



The Impact of Abuja Urban Mass Transit Scheme on Transportation Problem Mitigation in Federal Capital Territory, Abuja.

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Abstract

This study investigates the impact of mass transit scheme on transportation problem alleviation in Federal Capital Territory (FCT), Abuja. In order to achieve the objectives of the study, survey method of research design was adopted to sample the opinion of some residents of in FCT through the probability sampling method. A structured questionnaire was used with the following variables; existence of peak hours, insufficient affordable transport, traffic conjunctions, nature of the roads and high cost of transport in FCT. The logit probability methodology was employed to analyze the data in order to know the impact of mass transit scheme introduced by Federal Capital Territory Administration. To ascertain the reliability of the instruments, Cronbach's Alpha test was conducted which gave values greater than 0.5. Findings from the study revealed that Existences of peak hours, traffic conjunctions and nature of road have negative but significant impact with transportation problem alleviation in FCT. Insufficient affordable transport has positively and significant impact with transportation problem alleviation while cost of transportation is positively but insignificant impact transportation problem alleviation. It was recommended that the FCTA should ensure the enforcement of law that prohibit streets and highways trading in enhance free flow of traffic during peak hours, provision of adequate safe parking space for private and commercial vehicles. Finally, FCTA should put high priority on the construction of more roads and wider roads with at least three lanes as well as rehabilitation of existing ones.

Keyword: Urban, Mass Transit, Transportation, Federal Capital Territory

Introduction

The importance of mass transit stemmed from the fact that it provides mobility for those who cannot afford to buy a car and helps in creating and maintaining livable communities by relieving highway congestion and assuring long term sustainability in terms of resource consumption and the environment (Paul, 2001).

Mass transit is the movement of people within urban areas using group travel technologies such as buses and trains. The essential feature of mass transportation is that many people are carried in the same vehicle (e.g., buses) or collection of attached vehicles (trains). This makes it possible to move people in the same travel corridor with greater efficiency, which can lead to lower costs to carry each person or because the costs are shared by many people-the opportunity to spend more money to provide better service, or both.

The term "urban mass transit" generally refers to scheduled intra-city service on a fixed route in shared vehicle. Even this definition embraces horse –drawn Omnibus and streetcars, cable cars, trolley coaches, gasoline and diesel buses, underground and above ground rail rapid transit, ferries, and some commuter rail services. It also comprises a spectrum of modes of urban public transport that use specific fixed-track or exclusive and common – user road track (such as metros, suburban railways, light rail transit, and buses). Mass transit usually has superior operating capacity and performance compared with unsegregated road-based public transport (such as buses, taxis and Para transit) (Nwaogbe, Ukaegbu and Ibe, 2011).

Transportation provides a very efficient means of moving large number of people with considerable flexibility in order to meet demand throughout the city (Armstrong-Wright, 1999). It plays a key role in shaping urban and rural landscape through its influences on the form and size of settlements, the style and pace of life by facilitating trade, permitting access to people and resources, and enabling greater economies of scale (Santhakumar, 2003).

Transport interventions usually in the form of mass transit have the potential to contribute to poverty reduction through delivering better livelihood outcomes through their impact on time and access. Greater time availability and better access to facilities that can help build the poor's human and social capital can enable and help make the growth process pro-poor through giving the poor more opportunity to participate in it. Transport interventions can free up time used in journeys, making it available for use in other activities which can help to build the poor's asset base. Time may not necessarily be reallocated to income generating activities but can be reallocated to other activities which are equally important in producing better livelihood outcomes, including better family care, more access to health and education and more leisure.

Assessing and improving quality of service in the urban mass transit holds a high priority for the majority of public transport operators. Urban transport operators are forced to place particular emphasis on the monitoring and improvement of the service quality provided in an attempt to address the increasing rate of automobile ownership and the high rate of traffic congestion in the environment, and how to move the sustainability of urban transport system to a high extent (Tyrinopoulos and Antoniou, 2008).

The rate of migration of people and automobile from the various states of the federation to the Federal Capital Territory, Abuja is so high that in future the population of both people and automobile will be double what it is now. Already there is problem of congestion during the peak period in the major entrance and exit routes leading to satellite towns of the FCT. Despite the successive FCT administration's effort in the provision of transportation services, the deficient transport infrastructure has particularly limited the chances of the populace, aged and people with disabilities to access resources. The poor and it is the poorest of the poor who live in the satellite towns and villages around the city centre are made even more impoverished and

disadvantaged by inadequate rural transport facilities. Life in the rural communities of the FCT is still far from average living standard. The area is characterized with poor or lack of access to basic services and needs relating to health, education and income earning opportunities. This is mainly due to inadequate means of transportation, poor or inadequate road linkages, long travel time, and congestion, high cost of travel relative to income, discomfort and risk.

The questions therefore are:

- i. What is the level accessibility of mass transportation in rural communities of FCT-Abuja?
- ii. What is the impact of Abuja Mass Transit Scheme in FCT?

Empirical Review

Tunde and Adeniyi (2012) examined the impact of road transport on agricultural development in Ilorin East L.G.A of Kwara State. It employs the use of both primary and secondary data. One hundred and fifty copies of questionnaire were distributed systematically to the farmers in the study area. Focus group discussion was also used to obtain information on the impact of road transport on rural development as a whole. Descriptive and analytical statistical methods were both employed to analyze the data. The findings showed that road transport has both positive impact on agricultural development in the study area. However, the bad conditions of the road affect cost of transportation of agricultural produce which in turn affect the rural farmers' income. The study concluded by suggesting that an improvement in road transport system will lead to increased production by farmers. Community participation in road transport development should also be encouraged in the studied area.

Basorun and Rotowa (2012) conducted regional assessment of public transport operations in Nigerian cities: The Case of Lagos Island. The study examines the major challenge of adjusting the existing system of mobility to the evolving transport needs of the people. The study adopted simple descriptive statistics such as frequency counts and percentages as well as a pair-wise association between the level of service of the private sector in public transport system and patronage by commuters through the use of the Pearson's Correlation test. Result indicates that the role of the private sector in the public transport services associates highly (0.95) with patronage. As a vibrant sector of the transport system, it represents a major intervention area for a more effective transport operation in the city. They therefore recommend that the means of increasing public transport should be explored as a derived demand. Government should promote sustainable high quality links for people by improving the efficiency and effectiveness of the informal (private) operators through workshops, seminars and training for far reaching benefits to the transport system. These informal sectors should also be empowered with funding through soft loans to increase their operations in the area.

Ali (2010) assessed the quality of intra-urban bus services that are provided by government agencies and private bus operators in the city of Enugu as perceived by bus commuters. In the 31 sample centres selected for the study while 310 bus commuters were randomly interviewed to illicit information about their lengths of waiting time for the arrival of buses at the bus stops and their lengths of walking distances to the nearest bus stops. Using hourly bus frequency arrival count proforma, the numbers of buses arriving in each of the 31 sampled centres to carry passengers to different places in the city were collected by the stationed investigators between 6.00am and 6.00pm each day for one week. Descriptive statistic of mean and maps were employed to analyze the data collected. The findings revealed that the quality of bus service indicators passengers waiting time, walking distance to the nearest bus stops and bus service frequency varied from one centre to another, indicating variations in the level of bus services in different part of the city. The study recommends that the three Local Government Areas that

make up the city in conjunction with the state government should construct new urban link roads and maintain the old ones especially in the peripheries to enhance accessibility; partnership with private bus operators to increase the number of buses in circulation and relocation of some socio-economic facilities from the city centre to the city peripheries to spread demand for and services of buses in the city.

Aderamo and Magaji (2010) studied rural transportation and the distribution of public facilities in Edu local government area of Kwara State. They examined the role played by road transport in the distribution of public facilities in a rural environment. The data used were collected through mapping and surveys of the nature of road network and available public facilities in the study area. The results of data analysis showed that the area has a poorly connected road network characterized by poor surface condition, narrow bridges and many bends. The level of provision of public facilities is also low. In order to establish empirical relationship between road network development and distribution of public facilities in the area, regression technique was used. The analysis showed a strong relationship. The study concludes by making recommendations for the federal and state governments' intervention in road network development in the area and providing more facilities to make life better for the people.

Somuyiwa & Adebayo (2009) examined impact of bus rapid transit system (BRT) on passengers' satisfaction in Lagos metropolis. Data were collected through the use of questionnaire that was administered using simple random sampling technique. Also, secondary data were used. Findings revealed that less than average of the passengers were satisfied with the BRT system while some were fully dissatisfied. The study concluded that BRT can be a practical and technical alternative to highway reconstruction. They recommended the need to ensure greater coordination with local planning and operating agencies for the purpose of identifying BRT potentials; conduct research, develop operational techniques and promote the use of Intelligent Transport System (ITS) technology to enable safe and efficient deployment of BRT.

Odufuwa (2008) examined vulnerability and mobility stress coping strategies differentials among male and female in a developing city-Lagos, Nigeria. The study used primary data, which were obtained through a questionnaire survey of 356 respondents in Lagos. Indices of individual coping strategies and the weighted sum reflecting frequency and severity of respondents mobility stress coping strategies were used as a proxy for indicating the vulnerability of male and female respondents to mobility stress. Variables used include socio-economic characteristics such as number of vehicle in household, purpose of daily trip, number of trips, trip distance, travel time, income, age and travel difficulties. The result shows that female respondents were more vulnerable to mobility stress than the male. Sources of stress are basically associated with travel difficulties. There was higher prevalence of long-waiting at bus stop, prolong travel time, uncomfortable means of travel and expensive cost of travel among female respondents. This implies that female respondents had less access to and utilization of comfortable services transport and are therefore more transport-in secure than their male counterpart. The study emphasised the need to improve the current state of transport infrastructures in the country. Female and their counterparts (male) need transport enlightenment in order for them to be able to cope with stressful mobility conditions.

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Malapurum District of Kerala, India. The study was carried out among tribal settlements located in a remote hilly region, with restricted accessibility, in accordance with the IRAP methodology, as developed by agencies like the International Labour Office (ILO). The aim of the study was to evaluate accessibility/mobility related problems in order to arrive at cost-effective solutions with the potential to enhance accessibility and thereby improve the poor living standards and quality of life of the communities involved; notably by means of improvement measures which could, in turn, generate additional employment opportunities.

Asiyanbola (2007) examined the effects of urban transport infrastructure condition and intra-urban travel on the psychological well-being of women and men in Nigeria using Ibadan as a case study. The study uses primary data, which were obtained, through a cross-sectional survey of 721 households in Ibadan, Nigeria. The null hypotheses tested in the paper are that: (i) there is no significant effect of urban transport infrastructure condition and intra-urban travel on women's and men's psychological distress and (ii) there is no gender difference in the effects of urban transport infrastructure condition and intra-urban travel on the psychological distress of women and men.

Inconclusive Review

Anderson, Anderstig and Harsman (1990) examined relationship between infrastructure and regional productivity in Sweden and identify specific variables that are positively correlated to regional productivity. The study correlated with earlier views of Alonso (1964) and Appalachian (1982) that highway infrastructure investment exerts positive influence on economic productivity. Peckham and Issernman (1994) have documented that highways have "network properties" that are both spatial and economic in nature. Using a quasi-experimental matching method to examine the effects of highways on countries, economic growth of countries is greatest for those close to large cities, while rural countries have limited benefits.

Similarly, Howe (1994) reported that "there is a Growing recognition of the link between infrastructure investment and sustainable long-term economic growth. 'Now growth' thorniest in economic argue a strong correlation between the level of net public capital spending and the level of private sector output and labor productivity growth. It emphasized the potential for infrastructure investment to play a leading role in facilitating faster rates of economic growth.

Munnell (1990) examined the regional economic development and performance related to public infrastructure. The findings revealed that the probability of a business choice of location and that performance depends on its entity. The authors reported that the choice of a specific location depends on whether the business is a breach firm or a simple establishment firm. Munnell (1990) also indicated that highways have greater effect on economic productivity. He also suggested the need for further research to assess regional output as related to understanding of business choosing location.

Forkenbrock (1990) putting transportation and economic development in perspective using qualitative descriptive analysis presented positive relationship between a vector of factors and economic change and development at the county level. Apart from use of descriptive analysis, Forkenbrock suggested use of factor and cluster analysis to group counties and estimate economic impacts of rural transit infrastructures. Also, American Public Transit Association (APTA) presented a comprehensive analysis of economic benefits of public transit across the United States. Among the measurable and immeasurable benefits reported are: attractions of new business and other related services, increase retail trade and sales, employments or jobs, increased property values and fiscal improvement.

Rephann (1997) evaluated planning theories and transportation using input-output modeling including input-output modeling as related to highway management and economic analysis. The authors argue that regional economic theory is a useful economic tool and indicated that various regional and extra-regional characteristics significantly influence highway economic performance. However, Rephann criticized that “input-output adapted for transportation analysis may be impracticable and require data that are inadequate or available”

Transportation infrastructure provides rural residents improved access to opportunities outside the local community. Earlier, Moon (1987, 1988) reported global improvement imparts of interstate highway within rural community in Kentucky. The study examined factors that explained developments prospects along highway interchanges on rural Kentucky during mid-1980's. Also presented are possible developmental effects for remote and isolated transportation interchanges sites.

Methodology and Theoretical Framework

This study adopted a survey research design. This is found suitable for this study because it is a very valuable tool for assessing opinions and trends. It consists of a predetermined set of structured questionnaires built on Likert scale to collect information from a representative sample of the population commuters in Federal Capital Territory, Abuja. The primary data were used for the study. Sample size of 398 was determined using Taro Yamane, determination of sample size and a simple random sampling technique was employed because of its efficiency while the methodology of analysis is Logit model.

The questionnaire is tested for content reliability to assure that it is able to address appropriately the questions being answered. The reliability of the instrument concerns the extent to which the instrument yields the same results on repeated trials. Reliability shows the extent to which test scores are free from errors of measurement (Carmines and Zeller, 1979). The reliability of the measuring instrument Cronbach (1951) reliability statistics is employed.

Table 1: The Reliability Test for Indicators of Mass Transit Program and Alleviation of Transportation Problems.

Indicators	No. Items	Reliability Coefficient
Nature of transportation challenges	15	0.650
Impact of mass transit program	15	0.758
Measures to improve transport system	6	0.693
Overall Indicators	36	0.700

Source: By the Researcher (2018)

All the indicators namely; nature of transportation challenges, impact of mass transit program, and measures to improve transport system are all reliable since their Cronbach’s alpha is greater than 0.5. Hence, a reliability value of 0.5 and above are considered acceptable (Cooper and Schinder, 2006; Malhotra and Birks, 2006).

Model Specification

The logit regression equation is of the form:

$$L = \frac{\ln(P)}{\ln(1-P)} = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + U_i.$$

Where: Logit (L) stands for impact of mass transit program on the alleviation of transport problem in FCT. X₁ denotes the Existence of peak hours, X₂ represents insufficient affordable transport, X₃ means the Traffic conjunctions, and X₄ represents the Nature of the Roads while X₅ denotes High cost of transport. β₀ is Constant term while β₁– β₄ represent regression parameters and U_i represents the error term.

Estimation and Interpretation of Result

Demographic Characteristic of Respondents

From the table 2 below, 55.6% of the respondents are male and the remaining 44.4% representing 140 respondents are female. The result further reveals that the majority of the respondents are civil servant representing 93.7% of the respondents while the remaining 1.6% and 4.8% are farmers and traders respectively. In terms of age grouping sampled respondents between the age of 30 years and above constituted the majority of the respondents accounting for about 73%, follow by respondent of age between 26 and 29 years which stood at 19%, then 22 to 25 years which account for about 6.3% and only 5 respondents were found to be of age between 18 and 21 years. A total of 224 respondents representing 69.4% of the sampled size are married. While, 14.8% and 6.5% are divorced and widow respectively, the remaining 29 respondents representing 8.6% of the sampled population are single. The result further reveals that 52.4% of respondents have lived in FCT for the past five years, followed by those that have reside there for at least 10 years which constitute 28.6%, while the remaining 7.9% and 11.1% have lived in FCT for between 11 – 15 years and 16years and above respectively.

Table 2: Demographic Characteristics of Respondents

Items	Items Categories	Frequency	Percentages
Gender	Male	175	55.6
	Female	140	44.4
	Total	315	100.00
Occupation	Civil servant	295	93.7
	Farmer	5	1.6
	Trade	15	4.8
		315	100.00
Age	18 – 21years	5	1.6
	22 – 25 years	20	6.3
	26 - 29 years	60	19.0
	30 years and above	230	73.0
	Total	315	100.00
Marital Status	Single	29	8.6
	Married	224	69.4
	Divorced	49	14.8

	Widow	18	6.5
	Total	315	100.00
Duration	1 - 5 years	165	52.4
	6 – 10 years	90	28.6
	11 – 15 years	25	7.9
	16 years and above	35	11.1
	Total	315	100.00

Source: Field Survey 2014.

Table 3: Estimated Result of Logistic Regression

Variable	Coefficient	Std. Error	Z-Statistic	Prob.
C	-25.71000	0.553811	-46.40783	0.0050
X1	-0.800110	0.180000	-4.443821	0.0000
X2	0.690120	0.183111	0.771233	0.0000
X3	-0.800981	0.240611	-3.323711	0.0010
X4	-0.546922	0.176586	-3.090201	0.0020
X5	0.016811	0.168306	0.101001	0.9200
McFadden R-squared	0.511190	Mean dependent var	0.759184	
S.D. dependent var	0.428454	S.E. of regression	0.431389	
Akaike info criterion	1.158530	Sum squared resid	43.91884	
Schwarz criterion	1.287147	Log likelihood	-132.9199	
Hannan-Quinn criter.	1.210324	Deviance	265.8397	
Restr. Deviance	270.4893	Restr. log likelihood	-135.2447	
LR statistic	10.64961	Avg. log likelihood	-0.542530	
Prob(LR statistic)	0.000285			

Source: Author’s Computation, E-views 7 (2016)

X1 = Existence of peak hours, X2 = Insufficient affordable transport, X7 = Traffic conjunctions, X13 = Nature of the Roads, X15 = High cost of transport

existence of peak hours, insufficient affordable transport, traffic conjunctions, nature of the Roads and high cost of transport

The outcome of the result confirms our a priori expectations where existence of peak hour resulting in heavy traffic that obstructs free - flow of traffic is the most outstanding factor constraining the ability of mass transit program to end transportation problem in Federal Capital Territory, Abuja. A unit increase in existence of peak hours will lead to 80 percent decrease in transportation problem alleviation in the Federal Capital Territory (FCT), Abuja and with a probability value of 0.0000, which show a significant impact with transportation problem alleviation in FCT. On the other hand, insufficient affordable transport has positively impact on transportation problem alleviation in FCT by 69 percent. It probability value is 0.0000 which show that insufficient affordable transport has significant impact with transportation problem alleviation. This implies that mass transit program has brought about sufficient means of moving people from one place to another, hence contribute significantly to solve transport problem in FCT. The result also shows that a unit increase in traffic conjunctions will lead 80 percent decrease alleviation of transportation problems in FCT which will therefore distorts free - flow of traffic in FCT. A unit increase in nature of road will lead to 55 percent decrease in transportation problem alleviation in FCT with the probability of 0.0020, it show a significant impact of transportation problem alleviation in FCT. However, cost of transportation is

positively related in alleviation transportation problem to the turn of 1.68 percent in FCT. The probability value is 0.0920 which is greater than 0.005, it means that the positive impact of cost of transportation in transportation problem alleviation is not significant. The outcome of the empirical result reveals that the Mc Fadden (R^2) is 0.511. This shows that about 51.1% of the variation in mass transit program reduce transportation problem in Federal Capital Territory are explained by the exogenous variables identified in the model.

Conclusion and Policy Recommendations

Following the findings of this study, the study therefore concludes that the introduction of mass transit program could be positive initiatives on the alleviation of transportation problems in Federal Capital territory if necessary measures are taking to address among other things; the difficulties of movement during the peak hours, sufficient affordable transport, traffic control, expansion of roads and affordable transport fees.

From our findings, the following policy recommendations are therefore advanced in order to enhance the effective and positive impact of mass transit program on the alleviation of transportation problem in Federal Capital Territory, Abuja.

- i. The Federal Capital Territory Administration (FCTA) should ensure the enforcement of law that prohibit streets and highways trading in enhance free flow of traffic during peak hours. This complementary policy could be in the form of provision of an alternative marketing space for road side marketers and harsh penalties for the offenders as well as employment of more implementers and monitory group (Abuja Environmental Protection Agency). This will go a long way in addressing the problem of peak hour.
- ii. Provision of adequate safe parking space for private and commercial vehicles. This could be achieved through public-private partnership in the provision of modern motor parks with adequate modern securities that will ensure safety of individual vehicles. Such safety modern motor parks will attract user fee in exchange of parking ticket in line with global practices.
- iii. Installation of traffic light at strategic vehicle turning points and round about to ensure free and safe movement of vehicles and persons. In addition to installation of traffic light is the effective implementation of road rules, signs and regulations as well as ensuring the punishment of traffic offenders.
- iv. Finally, FCTA should put high priority on the construction of more roads and wider roads with at least three lanes as well as rehabilitation of existing ones. This will reduce conjunction and enhance easy movement of people and vehicles.

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Dependent Variable: L
 Method: ML - Binary Logit (Quadratic hill climbing)
 Date: 01/21/17 Time: 11:16
 Sample: 1- 315
 Included observations: 245
 Convergence achieved after 4 iterations
 Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-25.71000	0.553811	-46.40783	0.0050
X1	-0.800110	0.180000	-4.443821	0.0000
X2	0.690120	0.183111	0.771233	0.0000
X3	-0.800981	0.240611	-3.323711	0.0010
X4	-0.546922	0.176586	-3.090201	0.0020
X5	0.016811	0.168306	0.101001	0.9200
McFadden R-squared	0.511190	Mean dependent var		0.759184
S.D. dependent var	0.428454	S.E. of regression		0.431389
Akaike info criterion	1.158530	Sum squared resid		43.91884
Schwarz criterion	1.287147	Log likelihood		-132.9199
Hannan-Quinn criter.	1.210324	Deviance		265.8397
Restr. Deviance	270.4893	Restr. log likelihood		-135.2447
LR statistic	10.64961	Avg. log likelihood		-0.542530
Prob(LR statistic)	0.000285			
Obs with Dep=0	59	Total obs		245
Obs with Dep=1	186			