purchase or people should provide at least 40 percent of the total cost. This should be done under a strict supervision and condition in addition to severe penalties in case of default by the beneficiaries.
- (ii) The study also recommends that philanthropies and wealthy individuals should also invest more in the tricycle business as this will not only create more employment opportunities in Adamawa State but also reduce poverty and income inequality in the state and Nigeria.

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