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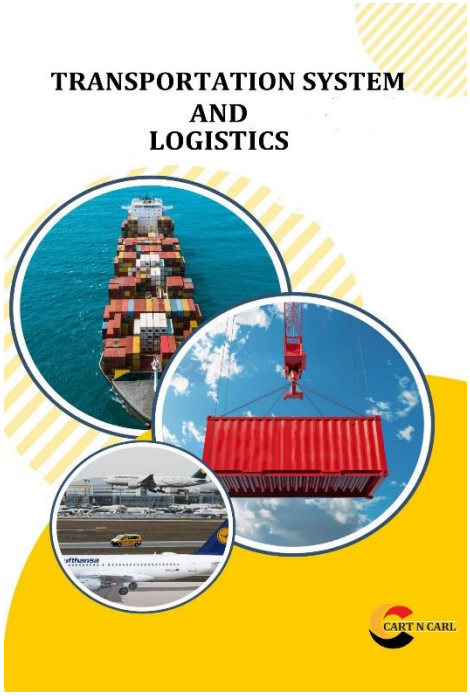

Impact of the High Cost of Transportation on the Transport Modal Choice In Northern Nigeria: A Socio-Economic Perspective

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Abstract

Transportation is vital to any economy as it is inseparably linked to other sectors. It is the vehicle for inter- and intra-country trade and a means of movement. The study examined the impact of the high cost of transportation on the transport modal choice in Northern Nigeria using socio-economic factors. Using qualitative and quantitative approach for research design and data collection, the study adopted 450 respondents randomly selected from North-West/North Central (NE/NC) states- Kaduna (164), Abuja (61), Plateau (93), and Benue (132), covering Airport Authorities, NURTW and Bus Operators, NRC staff, Security and Safety Agencies, and Passengers. The socio-economic attributes considered include fuel subsidy removal, pricing regulatory framework and higher transportation costs. The finding revealed that fuel subsidy removal (55%), pricing regulatory framework (39.3%) and higher transportation costs (51.9%) had significant impact on high cost of transportation and transport modal choice. The finding indicated that high cost of transportation arising from socio-economic factors has a significant impact on transport modal choice ($p = 0.000$). Conclusively, socio-economic pressures directly influence modal choice decisions in Northern Nigeria; hence, the importance of policy interventions aimed at stabilizing fares, regulating transport pricing, and aligning wage levels with inflationary realities to ensure accessibility and affordability of transport services for the population.

Keywords: Transportation, Transportation Services, Transport Modal Choice, Northern Nigeria, Socio-economic Factors

Introduction

Transportation is vital to any economy as it is inseparably linked to other sectors. It is the vehicle for inter- and intra-country trade and a means of movement. Transportation can be classified into five major modes, namely road, air, pipeline, rail, and water. In Nigeria, road transportation is the most widely used mode. Other countries like Canada and the USA have utilized alternative modes of transportation and adopted smart and sustainable transport measures as essential factors in developing the transport sector through technology. These nations have embraced sustainable transport planning, which, in its broadest sense, involves planning for environmental preservation, social equity, and economic growth. Promoting sustainable transportation aims to achieve greenhouse gas reductions, reduce land consumption, improve air quality and public health, and enhance the overall welfare and quality of life of urban populations, which has also alleviated human and physical security

challenges. To this end, various policies based on sustainable transport and "smart growth" principles have been developed to accommodate growing urban populations.

In Nigeria, the transport sector still struggles to adopt modern global systems where sustainability and technology play crucial roles in addressing human and physical insecurity, leaving the transport industry perplexed. This research acknowledges that the transport sector's current status has been impacted by various contemporary security challenges framed through the lens of human security, including political, economic, social, environmental, food, health, and community security issues. Of particular concern is the increasing incidence of kidnappings, banditry, escalating energy costs, and the deteriorating condition of facilities.

A historical overview of transport development in Nigeria traces back to before 1910 when existing bush paths were transformed into motorable routes. According to Standford Research Institute (1963), roads were constructed in the 1920s and 1930s to enhance the economic and settlement prospects of the country, which significantly influenced road network development in Nigeria. This initiative began with the introduction of feeder road services connecting the Nigerian Railways to major railway stations along the Lagos-Kano line, facilitating the export of products such as cocoa, palm produce, cotton, and groundnuts.

Between the 1950 and 1970s, road became the major mode of transport system in Nigeria. Road transport as at 1953 accounted for about 50% of freight in Nigeria and by 1960; the proportion had increased to 62%. After the Civil war, in the early 70s, studies in area of urban transportation confirmed that more than 75% of population in cities depended on public transport which generated revenue and enhanced employment opportunities while about 25% depended on private transport system (Ogunjumo, 1986). By 1980s through to the 1990s, road transportation accounted for about 90% of intra urban transport as the rail systems had gone comatose while air transportation could only be affordable to few privileged Nigerians.

The North-West/North Central (NE/NC) transportation routes is the critical gateway between the North and the South of Nigeria and the major link road to the North-east as well as to many neighbouring countries. The route is also a key outlet for the transportation of persons, goods and services across Nigeria which is evident in the volume of traffic on it round the clock." The importance of these routes was brought to the fore when the Federal Government of Nigeria (FGN) made frantic efforts to ensure it was well maintained by approving N797.2 billion for the reconstruction of the Abuja-Kaduna-Kano highway to Julius Berger in March 2017.

The 186km standard gauge line features both passenger and cargo trains. The passenger trains operate at a speed between 200km/h and 250km/h thereby reducing travel time by one hour with a capacity of about 5,000 commuters. On the other hand, the cargo trains, conveys 800 tons of goods with a travel time of one and half hours thereby making the rail transportation a very competitive choice on the Abuja – Kaduna route. Similarly, the average cost of both rail and road ranged between N2000 to N3000 as at 2023 but has since increased to N4000 to N9000. Despite the increase, the characteristics of the rail influences passenger choice of rail mode of transportation which recorded a steady increase since its operation commenced. This was further heightened with the increasing spate of insecurity along the Abuja Kaduna Road route. To meet the increasing demand for the rail choice of transportation, the FGN added new coaches in 2018 and announced further additions in 2019.

In 2023, the economic reforms which birthed the removal of fuel subsidies and a switch from the fixed to a floating exchange rate platform led to a spike in prices of gasoline and PMS which caused an unprecedented inflation of about 300% in transportation costs. This situation occasioned by the deplorable state of the roads greatly discouraged local and foreign investors from showing interest in the country's transport sector, thus impacting Foreign Direct Investment (FDI), the economy and the unemployment situation in the Country. In respect to socio-economic security, the removal of fuel subsidies in May 2023 significantly influenced passenger modal choices, particularly among lower-income groups as it led to higher transportation costs which reduced travel frequency. There was a shift to public transport as many passengers reduced private car usage and opted for cheaper alternatives like buses and shared taxis. Many passengers increased demand for fuel-efficient vehicles with many lower-income shifting towards motorcycles and tricycles, which consume less fuel. This was evident in rural areas, where public transport was scarce thus affecting access to markets and essential services. Therefore, the study

examined the impact of the high cost of transportation on the transport modal choice in Northern Nigeria using socio-economic factors.

Conceptual Framework

The conceptual framework explains the path of research to make research findings more meaningful, acceptable to the theoretical constructs in the research field and ensuring generalizability. A theoretical framework is the 'blueprint' or guide for research (Grant & Osanloo, 2014). It is a framework based on an existing theory or strategies in a field of inquiry that is related and/or reflects the hypothesis of a study which serves as the foundation upon which research is constructed. On the other hand, a conceptual framework (Figure 1) is the structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). It is linked with the concepts, empirical research and important theories used in promoting and systemizing the knowledge espoused by the researcher (Peshkin, 1993). It is the researcher's explanation of how the research problem would be explored.

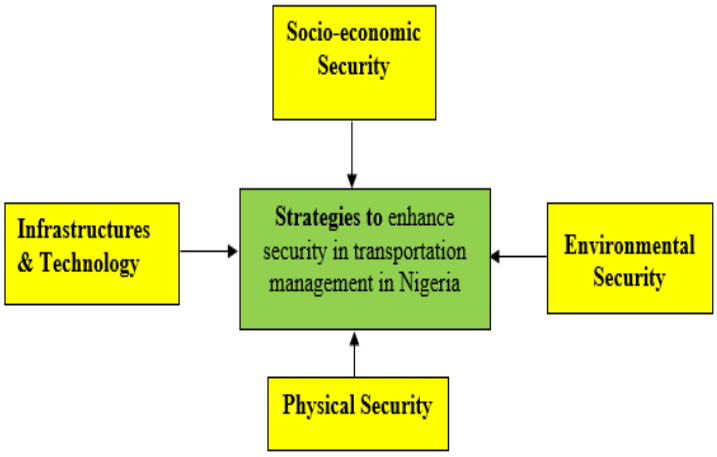

Figure 1: Conceptual Framework Showing Strategies

The diagram above is a summary of the focus of the study, which is based on four main thematic strategies to assist in transforming the status of food production in Nigeria. These strategies are political, diplomatic, economic, and military. They are briefly discussed in subsequent paragraphs.

Socio-economic Security: The socio-economic security situation examines how the current economic and social security status affects the transport industry and the modal choice of passengers. Changes in economic policies, such as the removal of fuel subsidies, have severely impacted the cost of transportation, thus altering the dynamics of transport modal choices among passengers. For instance, the extremely high cost of transportation, especially air transport along the NW and NC routes, has significantly influenced passenger modal choices. Furthermore, unemployment and the rising cost of living, which have affected the purchasing power of citizens, have also shaped transport modal choices.

Physical Security: The current spate of insecurity, especially in the NW and NC regions, ranges from kidnapping to armed robbery. Many people avoid traveling by road due to frequent incidents of highway robbery and kidnappings. This situation has impacted both the rural routes where bicycles and motorcycles are used for local road transportation and the urban routes linking cities in the NW and NC regions. The government's efforts to curb this menace have necessitated the deployment of security forces, including the Armed Forces of Nigeria and the Nigeria Police.

Infrastructures & Technology: Passengers tend to select the mode that offers the best balance of cost, convenience, and reliability. Deteriorating roads in the NW and NC cause passengers to experience longer travel times, higher vehicle maintenance costs, and safety concerns. This can lead to a preference for alternative modes like rail or air, if available. Similarly, limited rail connectivity, outdated systems, and slow-speed trains discourage passengers from considering rail as a viable option. This is especially true for long-distance travel, where reliability and efficiency are critical. Poor airport facilities, regional connectivity, and high costs can render air travel less appealing, pushing passengers toward road or rail options despite their shortcomings. In the case of NW and NC routes, where air travel is for short trips, it remains very expensive and only accessible to the very wealthy, thus limiting passenger preferences. The introduction of ICT and technologies like Artificial Intelligence-driven transport systems definitely provides alternative transportation options for passengers.

Environmental Security: Environmental security issues can increase travel costs and reduce accessibility, influencing passengers to choose modes that offer the best balance of safety, cost, and convenience. Poor

environmental security, such as flooding or erosion, can damage roads and bridges, making them unsafe or inaccessible. This forces passengers to seek alternative modes of transport, thus influencing modal choice among passengers. Railways are often less affected by environmental challenges like flooding compared to roads. As a result, passengers may prefer rail transport for its reliability during adverse weather conditions. In areas with environmental risks, air or water (inland) transport may become a preferred option for long-distance travel due to its ability to bypass ground-level disruptions, which depend on the availability and affordability of air services.

Materials and Method

Research Design

In this study, a mixed approach was adopted, combining both quantitative and qualitative methodologies. This decision was based on the desire to integrate insights from both quantitative data, which provides structured statistics on respondents' perceptions of strategy effectiveness, and qualitative data, which offers nuanced, constructivist knowledge through interviews with individuals regarding strategy objectives and their impact on food production efficiency.

Study Area

The study was carried out among the states of the Norther region of Nigeria and for the purpose of the study, state such as Plateau, Benue, Kaduna and Federal Capital Territory (FCT)-Abuja were selected randomly. The socio-economic attributes selected for the study include; fuel subsidy removal, pricing regulatory framework and higher transportation costs.

Sample Size

The sample size was determined using Yamane's (1967) formula, which yielded an approximate sample of 400 respondents; however, 450 questionnaires were distributed to account for potential non-responses. Table 1 presents the detailed breakdown of questionnaires distributed across Kaduna (164), Abuja (61), Plateau (93), and Benue (132), covering Airport Authorities, NURTW and Bus Operators, NRC staff, Security and Safety Agencies, and Passengers. This distribution ensured fair regional representation and comprehensive coverage of all relevant stakeholders in the study area.

Primary Data

Primary data were obtained directly from the field through the administration of structured questionnaires and the conduct of oral interviews. A total of 450 questionnaires were distributed across Kaduna, Abuja, Plateau, and Benue States in line with their respective population proportions as presented in Table 1. The respondents comprised five major categories:

i Airport authorities (Federal Airports Authority of Nigeria and airline officials)
ii Road transport operators (NURTW and luxury bus companies)
iii Railway officials (Nigerian Railway Corporation)
iv Security and safety agencies (Nigerian Army, Police, DSS, and FRSC personnel)
v Passengers (air, road, and rail users)

Data Analysis

The study employed both quantitative and qualitative data analysis techniques to ensure a comprehensive interpretation of the findings. Quantitative data collected through the structured questionnaires distributed were analysed using descriptive statistical tools, including frequencies, percentages, and means, to summarize respondents' views. Inferential statistics such as Chi-square and correlation analyses were conducted to examine the relationships between security factors and transport mode choices. These analyses were performed using Microsoft Excel and SPSS software, and the results were presented in tables and charts for clarity.

The qualitative data obtained from interviews with officials of the Federal Ministry of Transportation, the Ministry of Aviation, Nigerian Railway Corporation, security agencies, and transport unions were analysed thematically. Emerging themes were identified, categorized, and interpreted to complement the quantitative results. The integration of both analytical approaches enhanced the reliability of the findings and supported the study's objective of understanding how security issues influence transport decisions within the North Central and North West regions of Nigeria.

Table 1: Number of Questionnaires Distributed to Respondents across the Study Area

Serial	Respondents	Frequency				Total
		Kaduna	Abuja	Plateau	Benue	
1	Airport Authorities (FAAN and Airlines)	25	9	14	20	68
2	NURTW and Luxury Bus Operators	25	9	14	20	68
3	NRC	25	9	14	20	68
4	Security and Safety Agencies (Police, DSS, FRSC)	25	9	14	20	68
5	Passengers (Air, Road, and Rail)	66	24	37	53	180
Proportionate Sample Allocation		**164**	**61**	**93**	**132**	**450**
(Percentage)		**36.5**	**13.5**	**20.7**	**29.3**	**100.0**
NBS 2020 Estimated Population		**8,324,285**	**3,067,500**	**4,717,300**	**6,687,706**	**22,796,791**

Results and Discussion

From the administered questionnaire (450), a total of 389 were properly filled and returned which represents 97.3% response rate. From the analysis, the response composes of passengers (41.9%), Security and safety agencies (16.2%) and NURTW/luxury bus operators (15.7%), airport authorities (14.1%) and Nigerian railway corporation staff (12.1%).

Socio-Demographic Details of the Respondents

The demographic characteristics of respondents (Table 2) were carefully analyzed to provide a comprehensive understanding of the profiles of individuals who participated in the study and to contextualize their perspectives on security issues and transport modal choice along the North Central and North West routes. The respondents were drawn from four key locations: Kaduna (37.3%), Benue (29.0%), Plateau (20.3%), and Abuja (13.4%). The gender distribution of respondents showed a predominance of male participants (62.2%) compared to females (37.8%). The age distribution of respondents was fairly balanced, with the largest group being 31–40 years (33.7%), followed by 41–50 years (27.8%), 20–30 years (24.7%), and 51 years and above (13.9%).

The passengers formed the largest group, accounting for 41.9% of the sample. This was followed by security and safety agencies (16.2%), NURTW and luxury bus operators (15.7%), airport authorities (14.1%), and Nigerian Railway Corporation staff (12.1%). On the respondent's occupation, civil servants represented the largest occupational group at 42.7%, followed by farmers (22.9%), self-employed individuals (18.5%), students or unemployed respondents (9.0%), and retirees (6.9%). Ordinary diploma holders accounted for 35.2%, degree/HND holders 31.9%, those with other qualifications such as SSCE, vocational or informal training 19.3%, Master's degree holders 10.5%, and PhD holders 3.1%. On residents' experience, 37.5% of respondents had 1–10 years of experience, 33.7% had 11–20 years, 20.1% had 21–30 years, and 8.7% had over 31 years of experience.

Table 2: Socio-Demographic Details of the Respondents

	Frequency	Percentage (%)
Location of Respondents		
Kaduna	145	37.3
Abuja	52	13.4
Plateau	79	20.3
Benue	113	29.0
Category of Respondents		
Airport Authorities (FAAN and Airlines)	55	14.1
NURTW and Luxury Bus Operators	61	15.7
NRC	47	12.1
Security and Safety Agencies (Police, DSS, FRSC)	63	16.2
Passengers (Air, Road, and Rail)	163	41.9
Occupation of Respondents		
Civil Servant	166	42.7
Retiree	27	6.9
Farmers	89	22.9
Self Employed	72	18.5
Student/Unemployed	35	9.0
Gender of Respondents		
Male	242	62.2
Female	147	37.8
Age Distribution of Respondents		
20 – 30 Years	96	24.7
31 – 40 Years	131	33.7
41 – 50 Years	108	27.8
51 Years & Above	54	13.9
Educational Qualification of Respondents		
PhD	12	3.1
Master's	41	10.5
Degree/HND	124	31.9
Ordinary Diploma	137	35.2
Others (e.g., SSCE, Vocational, informal)	75	19.3
Experience of Using the Study Route by the Respondents		
1 – 10 Years	146	37.5
11 – 20 Years	131	33.7
21 – 30 Years	78	20.1
31 Years & Above	34	8.7
Total	389	100.0

Impact of High Cost of Transportation Based on Socio-Economic Factors

This subsection examines how socioeconomic factors, particularly rising transportation costs, influence the choice of transport modes along the North Central and North West routes. Factors such as fuel price increases, lack of fare regulation, and the relationship between income and inflation can affect the affordability and accessibility of transport services. To capture these dynamics, both descriptive statistics and chi-square analysis were employed. The descriptive results provide a clear distribution of respondents' perceptions, while the inferential test establishes whether the observed effects of cost pressures significantly influence modal choice. Examining these factors helps to reveal the economic pressures that shape commuters' decisions and the strategies they adopt to cope with cost-related challenges.

Fuel Subsidy Removal

The effect of fuel subsidy removal on the cost of transportation and its influence on transport modal choice is presented in Figure 2. A majority of respondents (55.0%) indicated that the impact of fuel subsidy removal was significant, while 21.3% reported a moderate effect, 12.3% observed a limited effect, and 11.3% were unable to determine the impact. This distribution shows that increases in fuel prices have substantially raised travel costs, affecting both transport operators and commuters along the North Central and North West routes. The data suggest that economic changes, such as subsidy removal, are felt directly by the public and influence decisions

regarding the affordability and accessibility of different modes of transport.

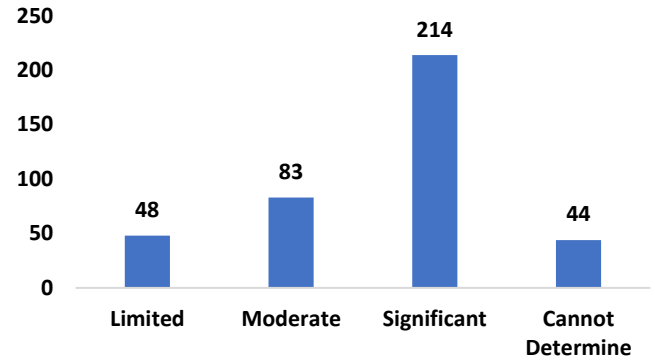

Figure 2: Effect of Fuel Subsidy Removal on Cost of Transportation and Modal Choice

Pricing Regulatory Framework

The effect of the absence of a pricing regulatory framework on transportation costs and modal choice is shown in Figure 3. A significant proportion of respondents (39.3%) reported that the absence of pricing regulation had a substantial effect on transport costs, while 30.6% noted a moderate effect, 15.9% indicated a limited impact, and 14.1% were unable to determine the effect. This distribution suggests that a lack of regulatory oversight allows transport operators to set fares without standardisation, leading to cost variability that directly influences commuters' decisions regarding the choice of transport mode.

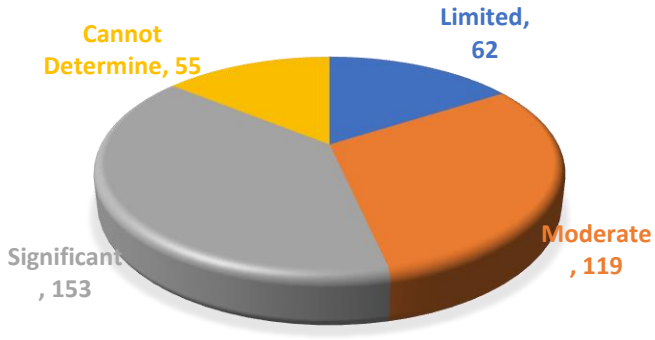

Figure 3: Effect of Absence of Pricing Regulatory Framework on Cost of Transportation

Rising transportation costs have a strong effect on the choice of transport mode. Commuters may respond by shifting to less expensive alternatives, reducing the frequency of their travel, or altering travel routes to minimise expenses. These behavioural adjustments demonstrate the direct influence of economic pressures on mobility decisions, particularly for individuals and households with limited disposable income. For transport operators, increased costs of fuel translate into higher fares, which can discourage some passengers from using certain modes, especially road and rail transport, making affordability a critical factor in determining modal choice.

The connection between socio-economic factors and transport decisions emphasises the need for practical policies and strategies that can ease cost pressures while maintaining access and safety. Measures such as targeted subsidies, fare adjustments, or incentives for more efficient transport options can help commuters continue to travel affordably while ensuring that transport services remain viable and secure. Addressing these economic challenges is important for sustaining travel along the North Central and North West corridors and for promoting stability in modal choice despite fluctuations in fuel prices

Higher Transportation Costs

The effect of minimum wage and current remuneration in relation to inflation on transportation costs and modal choice is presented in Figure 4. A majority of respondents (51.9%) reported that the impact of wage levels compared to inflation on transport costs was significant, while 24.2% indicated a moderate effect, 9.5% perceived a limited effect, and 14.4% were unable to determine the impact. This suggests that rising living costs and stagnant or low wages reduce the affordability of transportation, directly influencing how commuters choose between different modes of transport.

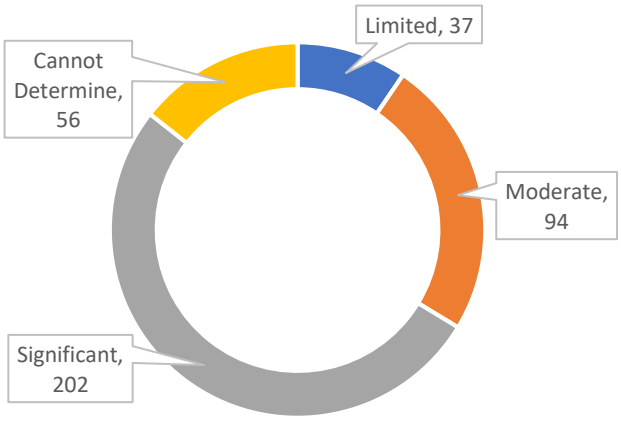

Figure 4: Effect of Minimum Wage/Current Remuneration vis-à-vis Inflation on Cost of Transportation

Higher transportation costs resulting from an unregulated pricing environment can affect the affordability and accessibility of transport services. Commuters may shift to alternative, more cost-effective modes of travel, reduce the frequency of trips, or reconsider their travel routes to manage expenses. Such adjustments demonstrate the influence of socio-economic pressures on mobility, particularly for low- and middle-income households who are most sensitive to fare fluctuations. Transport operators, on the other hand, may increase fares in response to fuel price changes, maintenance costs, or demand patterns, which further compounds the impact on commuter decisions. The interplay between economic factors and transport behaviour highlights the importance of policies and frameworks that promote fare stability while maintaining service quality and accessibility. Implementing mechanisms for fare regulation or oversight can reduce cost uncertainty, help commuters plan their travel more effectively, and ensure that transport services remain reliable and secure.

High transportation costs relative to income can prompt commuters to seek cheaper travel alternatives, reduce travel frequency, or prioritize essential trips over discretionary travel. For households and individuals with limited income, fluctuations in fares due to inflation or rising operational costs of transport services can strongly dictate their modal choice. This economic pressure also affects transport operators, who may adjust fares to offset increased expenses, further influencing commuter decisions and creating a cycle of cost sensitivity in transport behaviour.

The relationship between income, inflation, and transport affordability highlights the need for policies and interventions that can buffer commuters from the effects of rising costs. Measures such as fare stabilization, subsidies, or targeted support for vulnerable populations can help ensure access to reliable and safe transport options, even when economic pressures are high. The analysis of the three socio-economic variables namely fuel subsidy removal, absence of pricing regulatory framework, and the relationship between minimum wage and inflation shows a consistent pattern where respondents perceive these factors as exerting considerable influence on the cost of transportation and consequently on the choice of travel modes across North Central and North West Nigeria. These outcomes point to the strong economic pressures faced by commuters and transport operators, highlighting affordability as a central determinant of mobility. While the descriptive analysis provides useful insights into respondents' opinions, it does not establish whether the observed variations are statistically significant. Therefore, it becomes necessary to proceed with an inferential approach by combining the response data from the three tables and applying a Chi square test. This statistical procedure provides a more robust evaluation of the hypothesis that high transportation costs arising from socio economic factors significantly influence transport modal choice in the study area.

The hypotheses tested are stated as follows:

H_0: High cost of transportation arising from socio-economic factors has no significant impact on transport modal choice in North West and North Central Nigeria.

H_1: High cost of transportation arising from socio-economic factors has a significant impact on transport modal choice in North West and North Central Nigeria.

The combined analysis of responses on the effect of fuel subsidy removal, absence of a pricing regulatory framework, and the relationship between minimum wage and inflation on transportation costs and modal choice in North West and North Central Nigeria provides deeper statistical insight into the influence of socio-economic factors. The Chi square test, as presented in Table 3, was conducted to determine whether the observed distribution of responses differed significantly from what would be expected under the null hypothesis. The Pearson Chi square value obtained was 26.035 with 6 degrees of freedom, and a corresponding p value of 0.000. Similarly, the likelihood ratio Chi square produced a value of 26.336 with 6 degrees of freedom and a p value of 0.000.

Table 3: Test of Significant Relationship among Variables

Response Option	Fuel Subsidy Removal	Absence of Pricing Regulatory Framework	Minimum Wage/ Inflation
Limited	48 (49.00)	62 (49.00)	37 (49.00)
Moderate	83 (98.67)	119 (98.67)	94 (98.67)
Significant	214 (189.67)	153 (189.67)	202 (189.67)
Cannot Determine	44 (51.67)	55 (51.67)	56 (51.67)
Cell Contents: Count (Expected count)			
Pearson Chi-Square = 26.035, DF = 6, P-Value = 0.000			
Likelihood Ratio Chi-Square = 26.336, DF = 6, P-Value = 0.000			

At the 5% level of significance, the decision rule is to reject the null hypothesis if the p value is less than 0.05. Since the calculated p value of 0.000 is well below the threshold, the null hypothesis is rejected. This result indicates that high transportation costs arising from socio-economic factors such as fuel subsidy removal, lack of pricing regulation, and the imbalance between wage levels and inflation have a statistically significant impact on the choice of transport mode among commuters in the study area.

Qualitative Outcome

Based on the interviews conducted, the thematic analysis presented in Figure 5 reveals that escalating transportation costs exert a strong influence on passengers' modal preferences across the North Central and North West regions. Officials from airport authorities and airlines observed that rising ticket prices have driven many middle-income travellers away from air transport toward rail or long-distance buses, which are considered more affordable alternatives. Similarly, road transport operators under the NURTW reported that fare increases often compel passengers to switch from luxury buses to smaller vehicles or shared taxis, underscoring the high degree of cost sensitivity among travellers. In the same vein, NRC officials noted that rail transport is widely perceived as a cost-effective option, particularly for families and groups, even though it offers less flexibility in terms of scheduling.

Socio-economic challenges such as widespread poverty, unemployment, and declining household incomes were identified as the main drivers of cost sensitivity. Security and safety agencies emphasised that these constraints heighten passengers' reluctance to pay higher fares, especially in rural areas where incomes are low. Fuel subsidy removal and frequent fluctuations in petroleum prices were also cited as key contributors to escalating fares across all modes. Bus operators explained that they adjust fares almost immediately in response to fuel price changes, while airlines reported that policy-induced costs, such as taxes and surcharges, directly affect ticket affordability.

Interviewees consistently stressed the need for targeted interventions to reduce cost burdens without undermining service quality. Suggested measures included government fuel price stabilisation policies, subsidies for public transport operators, improved rail investments to expand affordable alternatives, and tax incentives for airlines to reduce excessive ticket surcharges. Passengers themselves emphasised that affordability should not come at the expense of comfort or safety, urging for balanced strategies that sustain both accessibility and service standards.

The responses suggest that high transportation costs are a critical determinant of modal choice in the NW/NC region, with passengers consistently seeking the most affordable yet reliable options. Without interventions to cushion the impact of rising fuel prices and economic hardship, cost pressures will continue to shift travel demand away from safer or more efficient modes toward cheaper, less reliable alternatives.

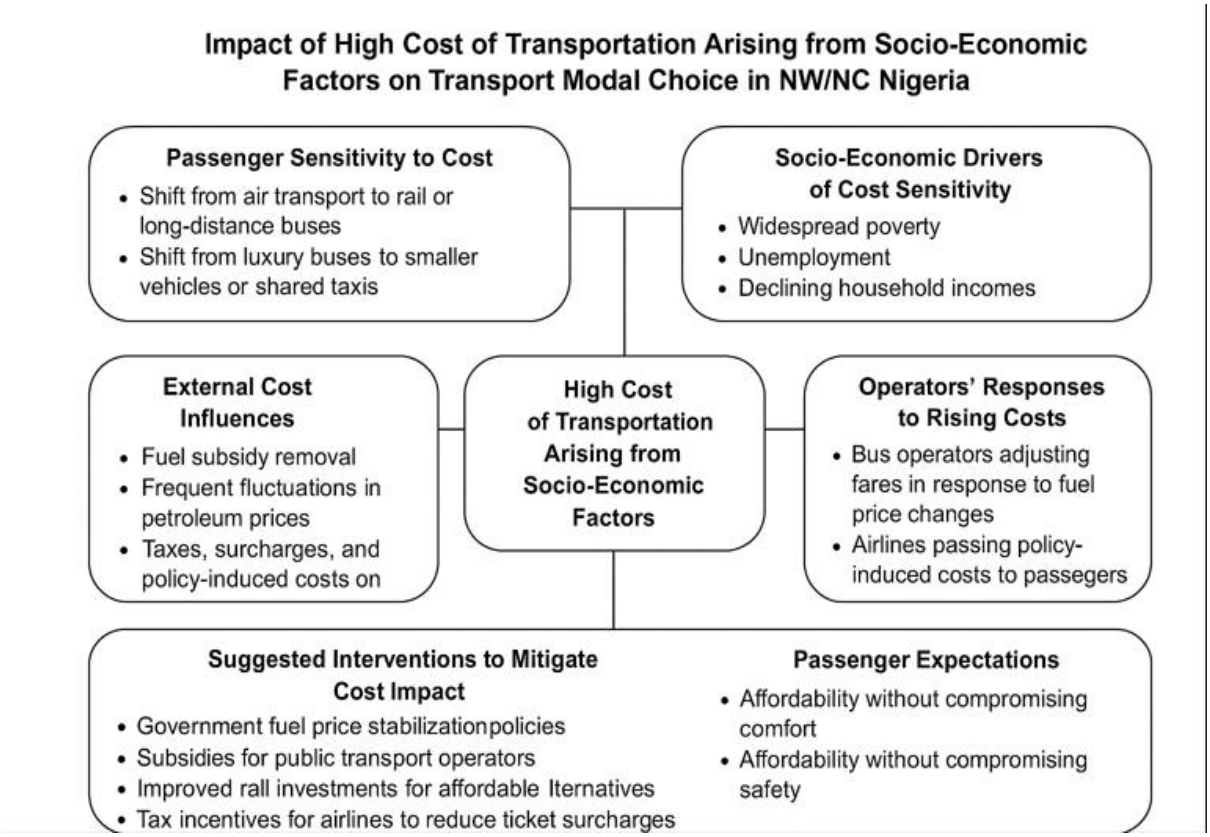

Figure 5: Impact of High Cost of Transportation Arising from Socio-Economic Factors on Transport Modal Choice in NW/NC Nigeria

Conclusion and Recommendations

The inferential analysis confirms that socio-economic pressures directly influence modal choice decisions in North West and North Central Nigeria. This shows the importance of policy interventions aimed at stabilizing fares, regulating transport pricing, and aligning wage levels with inflationary realities to ensure accessibility and affordability of transport services for the population.

Government should introduce a clear regulatory framework for transport fares to prevent arbitrary price hikes and protect passengers from exploitative practices. At the same time, wage reviews and targeted subsidies are required to cushion vulnerable groups from the impact of subsidy removal and inflation. Tax incentives and financial relief to operators will further help reduce operational costs and stabilize pricing across road, rail, and air transport.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Credit Authorship Contribution Statement

Agba, F. I.: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Visualization, Project administration, Writing - original draft. **Wizor, C. H.**: Supervision, Methodology, Validation, Formal analysis, Data curation, Visualization, Review and Editing.

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