



The Impact of road infrastructural development on intercity transport fare differentials in Imo State

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Abstract

The current research seeks to determine the impact of road infrastructural development on intercity transport fare differentials in Imo State. Using a descriptive research design because the study is quantitative in nature. Hence the probability sampling plan was employed. A total number of 391 questionnaire were administered to the intercity drivers of the in Imo State Local Government Areas and 323 (82.61%) were retrieved questionnaire and 68 (17.39%) were un-retrieved questionnaire and the percentage success rate of 245 (65.22%) was obtained. The result showed the correlation coefficient $r .999$ which is greater than the p -value 0.05 , then we reject the null hypothesis. We accept the alternate hypothesis and states as thus "road infrastructural development has significant effect on intercity transport fare differential in Imo State". The findings from the linear regression analysis showed that road infrastructural development has significant effect on intercity transport fare differential in Imo State. Based on this findings the study recommended that there is need for the government to improve the road infrastructure development so as to control and moderate transport fare system in the study area.

Keywords: Road, infrastructural development, Intercity, Imo State, transport differentials

I. Introduction

Differentials in transport fare within a region are influenced by various factors, ranging from economic to infrastructural elements. In Nigeria, specifically in Imo State, understanding the determinants of intercity transport fare differentials is crucial for policy-making and improving transportation efficiency. Imo State, located in southeastern Nigeria, serves as a significant economic hub, with diverse transportation networks connecting its various cities and towns. However, despite the importance of transportation in facilitating economic activities, there exists a noticeable variance in transport fares between different cities within the state. Several studies have

examined the determinants of transport fare differentials in various contexts, shedding light on factors such as distance, infrastructure quality, fuel prices, vehicle types, competition among transport providers, and regulatory policies. These factors interact in complex ways, influencing pricing strategies and ultimately shaping the transport landscape.

In the Nigerian context, previous researches have explored transportation dynamics, but there is a gap in understanding the specific determinants of intercity transport fare differentials in Imo State. Given the state's unique socio-economic and geographical characteristics, factors influencing fare differentials may differ from those in other regions of the country. So, the determinants of intercity transport fare differential lies on the vehicle comfortability (car or bus), distance, volume of traffic, price of fuel and festive periods. The transport system basically used for intercity transport is buses and cars. Hence, buses offer the most dominant form of public transport carriers which are mostly involved in commercial transport services, including the road-based intercity passenger transportation in Nigeria (Draft National Transport Policy, 2017; Awoyemi, ItaLawal, Dienne, Onogbeselle, 2013; Jain, 2012).

The demand for bus and car services has been on the increase, with predictions that it will remain so, especially in the developing countries like Nigeria (Awoyemi, et al 2013; Aderano, 2010). Perhaps, the sparse and uneven distribution, endowment and the location of the people, goods and services across geopolitical entities explain in part, the need for intercity travels (Jain, 2012, Osoba, 2012). In fact, it is believed that for people to obtain or exchange necessary goods and services, they must travel or move from place to another. People must transport goods and services to the destinations of wants in order to satisfaction their desire through vehicular carriers in most cases 'bus' (Osoba, 2012). This movement could be from one city to another; one state or to another. This is what is called interstate or intercity movement. If the movement is aided by vehicular mediums, it is



called interstate/intercity transportation. Intercity transport service generates urban-related trips, which terminates in major cities (Bardi, Coyle, Novack, 2006; Onakomaiya: Badejo and Bawa-Allah, 2000). Intercity transport has distinctive features such as: the vehicles are regularly scheduled, using highways and/or expressways for the medium/long distance travels; it is a through/non-stop movement (may stop only at gas/fuel station(s), eateries and/or shopping malls/commercial centres; dedicated points of

interchange, roadside public rest rooms etc, where extremely necessary) (BorloIbe, Emenike, 2021).

The current research seeks to determine the impact of road infrastructural development on intercity transport fare differentials in Imo State. This next section addresses the review of literature, in section three, the methodology used in the study is explained. In section four, we the results are presented and the conclusion of the study is presented in section five.

II. Literature Review

2.1 Conceptual Framework

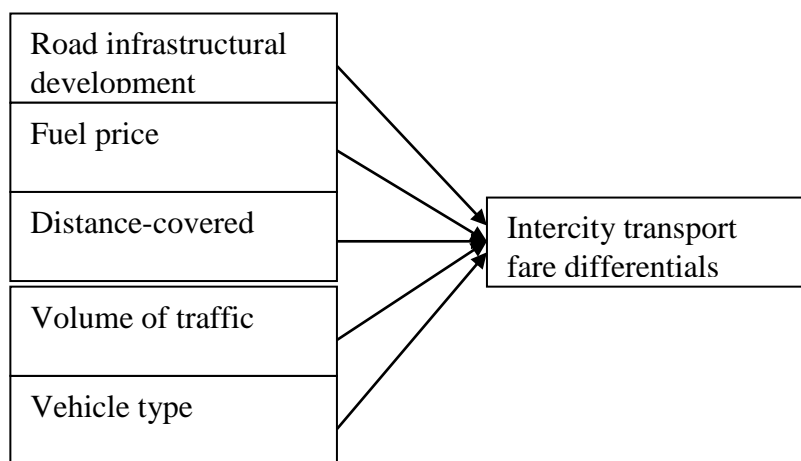


Fig 2.1: Conceptual Framework Source: (Bronkhorst, 2019)

Intercity transport

Intercity transport plays a crucial role in connecting different regions, facilitating economic activities, and enabling social interactions across Nigeria's vast and diverse landscape. While various modes of intercity transport exist, including buses, commercial vehicles, trains, and domestic flights, challenges such as infrastructure deficiencies, safety concerns, fare differentials, and regulatory issues impact the efficiency and accessibility of intercity transportation services.

Modes of Intercity Transport: Buses: Intercity buses operated by private companies and government agencies serve as a primary mode of transportation for long-distance travel between cities and towns. These buses typically operate on designated routes, providing scheduled services with various amenities and seating options to cater to different passenger preferences.

Commercial Vehicles: Commercial vehicles, including taxis, vans, and minibuses, also offer intercity transport services, particularly in areas where formal bus services are limited or nonexistent. These vehicles operate on flexible schedules and routes, providing door-to-door transportation for passengers.

Trains: Nigeria's railway system connects major cities and towns, offering an alternative mode of intercity transport. While railway infrastructure has undergone recent upgrades and expansions, challenges such as limited coverage, service reliability, and ticketing issues persist.

Domestic Flights: Domestic air travel provides a faster and more convenient option for long-distance intercity travel, particularly between major cities. However, air travel remains relatively expensive compared to other modes of transport, limiting its accessibility to certain segments of the population.



Table 2.1 Location of Public Parks in Owerri

Name	Location	Capacity range
New market motor park	Douglas road	50-80 vehicles
Ogugba Park	Royce Road	45-50 vehicles
Arugo motor park	Onitsha road	50-60 vehicles
Rotobi park	Royce road	25-30 vehicles
Okigwe motor park	Okigwe road	50-65 vehicles
Mbaise road motor park	Mbaise road	30-35 vehicles
Aba motor park	Aba/Owerri road	60-75 vehicle

Source: Field survey, 2024

2.2 Theoretical Framework

Trip generation Model

Trip generation is defined as the number of individual trips generated in a given period of time. Traditionally, in travel demand modeling, trip generation is the first component that provides the possibility for the next steps, such as destination choice and mode choice. In the context of urban travel, a trip can be home-based or non-home-based. In practice, according to Ortuzar (1994), it is also classified by purpose, such as trips to work, trips to school or college, shopping trips, social and recreational trips and other trips. Alternatively, the trips can be classified by person type based on income level, car ownership, household size and structure, which is often used as the model segmentation base. In an intercity travel context, a trip is usually categorized as a business trip or nonbusiness trip. It also can be further classified as business, combined business/pleasure, convention, conference or seminar, visiting relative or friends, rest or relaxation (the 1995 American Travel Survey). Trip generation analysis requires identification of the factors that affect trip generation. Often, the variables taken into account are characteristics of the traveler, and personal trip attraction (Ortuzar, 1994), as well as the attributes of alternatives. The characteristics of travelers include household income, car ownership, household structure, and household size.

2.3 Empirical Review

Feyisola, Mobolaji and Adedotun (2023) examined the factors influencing passengers' choice of intercity bus operators in Lagos, Nigeria. To achieve this, five intercity bus operators were selected and a total of forty-six (46) bus terminus were sampled. Three thousand copies of questionnaires (3000) were distributed among the five intercity bus operators through the assistant of the terminal managers across the forty-six-terminal operated by the bus companies, two thousand six hundred and eighty-two copies of questionnaires

(2682) were retrieved and found useable for analysis. Primary data were collected using structured questionnaire, the data collected were arranged systematically and coded to facilitate analysis and data were subjected to descriptive statistics evaluation. Multiple linear regression analysis was adopted for the study. Passenger's choice of operator revealed that for ABC transport, advertisement, frequency of operator's service, reliability of service and expectation of future price were the most significant factors influencing choice of customers to use the operator's service. For CHISCO transport, it was observed that among the factors influencing passenger's choice, the frequency of operators' service has ($\beta=0.883$, $p \leq 0.05$) is the most significant factor, reliability of service has ($\beta=0.488$, $p \leq 0.05$), fare has ($\beta=0.455$, $p \leq 0.05$). Based on their findings the study therefore recommends that frequency and reliability of service should be geared up by the respective intercity bus operators in other to improve their service quality to their existence customers and to attract their potential customers.

Akuirene et al (2020) studied on effect of poor road network and maintenance on safety and security in Delta State Nigeria. Their objectives to access the perception about road networks'to model the effects of poor road network (PRN) on vehicle repairs; and road maintenance on occupational health and safety (OHS) issues in Delta state, Nigeria. Method: Their study adopted a survey approach. Likert scaled questionnaire was used to survey the perception of different stakeholders. The responses were used to model the effects of environmental and mechanical factors of road traffic accidents. ANOVA and regression modelling techniques were performed. Results: This study shows mixed perceptions from respondents. 64% of responses agreed on state of the roads being poor while a lower (49%) indicate insecurity on the roads. Modelling showed over 32% increases in vehicle repairs and OHS concerns attributable to PRN and road maintenance respectively. They



conclusion highlighted gap in knowledge about road traffic, which calls for OHS education. This educational promotion need is adoptable particularly in low-mid income countries where PRN remains an OHS issue, but also relevant in developed countries as unhealthy driving behaviour is still a factor of drivers' perceptions.

Udo and Akpan (2020) explored the impact of fuel price deregulation on intercity transport operations in Nigeria. Their study found that the removal of fuel subsidies led to a sharp increase in fuel prices, resulting in higher operating costs for transport operators. As a consequence, transport fares rose significantly, affecting the affordability of intercity travel for passengers, particularly low-income earners. The study underscored the need for government intervention to address the adverse effects of fuel price deregulation on transport operators and passengers.

Ogunleye and Ogunsanya (2019) conducted a study on the effect of fuel price changes on transport fares in Nigeria. Their research revealed a strong positive correlation between fuel price increases and transport fare adjustments, with transport operators passing on the additional fuel costs to passengers through fare hikes. The study emphasized the vulnerability of transport operators to fuel price volatility and the importance of fuel subsidies or price stabilization mechanisms in mitigating the impact on fare affordability.

Leung et al (2019) investigated the fuel price changes and their impacts on urban transport – a literature review using bibliometric and content analysis techniques. They argued that car dependent societies may have socio-economically disadvantaged and often lack public and active transport accessibility. Emerging research focus has been placed on issues of transport equity including effects of fuel prices.

Adeniran and Adesina (2019) examined the role of road infrastructure in promoting regional integration and economic growth in Nigeria. Their study emphasized the importance of well-maintained roads in facilitating trade, commerce, and social interactions between different regions of the country. However, the researchers also highlighted disparities in road infrastructure investment across regions, with some areas experiencing neglect and underdevelopment.

Naazieet al (2018) assessed the effects of bad roads on transportation system in the South-East of Nigeria. Both primary and secondary data were collected for the study. The primary data involved 150 Drivers, Driver Mates and Transport Owners using mainly questionnaire. The findings showed

that bad roads had effects on transportation system as this brought about frequent break down of vehicles and increased maintenance cost. It is therefore recommended that government should formulate a good road infrastructure policy that will enhance the sustainability of road infrastructure and should also encourage public participation in road infrastructure provision and maintenance to accelerate development of the District

Ogunbodede and Oladipo (2018) conducted a comprehensive study on road infrastructure development in Nigeria, focusing on the impact of road conditions on transportation costs and economic productivity. The study found that poor road conditions, characterized by potholes, congestion, and inadequate maintenance, contribute to increased vehicle operating costs, travel time, and accidents, leading to economic losses and reduced competitiveness.

Furthermore, Arowolo and Ogunleye (2018) examined the impact of fuel price changes on the of intercity bus operations in Nigeria. Their study revealed that fluctuations in fuel prices directly affect the profitability margins of transport companies, with higher fuel costs reducing net revenues. The researchers recommended strategies such as fuel hedging and route optimization to mitigate the impact of fuel price volatility on the financial viability of intercity transport operations.

Additionally, Olusoji and Babajide (2017) investigated the determinants of transport fare differentials in Nigeria, with a focus on the role of fuel prices. Their research identified fuel prices as a significant factor influencing fare variations across different transport modes and routes. The study highlighted the sensitivity of transport fares to changes in fuel prices, as fuel constitutes a substantial portion of operating expenses for transport operators.

III. Methodology

3.1 Research Design

The research design describes the structure that has been used to address the research problem of the study in order to establish facts which could be verified and used to build new ideas. According to Thomas (2022), a research design is the overall strategy for data collection and analysis. It points out the statistical tests a researcher can use to test hypothesis later on. Therefore, this study chooses a descriptive research design because the study is quantitative in nature. Hence the probability sampling plan comprising of simple random



sampling and stratified random sampling will also be adopted.

3.2 Study Area

Imo State, situated in the southeastern part of Nigeria, is one of the thirty-six states that constitute the country. The State is delimited by Anambra State to the North, Abia State to the East, and Rivers State to the West and South. Imo State, with a land area of 5,288 km² according to Dada & Mendes (2011), is located between Longitude 06°37'0" and Longitude 07° 26' 0" East of Greenwich Meridian and Latitude 5° 12' 0"N and Latitude 5° 57'0" North of the Equator as shown in figure 3.1. The projected population of Imo State, according to the Bureau of Statistics of Nigeria (NBS) (2007), is 5,426,128.79 for the year 2017, based on an annual growth rate of 3.2% from the 2006 Population Census figures of 3,934,899. Geographically, Imo State is divided into three distinct zones- Owerri, Orlu, and Okigwe, respectively. The Orlu zone covers a significant portion of the landmass, spanning from the North Central through the western margin to the Southwestern part. The Okigwe zone, on the other hand, covers the Northeast region of the State, while the Owerri zone occupies the Southwestern portion of the State. It is noteworthy that the Owerri zone is the epicenter of political administration of the State.

3.3 Population of the Study

The population of this study was commercial drivers in Imo State and specifically the Local Government Area Headquarters. Estimated population of Imo state population as at 2022 is 5,459,300. The target population consisted commercial drivers in Local Government Area Headquarters of Imo State.

3.4 Sample and Sampling Techniques

The determination of the sample size will comprise public intercity motor terminals in the LGA Headquarters and private intercity transport terminals in the LGA headquarters including the state capital. Taro Yamane formula was employed to ascertain the sample size of this study. It is written in the form:

Where;

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

N= Total population of drivers

1 = Constant

e²=Level of significance

$$N = \frac{18200}{1 + 18200(0.05)^2}$$

$$N = \frac{18200}{46.5}$$

$$N = 391.39$$

$$n \approx 391$$

IV. Result and Discussion

4.1 Result Presentation

Table 4.1 Administration of Questionnaire

Local Government Area	Questionnaire administered	Questionnaire retrieved	Questionnaire unretrieved	Percentage success rate
<u>Abo-Mbaise</u>	12	9(75%)	3(25%)	7(50%)
<u>Ahiazu-Mbaise</u>	8	7(87.50%)	1(12.50%)	5 (75%)
<u>Ehime-Mbano</u>	8	7(87.50%)	1(12.50%)	6(75%)
<u>Ezinihitte</u>	7	6(85.71%)	1(14.29%)	5(71.42%)
<u>Ideato North</u>	8	5(62.50%)	3(37.50%)	2(25%)
<u>Ideato South</u>	8	6(75%)	2(25%)	4(50%)
<u>Ihitte/Uboma</u>	5	5(100%)	0	5(100%)
<u>Ikeduru</u>	7	5(71.43%)	2(28.57%)	3(42.86%)
<u>Isiala-Mbano</u>	7	6(85.71%)	1(14.29%)	5(71.42%)
<u>Isu</u>	7	6(85.71%)	1(14.29%)	5(71.42%)
<u>Mbaitoli</u>	11	9(81.82%)	2(18.18%)	7(63.64%)
<u>Ngor-Okpala</u>	7	6(85.71%)	1(14.29%)	5(71.42%)
<u>Njaba</u>	8	7(87.5%)	1(12.5%)	6(75%)
<u>Nkwerre</u>	7	5(71.43%)	2(28.57%)	3(42.86%)
<u>Nwangele</u>	8	6(75%)	1(25%)	5(50%)
<u>Obowo</u>	8	7(87.5%)	1(12.5%)	6(75%)
<u>Oguta</u>	4	4(100%)	0	4(100%)
<u>Ohaji/Egbema</u>	8	6(75%)	2(25%)	4(50%)
<u>Okigwe</u>	10	8(80%)	2(20%)	6(60%)



<u>Orlu</u>	10	7(70%)	3(30%)	4(40%)
<u>Orsu</u>	5	4(80%)	1(20%)	3(60%)
<u>Oru East</u>	10	9(90%)	1(10%)	8(70%)
<u>Oru West</u>	10	8(80%)	2(20%)	6(60%)
<u>Owerri Municipal</u>	104	88(84.62%)	16(15.38%)	72(69.24%)
<u>Owerri North</u>	46	39(84.78%)	7(15.22%)	32(69.56%)
<u>Owerri West</u>	50	41(82%)	9(18%)	32(64%)
<u>Unuimo</u>	9	7(77.78%)	1(22.22%)	6(55.56%)
Total	391	323 (82.61%)	68(17.39%)	245 (65.22%)

Source: Researcher's computation, 2024

Table above indicated the analysis of research instrument (questionnaire). A total number of 391 questionnaire were administered to the intercity drivers of the in Imo State Local

Government Areas and 323 (82.61%) were retrieved questionnaire and 68(17.39%) were un-retrieved questionnaire and the percentage success rate of 245(65.22%) was obtained.

Table 4.2 Demographic Characteristics of Respondents

Variables	Frequency	Percentage (%)	Cumulative Percentage (%)
Gender			
Male	301	93.19	93.19
Female	12	6.81	100
Total	323	100	
Marital Status			
Single	71	21.98	21.98
Married	237	73.37	95.35
Widow/widower	15	4.64	100
Total	323	100	
Age			
Less than 18	16	4.95	4.95
18- 35 years	98	30.34	35.29
36-55 years	165	51.08	86.37
Above 66 years	44	36.84	100
Total	323	100	
Educational Qualification			
Primary	99	30.65	30.65
Secondary	105	32.51	63.16
Tertiary	119	73.66	100
Total	323	100	

Source: Researcher's computation, 2024

Table 4.2 showed the descriptive analysis of demographic data of respondents on the analysis of determinants of intercity transport fare differentials in Imo state, Nigeria.

The gender characteristics revealed that male respondents are 301(93.19%) and female respondents are 12(6.81%). The male respondents are predominant drivers compared to female counterpart showing the analysis of gender characteristics. The marital status characteristics showed that there are 71(21.98%) single respondents; 237(73.37%) married respondents and 15(4.64%) widow/widower respondents. There are

more of married respondents than other class of age brackets. The age bracket of less than 18 participated in the questionnaire with respondents and percentage of 16(4.95%); the respondents of 18-35 years representing 98(30.34%); the respondents of 36-55 years are 165(51.08%) and above 66 years respondents are 44(36.84%). From the analysis the respondents of 36-55 years are more in number displaying the age bracket of the respondents. The educational qualification for this study includes primary, primary and tertiary institution. The respondents with primary school qualification are 23(6.18%) while respondents with secondary school



qualification are 75(20.16%) and respondent with tertiary qualification are 274(73.66%)showcasing the educational education of the respondents.

Table 4.3: Road infrastructure development influences Intercity Transport Fare differentials in Imo State (N=323)

S/N	ITEM	SA(x4)	A(x3)	SD(x2)	D(x1)	Total	Mean (x)	Remark
1	Bad road influences transport fare.	153 (612)	104 (312)	51 (102)	15 (15)	1041	3.22	Agreed
2	Class of road influences transport fare	141 (564)	89 (267)	63 (126)	30 (30)	987	3.06	Agreed
3	Route distance influences transport fare	122 (488)	73 (219)	70 (140)	58 (58)	905	2.80	Agreed
4	Traffic congestion on road influences transport fare	136 (544)	101 (303)	52 (104)	34 (34)	985	3.05	Agreed
5	Nature of road surface influences transport fare	161 (644)	128 (384)	25 (50)	9 (9)	1087	3.37	Agreed
Grand mean							3.10	Agreed

Source: Researcher’s computation, 2024

Table 4.3 contained the analysis of research question one, revealing that bad road influences transport fare at mean value ($x = 3.22$); it also showed that class of road influences transport fare at mean value ($x = 3.06$); the analysis showed that route distance and traffic congestion influences transport fare at mean values of $x = 2.80$ and $x = 3.05$ respectively. Then, the nature of road surface also has influence on transport fare at mean value of $x =$

3.37. From this overview road infrastructure is a proponent to variation in transport fare of intercity transport in Imo State Local Government Areas.

Hypothesis Testing

There is no significant effect of road infrastructural development on intercity transport fare differentials in Imo State.

Table 4.4 Model Summary Hypothesis One Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	df1	df2		
1	.999 ^a	.999	.998	.00235	.999	1352.470	1	2	.001	1.213

a. Predictors: (Constant), Road_Infrastructure

b. Dependent Variable: Transport_fare_differential

Table 4.4 contained the linear regression of hypothesis one on influence of road infrastructural development on intercity transport fare differential in Imo State. For the decision making, if the p-value less than 5% we reject the null hypothesis and uphold the alternate hypothesis. The result showed the correlation coefficient $r .999$ which is greater than the p-value 0.05, then we reject the null hypothesis “There is no significant effect of road infrastructural development on intercity transport fare differentials in Imo State”. We accept the alternate hypothesis and states as thus “road infrastructural development has significant effect on intercity transport fare differential in Imo State”.

4.2 Discussion of Findings

The findings which was contained in Table 4.4 using linear regression analysis showed that road infrastructural development has significant effect on intercity transport fare differential in Imo State. Hamza, (2016) on the assessment of the state, types and functionality as well as distributions of road transport infrastructure development in Kaduna state, Nigeria has a similar result with the present study. However, William (2016) on “the Impact of Transportation Infrastructure on Nigeria's Economic Development” showed that Nigeria has suffered transportation infrastructure deficits for some



decades. Ajibola, et al (2013) assessed the effects of infrastructure on property values in unity estate, Lagos, Nigeria agreed with the result of the present study. Then, the study of Akuirene et al (2020) on effect of poor road network and maintenance on safety and security in Delta State Nigeria was in accordance with the result of the present study. The Naazie et al (2018) in their study on the effects of bad roads on transportation system in the South-East of Nigeria. Both primary and secondary data were collected for the study was in agreement with the current study. Dimnwobi et al (2017) empirically linked transportation infrastructure and diversification of the Nigerian economy which agreed with the result of the present study.

V. Conclusion and Recommendations

The need for movement of people and goods from one destination to another via land is an inevitable phenomenon that requires the use of vehicle (bus and car) services. The transport fare associated with this, is determined according to the road infrastructure development. Hence, the precipitating issue is the unmotorable conditions of the roads. There has been an incessant accidents caused by poor roads in the study area thereby negating the determination of transport fare differentials in Imo State. There is need for the government to improve the road infrastructure development so as to control and moderate transport fare system in the study area.

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