

International Journal Research Publication Analysis

Page: 01-07

ENERGY COST CHANGES AND TRANSPORTATION COSTS IN ABUJA, FEDERAL CAPITAL TERRITORY, NIGERIA

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Article Received: 30 August 2026

Article Revised: 18 September 2026

Published on: 08 October 2026

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DOI: <https://doi-doi.org/101555/ijrpa.5991>

ABSTRACT

This article examined the relationship between energy cost changes and transportation costs in Abuja, Federal Capital Territory, Nigeria. The article was derived from the first objective of a study that investigated energy cost changes and transportation and logistics operations in Abuja. A quantitative cross-sectional survey design was adopted. The accessible population comprised transportation operators, logistics firms, courier and dispatch operators, haulage firms, warehouse and distribution operators, and e-hailing and delivery-platform operators. A reported sample of approximately 303 respondents was determined using the Taro Yamane formula, while the empirical correlation reported for the first hypothesis was based on 300 observations. Data were collected with a structured questionnaire and analysed using descriptive statistics and Pearson Product Moment Correlation. The descriptive findings showed agreement that energy-cost increases raised vehicle operating costs ($M = 4.26$), passenger and goods transportation costs ($M = 4.23$), transportation fares and charges ($M = 4.20$), maintenance and operating expenses ($M = 4.23$), and overall transportation costs ($M = 4.27$). The Pearson correlation result showed a positive and statistically significant relationship between energy cost changes and transportation costs ($r = 0.642$, $p = 0.000$). The null hypothesis was therefore rejected. The finding supports the Cost-Push Inflation Theory by indicating that higher energy input costs are associated with higher transportation costs. The article recommends stronger fuel and energy-cost management, route optimisation, preventive maintenance, realistic budgeting and flexible pricing strategies among transportation operators in Abuja.

KEYWORDS: Energy Cost, Fuel Price, Transportation Costs, Logistics, Abuja, Cost-Push Inflation Theory, Transport Operators.

1. INTRODUCTION

Transportation is a central component of economic activity because it facilitates the movement of people, raw materials, finished products and commercial supplies. In Nigeria, road transportation plays a dominant role in domestic movement, making the cost of vehicle operation an important element of the wider cost structure of production and distribution. Energy is fundamental to this system because vehicles, logistics equipment and supporting facilities require petrol, diesel, electricity and other energy inputs.

The energy-cost environment in Nigeria changed substantially following the removal of the petrol subsidy in May 2023. The dissertation reports that petrol prices increased from approximately ₦185 per litre before subsidy removal to above ₦1,000 per litre in some Abuja locations by 2024. Such changes created substantial operating pressures for transportation and logistics operators. The effects can be expressed through increased fuel expenditure, higher maintenance-related costs, increased fares and freight charges, and changes in route and trip decisions.

Abuja is particularly relevant because it is Nigeria's administrative capital and an important transportation and logistics hub. The city connects several parts of the country and contains extensive passenger transportation, courier, haulage, e-hailing, warehousing and distribution activities. The combination of high transportation demand and rising energy costs makes the relationship between energy expenditure and transportation costs an important empirical issue.

The first objective of the parent study was therefore to examine the effect of energy cost changes on transportation costs in Abuja. The corresponding null hypothesis stated that there was no significant relationship between energy cost changes and transportation costs in Abuja. This article focuses exclusively on that objective and its associated empirical evidence.

2. Literature and Theoretical Foundation

Energy costs constitute a major component of transportation expenditure because fuel is consumed directly during vehicle operation. Transportation costs also include vehicle maintenance, tyres, spare parts, labour, insurance, licensing, tolls, loading and unloading and other operating expenses. An increase in fuel prices can therefore increase the cost of

completing a trip even when distance, cargo volume or passenger demand remains unchanged.

The relationship can also be understood through cost transmission. Operators may respond to higher energy expenditure by increasing fares and freight charges, absorbing part of the additional cost through lower margins, reducing trips, consolidating loads or adopting more efficient routes. The magnitude of the response depends on market competition, demand, vehicle efficiency, route characteristics and the operator's ability to recover additional expenditure.

The Cost-Push Inflation Theory provides the principal theoretical foundation for Objective One. Jhingan (2018) explains cost-push inflation in terms of increases in the prices of strategic inputs that raise the cost of production and service provision. Applied to transportation, fuel is an essential production input. An increase in fuel price therefore raises the cost of providing transportation services and may encourage service providers to transfer some of the additional cost to consumers through higher fares or charges.

The dissertation also relates energy costs to Neoclassical Growth Theory, which emphasises productive resource utilisation and technological progress. From this perspective, persistent energy-cost increases may constrain resources available for fleet renewal, maintenance, technology adoption and productivity-enhancing investments. Although Objective One is primarily concerned with transportation costs rather than long-run growth, the theory helps explain why higher energy expenditure can influence firms' resource allocation decisions.

3. METHODOLOGY

The parent study adopted a quantitative cross-sectional/descriptive survey approach. The study area was Abuja, Federal Capital Territory, covering AMAC and selected surrounding satellite towns. The accessible population was estimated at 1,250 respondents comprising passenger transportation operators, courier and dispatch operators, freight and haulage operators, warehouse and distribution service operators, and e-hailing and delivery-platform operators.

Using the Taro Yamane formula at a 0.05 level of precision, the reported sample size was approximately 303 respondents. Stratified and simple random sampling techniques were used. Data were collected with the Fuel Price Changes, Energy Costs and Logistics Performance Questionnaire (FPECLPQ), structured around the study objectives and measured on a five-point Likert scale. The questionnaire was subjected to face and content

validity, while a pilot study involving 30 respondents was identified for reliability assessment using Cronbach's Alpha.

Descriptive statistics, including frequencies, percentages and mean scores, were used to summarise the questionnaire responses. Pearson Product Moment Correlation was employed for hypothesis testing. The decision rule specified rejection of the null hypothesis where $p < 0.05$. For Objective One, the reported PPMC analysis used $N = 300$ observations.

4. RESULTS

The first objective was measured with five questionnaire statements. All five statements produced mean scores above the study's 3.00 decision threshold, indicating agreement among respondents.

Table 1. Descriptive analysis of energy cost changes and transportation costs. Source: Field Survey (2026).

Indicator	Mean	Decision
Fuel-price increases increased vehicle operating cost	4.26	Agreed
Energy costs increased passenger/goods transport cost	4.23	Agreed
Fuel-price changes increased fares and charges	4.20	Agreed
Higher energy costs increased maintenance/operating expenses	4.23	Agreed
Energy-cost increases increased overall transportation cost	4.27	Agreed

The highest mean score was 4.27 for the statement that energy-cost increases had contributed significantly to the overall cost of transportation services. The result was followed by a mean of 4.26 for increased vehicle operating costs. The other indicators also exceeded the 3.00 threshold. Collectively, the descriptive findings show that respondents perceived energy-cost changes as an important contributor to transportation-cost increases.

The inferential result is presented below.

Table 2. Pearson Product Moment Correlation result for Objective One. Source: Research Survey (2026).

Variables	r	p-value	N	Decision
Energy cost changes ↔ Transportation costs	0.642	0.000	300	Reject H_0

The Pearson correlation coefficient of 0.642 indicates a positive, moderately strong association between the reported energy-cost changes and transportation costs. The significance value of 0.000 is below the 0.05 threshold. Consequently, the null hypothesis that there is no significant relationship between energy cost changes and transportation costs in Abuja was rejected. The result establishes a statistically significant association; it should

not, however, be interpreted by itself as proof that energy cost changes caused the observed transportation-cost outcomes.

5. DISCUSSION

The Objective One finding indicates that increases in energy costs are closely associated with increases in transportation costs in Abuja. The descriptive results provide consistent evidence across vehicle operating costs, passenger and goods transportation costs, fares and charges, maintenance expenses and overall transportation costs. This pattern is consistent with the economic logic that fuel is a recurring input into road transportation and that increases in the price of the input raise the cost of each trip.

The finding is consistent with the empirical evidence reviewed in the dissertation. Yahaya (2026) reported that fuel subsidy removal significantly increased transportation costs and household living costs in Nigeria. Adepoju, Bello and Hassan (2025) reported increases in transportation fares and logistics charges associated with fuel-price increases. Majjamaa, Bala and Garba (2024) found that fuel-price increases were transmitted to transportation costs, while Alli, Jubril and Bello (2024) reported significant increases in freight charges and logistics costs associated with fuel-price increases.

The finding also supports the Cost-Push Inflation Theory. Transportation operators cannot generally avoid energy consumption when providing road-based services. When the cost of fuel increases, the cost structure of operators changes. Depending on market conditions, the additional cost may be reflected in higher fares and freight charges, absorbed through reduced margins, or managed through operational changes such as route optimisation and trip consolidation.

The result should nevertheless be interpreted within the limitations of a cross-sectional survey and correlation analysis. The reported association reflects respondents' perceptions and does not establish a time-series causal effect. Other factors including inflation, exchange-rate changes, road conditions, vehicle characteristics, traffic congestion, maintenance prices and market competition may also influence transportation costs. The dissertation's result therefore provides empirical evidence of association rather than an isolated causal estimate.

6. Implications

For transportation operators, the finding highlights the importance of systematic fuel and energy-cost management. Monitoring fuel consumption, reducing unnecessary idling, selecting efficient routes and maintaining vehicles can reduce avoidable energy expenditure.

For policymakers, the result indicates that energy-pricing changes have operational implications for transport providers and may therefore warrant complementary transportation-efficiency measures. For logistics firms, budgeting should incorporate energy-price volatility rather than assuming a constant fuel-cost environment.

7. Recommendations

First, transportation operators should adopt effective fuel and energy-cost management systems. Operators should monitor fuel consumption, reduce unnecessary idling, optimise routes and undertake regular vehicle maintenance to minimise avoidable operating expenses.

Second, operators should develop flexible pricing and budgeting strategies capable of accommodating energy-cost changes without imposing excessive increases on passengers and customers.

Third, transport and logistics organisations should strengthen fleet management, fuel-consumption monitoring and preventive maintenance so that higher energy prices do not translate automatically into avoidable operating inefficiencies.

Fourth, relevant policymakers and industry associations should support measures that improve energy-cost predictability and encourage efficient, affordable and stable energy supply for transportation operations.

8. CONCLUSION

The article concludes that energy cost changes have a statistically significant positive relationship with transportation costs in Abuja. Respondents consistently reported higher vehicle operating costs, passenger and goods transport costs, fares and charges, maintenance expenditure and overall transportation costs as energy costs increased. The PPMC result of $r = 0.642$ with $p = 0.000$ provides empirical support for the relationship. The evidence is consistent with Cost-Push Inflation Theory, while the practical response lies in improved energy-cost management, operational efficiency and realistic budgeting.

REFERENCES

1. Yahaya (2026), Ogunleye and Eze (2025), Azeez (2025), Nwankwo and Adebayo (2024), and Maijamaa et al. (2024) strengthens the evidence that energy-cost instability is an important operational and economic issue for transportation and logistics service providers in Abuja.

2. Adepoju, T., Balogun, A., & Bekesumowei, E. (2023). Impact of fuel subsidy removal on transportation costs and gross domestic product in Nigeria. *European Journal of Theoretical and Applied Sciences*, 1(5), 63–78.
3. Adepoju, T., Bello, K., & Hassan, A. (2025). Fuel subsidy removal and transportation inflation in Nigeria: Evidence from vector error correction modelling. *Journal of Applied Economics and Policy Studies*, 8(1), 22–41.
4. Alli, S., Jubril, A., & Bello, M. (2024). Fuel subsidy removal and supply chain performance in Nigeria. *Journal of Supply Chain and Operations Management*, 9(2), 87–109.
5. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications
6. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.
7. Maijamaa, B., Bala, U., & Garba, A. (2024). Oil price pass-through to transportation costs in Nigeria: Evidence from asymmetric threshold models. *Journal of International Business and Economics*, 12(1), 1–18. National Bureau of Statistics. (2020). Transport fare watch. National Bureau of Statistics National Bureau of Statistics. (2021). Transport fare watch. National Bureau of Statistics National Bureau of Statistics. (2022). Transport fare watch. National Bureau of Statistics National Bureau of Statistics. (2023). Transport fare watch. National Bureau of Statistics National Bureau of Statistics. (2024). Transport fare watch. National Bureau of Statistics Nigerian Midstream and Downstream Petroleum Regulatory Authority. (2024). Petroleum products pricing and market reports. NMDPRA
8. Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65–94. THISDAY. (2024, June 25). Energy prices continue to rise, increasing transportation costs nationwide. THISDAY Newspaper. <https://www.thisdaylive.com> World Bank. (2021). Connecting to compete: Trade logistics in the global economy. World Bank World Bank. (2022). Nigeria development update. World Bank World Bank. (2024). Nigeria development update. World Bank
9. Yahaya, M. (2026). Fuel subsidy removal and living costs in Nigeria, 1986–2025. *African Journal of Economic Policy and Development*, 14(1), 1–29.