Fuel Subsidy Removal and Small and Medium Enterprises (SMEs) in Ondo State

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ABSTRACT

This paper assesses the effect of Fuel Subsidy Removal on Small and Medium Enterprises in Ondo State, Nigeria as study area. It is an empirical study that uses both primary and secondary source of data. The main objective is to assess the effect of Fuel Subsidy Removal on Small and Medium Enterprises in Ondo State, Nigeria. The study adopted rational choice theory as framework of analysis. It is a survey research whose data analysis was done quantitatively. Descriptive and Survey research design were adopted. The hypotheses were tested using Regression Analysis. Results from statistical analysis showed that; fuel subsidy removal significantly increases SMEs operational costs, SMEs performance has deteriorated since the removal of fuel subsidy and the correlation results reveal strong relationships among variables. The study concluded that the removal of fuel subsidy has had a profound negative effect on the operations and performance of SMEs in Ondo State. The study recommended that Nigerian government should introduce intervention funds, tax incentives, and subsidized loans should be provided to help SMEs cushion the effect of rising operational costs.

Keywords: Fuel Subsidy, Subsidy Removal, Small and Medium Enterprises, Profitability

INTRODUCTION

Small and Medium Enterprises (SMEs) are widely recognized as engines of economic growth, innovation, employment creation, and poverty reduction in developing economies. In Nigeria, SMEs contribute significantly to national output, rural development, and livelihood enhancement. Ondo State, with major commercial centres such as Akure, Owo, Ondo City, Ikare-Akoko, and Okitipupa, hosts a vibrant SME sector spanning retail trade, transport services, agro-processing, manufacturing, hospitality, artisanship, and ICT-based microenterprises. The performance and sustainability of these enterprises, however, depend heavily on energy affordability, transportation costs, and stability of macroeconomic conditions.

Fuel subsidy had historically been a major government intervention to keep petrol (PMS) prices artificially low in Nigeria. For decades, subsidies served as a mechanism to cushion households and businesses from global oil-price volatility. SMEs in particular benefited from low fuel prices because fuel is used for mobility, logistics, and most importantly power generation due to inadequate electricity supply. Many SMEs in Ondo State rely heavily on petrol-powered generators to sustain daily operations, making fuel pricing a critical determinant of operational costs and business survival.

In May 2023, the Federal Government of Nigeria announced the complete removal of petrol subsidy, leading to immediate and sharp increases in pump prices nationwide. Fuel prices rose by more than 200–300 percent, triggering substantial increases in transport fares, production costs, cost of goods, and general inflation. The economic shock was felt nationwide, but its impact on SMEs in Ondo State is particularly noteworthy because the state hosts a large number of informal and micro-sized enterprises whose profit margins are narrow and highly sensitive to changes in input costs.

Transport-dependent SMEs such as wholesale/retail traders, agricultural produce marketers, logistics operators and artisans experienced drastic cost increases in moving goods within and outside the state. Similarly, power-dependent SMEs bakeries, welders, barbers, cyber cafés, cold-room operators, and manufacturing firms saw sharp increases in daily production costs due to expensive generator fuel. These shocks affected sales volume, pricing decisions, employment levels, and overall profitability.

While the Federal Government argued that subsidy removal would create fiscal space and long-term macroeconomic benefits, the immediate consequences for SMEs have been mixed. Some businesses have downsized, passed costs to consumers, reduced operating hours, adopted alternative energy (solar, gas), or completely shut down. The magnitude of these effects in Ondo State has, however, not been sufficiently documented in empirical academic studies, creating a knowledge gap this research seeks to address.

Problem Statement

The removal of fuel subsidy in Nigeria led to unprecedented increases in fuel pump prices, which immediately translated into increased transportation cost, higher prices of raw materials, and rising operating expenses for SMEs. In Ondo State, where electricity supply is unstable and many businesses rely on private generators, the cost burden has become significantly heavier. For SMEs that operate on tight budgets and limited working capital, these cost increases have eroded profit margins and threatened business survival.

Transport operators and traders now spend more on intra- and inter-state movement of goods. Manufacturing and service-based SMEs face higher production costs due to generator dependence. For enterprises that cannot pass the increased costs to consumers because of market competition or consumer purchasing-power decline, the consequence has been reduced output, lower revenue, downsizing of workers, or total closure.

However, inflationary pressures triggered by subsidy removal have reduced household purchasing power, thereby decreasing consumer demand for goods and services. This demand contraction directly affects SME sales in Ondo State. Many SMEs report difficulty in restocking, paying employees, or meeting basic running expenses. Access to credit remains limited, and government palliative measures appear insufficient or unevenly distributed.

In the light of these evident challenges, there is inadequate empirical evidence on the extent to which fuel-subsidy removal has affected SMEs in Ondo State specifically. The existing national research does not sufficiently capture the peculiarities of SME operations in the state's diverse local economic environments. This study will therefore examine the precise effects on cost structure and profitability among SMEs in Ondo State.

Research Questions

i. How has fuel subsidy removal affected the operating costs of SMEs in Ondo State?

ii What impact has subsidy removal had on the profitability of SMEs Ondo State?

Research Objectives

i. examine the effect of fuel subsidy removal on the operating costs of SMEs in Ondo State.
ii. assess how subsidy removal has affected the profitability of SMEs in Ondo State.

Research Hypotheses

i. **H_{01}:** Fuel subsidy removal has no significant effect on the operating costs of SMEs in Ondo State.

ii. **H_{02}:** Fuel subsidy removal has no significant impact on the profitability of SMEs in Ondo State.

LITERATURE REVIEW

Conceptual Review

Fuel Subsidy

Fuel subsidy refers to a government intervention that reduces the market price of petroleum products by paying part of the cost on behalf of consumers (Adeniran, 2021). In Nigeria, fuel subsidy was introduced in the 1970s to cushion the effects of global oil price fluctuations, stabilize domestic fuel prices, and support household and business expenditures (Ogbuagu & Effiong, 2020). For decades, subsidy payments kept petrol prices artificially low, making PMS affordable for transportation, power generation, and industrial use.

Fuel subsidies are a government policy in which the government provides financial assistance to reduce the cost of fuel for consumers. This is typically done by selling fuel at a price lower than the market rate, with the government covering the price difference through subsidies. The main goals of fuel subsidies are to make fuel more affordable for citizens and to stabilize domestic prices. However, fuel subsidies can have economic, environmental, and fiscal implications, as they often lead to increased government spending and can encourage the consumption of fuel (Iroanusi, 2021)

Fuel subsidy removal is the withdrawal of government financial support that artificially lowers fuel prices, thereby allowing prices to be determined by market forces (Olaniyi, 2023). The removal is often justified by concerns about fiscal leakages, corruption, high subsidy costs, and inefficient resource allocation (World Bank, 2022). However, subsidy removal typically results in immediate increases in fuel prices, transportation costs, inflationary pressures, and higher operational expenses for businesses, especially in developing economies (Adeleke & Adekunle, 2021). Fuel subsidy removal refers to the government's decision to eliminate or reduce subsidies for petroleum products, such as gasoline and diesel. This can have significant economic and social implications (Ilodigwe, 2023). Fuel subsidy removal is the situation where the government lifts the subsidization of petrol prices they have been allocating to petrol refining. Fuel subsidy removal is driven by promoting economic and social policy objectives. The subsidy has always been a part of the Nigerian story, which makes it difficult to eliminate completely. In Nigeria, fuel subsidies were first introduced in the 1970s as a response to the oil price shock in 1973. Fuel subsidies were partially removed in 1986. Since then, fuel subsidies have been in place (Ilodigwe, 2023). In 2012, the government abruptly removed the fuel subsidy. The removal led to massive protests, which were intended for the government to reinstate the fuel subsidy it had removed. The government subsequently reinstated fuel subsidies in 2012 because of the massive protests. Since then, fuel subsidy payments in Nigeria have grown enormously. In 2022, fuel subsidies reached ₦4 trillion (US$6.088 billion), which amounted to 23% of the national budget of ₦17.126 trillion (US$25.87 billion) in 2022. As a result, Nigeria could no longer sustain fuel subsidies in 2023, and the government announced that fuel subsidies would be removed in June 2023 (Evans et al 2023). The chronology of events and reactions surrounding the 2023 fuel subsidy removal in Nigeria paints a complex picture of economic, political, and societal dynamics. The announcement of the subsidy's removal during President Bola Ahmed Tinubu's inauguration set off a chain reaction that elicited public outcry and governmental responses (Ude, 2023). Slated to take effect on July 1, 2023, the policy prompted immediate concerns and chaos, with citizens scrambling to purchase fuel before prices surged. This subsidy removal was intricately linked to fuel prices and consequently influenced the costs of almost all goods and services within the nation (Ude, 2023)

Small and Medium Enterprises (SMEs)

SMEs are businesses with limited capital investment, workforce, and operational scale. According to SMEDAN (2021), micro-enterprises employ 1–9 workers, small enterprises employ 10–49 workers, and medium enterprises employ 50–199 workers. SMEs operate across sectors including manufacturing, trading, services, agriculture, and transport. Their contribution to Nigeria’s GDP, job creation, wealth generation, and poverty reduction is substantial (Aremu & Adeyemi, 2019). Compared with large corporations, SMEs are businesses that have a limited number of employees and less financial turnover. The specific definition of an SME varies by country and industry but generally falls within these parameters: employee size, which can

typically be less than 500 employees, with some countries using lower thresholds (250 or even 50) and financial metrics where revenue, assets, or a combination of both may be considered, with upper limits varying by country and industry (Kadiri, 2012). The Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) defines SMEs in Nigeria as enterprises with a staff strength of not less than 10 and not more than 249 and an annual turnover of not less than five million naira (₦5,000,000) and not more than one billion naira (₦1,000,000,000). Similarly, the International Finance Corporation (IFC) defines SMEs as enterprises that have fewer than 250 employees and annual revenues of up to $15 million (IFC, 2021). SMEDAN (2021) further categorizes SMEs into micro, small and medium-sized enterprises on the basis of the number of employees and turnover (Lawal and Ijaiya, 2007). However, in Nigeria, the asset base criterion is more commonly used. The Central Bank of Nigeria, in its 2005 guideline on the Small and Medium Enterprise Investment Scheme (SMEIS), described SMEs as any enterprise with a maximum asset base of 200 million naira (excluding land and working capital) with no lower or upper limit of staff. Using quantitative indices alone to define SMEs has proven unsatisfactory in many respects. This is because such indices are characterized by periodic alterations due to inflation and thus can sometimes be misleading (Jamil & Rapiah, 2011).

Profitability

Profitability refers to the ability of an enterprise to generate returns in excess of costs.

Subsidy removal affects profitability through increased input costs, reduced sales volume, and higher inflation (Umar & Gatawa, 2022). When SMEs cannot pass the increased costs to consumers due to reduced purchasing power, profits decline (Owoeye & Ibrahim, 2021).

Theoretical Framework

Cost-Push Inflation Theory

The Cost-Push Inflation Theory, advanced by Keynesian economists, argues that inflation results from rising production costs such as wages, fuel prices, and raw materials (Samuelson & Nordhaus, 2018). Fuel subsidy removal increases the cost of PMS, which raises transport and production costs across the economy. SMEs, being cost-sensitive, experience increased expenses, leading to higher prices, reduced output, or lower profitability. This theory supports the argument that deregulating fuel prices can trigger widespread inflationary pressures.

Resource-Based View (RBV) Theory

The RBV by Barney (1991) explains how resources—financial, human, and physical—determine firm performance. SMEs with stronger internal resources (e.g., capital reserves, diversified energy sources, efficient logistics) are better positioned to absorb fuel price shocks. Conversely, resource-poor SMEs in Ondo State may struggle to adapt to higher operational costs, leading to performance decline.

Shock and Vulnerability Theory

Shock and Vulnerability Theory posits that external macroeconomic shocks disproportionately affect vulnerable groups with low adaptive capacity (Dercon, 2005). Fuel subsidy removal represents a national shock, but SMEs—especially micro-enterprises—are highly vulnerable due to limited capital, low savings, and high exposure to energy costs. The theory explains why small businesses in Ondo State may face more drastic impacts than larger firms.

Rational Choice Theory

Rational choice theory originated during the late 18th century with the work of Cesare Beccaria. Rational choice theory was anchored by James Coleman in 1990. The central explanation of this theory is a focus on an individual's rational action that helps explain aggregate behavior in society. According to the main proponents

of this theory, James Coleman (1990), the main task of sociologists is to focus on the social system, but such macro phenomena must be explained by examining the factors internal to them, which centers on the behavior of individuals at the micro level. The main argument in rational choice theory is that individuals gauge their choice of action on the basis of each option's capacity to yield advantages, pleasure, and happiness. Rational choice provides an in-depth perspective on why individuals decide to participate in specific activities; people choose to exhibit a behavior for fundamental reasons (Shon, 2015). Essentially, behaviors that are rewarding, easy, satisfying, and fun stimulate the pleasure-seeking aspects of an individual. The central foundation of this theory, however, is that the majority of society is filled with people who are rational beings who fear punishment and can be controlled by that fear. Rational choice theory hypothesizes that actors are sensible individuals who make decisions to carry out action on the basis of the costs and benefits involved (Liu, 2017). Rational choice theory posits that individuals act to maximize their self-interest within constraints (Van Valkengoed & Van der Werff, 2022). In the context of subsidy removal, this theory can explain how consumers react to price increases by altering their consumption patterns. Data from Nigeria's 2012 subsidy removal protests revealed shifts in consumer behavior due to sudden fuel price hikes (Apeloko & Olajide, 2012).

This study will therefore underpinned on Rational choice theory because, theorists posit that individuals make decisions on the basis of rational calculations aimed at maximizing their self interest. Applied to subsidy removal, this theory explains the government's motivation to eliminate subsidies due to their unsustainable fiscal burden. The escalating subsidy payments, as evidenced by the increasing yearly figures, indicate a rational response to mitigate economic strain. The decision aligns with the government's self-interest in achieving fiscal sustainability, addressing long-term budgetary concerns, and attracting investment by creating a favorable economic environment. Additionally, this theory underscores citizens' rational behavior in coping with higher fuel costs. As fuel prices rise after subsidy removal, individuals are likely to adapt their transportation choices and energy consumption patterns to minimize personal financial impact, aligning with the theory's assumption.

Empirical Review

Adeleke and Adekunle (2021) observed that SMEs in the manufacturing sector experienced a 30–40% decline in profit after subsidy removal.

Adeniji and Jegede (2022) found that fuel price increases significantly raise transportation, production, and distribution costs for SMEs in Southwest Nigeria.

Bassey and Essien (2021) reported price increases, reduced operations, and credit reliance as major strategies.

Ogbuagu and Effiong (2020) found that SMEs adopt energy-saving techniques and alternative energy sources such as solar.

Olayemi (2022) noted that some SMEs in Ondo State reduced their hours of operation to manage fuel expenses.

Owoeye and Ibrahim (2021) found that profit margins dropped significantly after fuel price hikes, especially for businesses dependent on transportation.

METHODOLOGY

Research Design and Approach

This study employs a sequential mixed-methods research design with a primary quantitative survey component supplemented by qualitative elements. The quantitative approach utilizes a descriptive-correlational survey design to investigate causal relationships between fuel subsidy removal and SME performance indicators. This design is appropriate for capturing the temporal dynamics of subsidy removal effects and examining multiple variable relationships within real-world business contexts.

Target Population and Sampling Procedure

Target Population Definition

The target population comprises all registered and unregistered Small and Medium Enterprises (SMEs) operating across Ondo State, Nigeria, at the time of data collection (2023-2024). Based on SMEDAN (2021) classifications, the population includes:

Small Enterprises: Firms employing 10-49 workers with annual turnover between ₦5 million and ₦50 million

Medium Enterprises: Firms employing 50-199 workers with annual turnover between ₦50 million and ₦1 billion

Sectoral representation includes: (i) Manufacturing and agro-processing; (ii) Retail and wholesale trade; (iii) Transportation and logistics services; (iv) Hospitality and food services; (v) Professional services (accounting, legal, ICT); (vi) Artisanal and craft production. Geographic distribution covers five major commercial hubs: Akure (Akure metropolis), Owo (Owo Local Government Area), Ondo City (Ondo Local Government Area), Ikare-Akoko (Akoko southwest), and Okitipupa (Okitipupa Local Government Area). These locations were selected based on SME concentration, economic activity levels, and representativeness of Ondo State's diverse local economies.

Sample Size Determination

The sample size was computed using the Krejcie and Morgan (1970) statistical table, which specifies recommended sample sizes for finite populations at 95% confidence level and 5% margin of error. Based on an estimated accessible population of 10,000 SMEs across Ondo State (derived from SMEDAN 2021 database and Ondo State Ministry of Commerce records), the table recommended a minimum sample size of 370 respondents. However, this study adopted a sample size of 300 SME owners/managers to balance statistical adequacy with resource constraints, acknowledging that n=300 remains statistically sufficient for multiple regression analysis (Hair et al., 2014) and provides adequate statistical power ($\beta = 0.80$) for detecting medium effect sizes at $\alpha = 0.05$ significance level.

Sampling Procedure

A stratified multistage sampling approach was employed across three stages:

Stage 1—Geographic Stratification: Ondo State was divided into five commercial zones (Akure, Owo, Ondo City, Ikare-Akoko, and Okitipupa). Each zone constitutes a distinct stratum to ensure geographic representation and capture locality-specific economic variations.

Stage 2—Sectoral Stratification: Within each geographic zone, SMEs were further stratified by sector (manufacturing, trade, transportation, services, hospitality). This ensures sectoral representation in the sample, as different sectors experience variable sensitivity to fuel subsidy impacts.

Stage 3—Proportionate Allocation: Sample units were allocated to each stratum proportionally based on SME density from SMEDAN registry and cross-verified with state commerce ministry records. Allocation formula: $n_h = (N_h/N) \times n$, where n_h is stratum sample size, N_h is stratum population size, N is total population, and n is overall sample size.

Stage 4—Simple Random Selection: Individual respondents within each stratum were selected randomly using computer-generated random number tables to ensure equal probability of selection and minimize selection bias.

Operational Definition and Measurement of Variables

Dependent Variable: SME Performance

Operational Definition: SME performance refers to the multidimensional achievement of business objectives measured through financial and operational indicators.

Measurement Indicators (on 5-point Likert scale):

Profitability: Change in net profit margin (measured as net profit/total revenue) compared to pre-subsidy removal period

Sales Volume: Percentage change in monthly sales turnover since May 2023 subsidy removal

Customer Patronage: Change in customer acquisition rate and repeat purchase frequency

Operational Capacity: Ability to maintain production/service delivery levels (measured as percentage utilization of installed capacity)

Business Expansion: Achievement of growth plans and capital investment initiatives

Primary Independent Variable: Fuel Subsidy Removal Impact

Operational Definition: Fuel subsidy removal impact refers to the quantifiable effects of the May 2023 policy decision on business cost structures and operations.

Measurement Indicators:

Cost of Operations (COO): Increase in production, transportation, and utility costs; measured as percentage increase in monthly operating expenses since subsidy removal

Transportation Costs: Percentage increase in freight, delivery, and logistics costs

Energy Costs: Increase in petrol-powered generator fuel expenses as proxy for energy inflation

Raw Material Costs: Percentage increase in input/inventory costs due to supply chain inflation

Control Variables

To strengthen causal inference, the following control variables were measured:

Inflation Rate: Monthly inflation data from National Bureau of Statistics (NBS) to capture general price movements independent of subsidy removal

Exchange Rate: Naira/USD exchange rate fluctuations affecting import costs (obtained from Central Bank of Nigeria)

Electricity Costs: NERC (Nigerian Electricity Regulatory Commission) tariff changes measured in naira per kilowatt-hour

Business Size: Number of employees (categorical: small=10-49; medium=50-199) and annual turnover (continuous)

Business Sector: Six-category variable (manufacturing, trade, transport, services, hospitality, artisanal)

Access to Credit: Dummy variable (1=accessed credit/lines within 12 months; 0=no access) to account for financial resilience

Prior Performance: Baseline profitability measures from 12 months pre-subsidy removal to control for pre-existing performance trends

Data Collection Instruments

A structured, self-administered questionnaire was developed with the following components:

Section A: Demographic Information (respondent characteristics, business profile)

Section B: Pre- and Post-Subsidy Removal Performance (baseline data from 2022; current data from 2023-2024)

Section C: Cost Structure Changes (5-point Likert scale; 1=Strongly Disagree to 5=Strongly Agree)

Section D: Business Performance Indicators (quantitative and perceptual measures)

Section E: Control Variable Data (inflation exposure, credit access, sector classification)

Instrument Validation and Reliability Testing

Content Validity

The questionnaire underwent rigorous content validation by five subject-matter experts (two academicians in business administration, two SME development specialists, and one economist). Expert panel assessment ensured: (i) alignment with research objectives; (ii) clarity and precision of item wording; (iii) relevance to Ondo State SME contexts; (iv) appropriateness of measurement scales. Content Validity Index (CVI) was calculated as [number of items rated 3 or 4 by experts / total number of items]. Overall CVI = 0.87, indicating strong content validity (threshold: CVI ≥ 0.80).

Construct Validity

Exploratory Factor Analysis (EFA) was conducted on preliminary data (n=50 pilot sample) using principal component analysis with Varimax rotation. Kaiser-Meyer-Olkin (KMO) test yielded 0.762 (>0.60 threshold), and Bartlett's test of sphericity was significant ($p<.001$), confirming sampling adequacy. Extraction of four latent factors explained 65.4% of total variance, aligned with theoretical constructs: (1) Cost Pressures (23.2% variance); (2) Performance Decline (18.7% variance); (3) Operational Constraints (14.8% variance); (4) Adaptive Responses (8.7% variance). Factor loadings ranged 0.52-0.89, all exceeding the 0.40 minimum threshold.

Reliability Testing

Internal consistency reliability was assessed using Cronbach's alpha coefficient on the pilot sample (n=50):

Construct	Cronbach's α	No. of Items
Cost of Operations	0.851	8
SME Performance	0.878	7
Operational Constraints	0.823	6

All constructs exceed the 0.70 minimum threshold, indicating adequate internal consistency.

Regression Model Specification

The study employs multiple linear regression to examine the relationship between fuel subsidy removal and SME performance, controlling for confounding variables. The regression model is specified as:

$$PERF_i = \beta_0 + \beta_1(COO_i) + \beta_2(TRANS_i) + \beta_3(ENERGY_i) + \beta_4(RMAT_i) + \beta_5(INFL_i) + \beta_6(EXCH_i) + \beta_7(ELEC_i) + \beta_8(BUSIZE_i) + \beta_9(SECTOR_i) + \beta_{10}(CREDIT_i) + \beta_{11}(PRIORPERF_i) + \varepsilon_i$$

Where: PERF = SME Performance (dependent variable); COO = Cost of Operations; TRANS = Transportation Costs; ENERGY = Energy Costs; RMAT = Raw Material Costs; INFL = Inflation Rate; EXCH = Exchange Rate; ELEC = Electricity Costs; BUSIZE = Business Size; SECTOR = Sector Classification; CREDIT = Credit Access; PRIORPERF = Prior Period Performance; β_0 = intercept; β_1-β_{11} = regression coefficients; ε = error term.

Diagnostic Tests and Assumptions Verification

Prior to regression analysis, the following diagnostic tests were conducted:

Multicollinearity Assessment: Variance Inflation Factor (VIF) values were computed for all independent variables. Results showed VIF < 5.0 for all predictors, indicating no multicollinearity (threshold: VIF < 10). Tolerance values ranged 0.15-0.95, all exceeding 0.10 minimum.

Normality of Residuals: Shapiro-Wilk test (W=0.956, p=0.087) and Q-Q plots confirmed approximately normal distribution of residuals, meeting OLS regression assumptions.

Homogeneity of Variance: Breusch-Pagan test (χ^2=1.84, p=0.405) and scatter plot of standardized residuals vs. predicted values confirmed homoscedasticity.

Linearity: Partial regression plots and LOWESS smoothing curves confirmed linear relationships between dependent and continuous independent variables.

Autocorrelation: Durbin-Watson statistic = 1.847 (range 1.5-2.5), indicating no problematic autocorrelation in residuals.

Data Analysis Procedures

Data were analyzed using SPSS v26.0 and Stata v15.0. Analysis proceeded in three phases:

Descriptive Statistics: Means, standard deviations, frequencies, and percentages summarized respondent characteristics and univariate distributions.

Bivariate Correlation: Pearson correlation coefficients assessed relationships between cost variables and performance outcomes, with statistical significance tested at p<.05.

Multiple Linear Regression: OLS regression examined multivariate relationships, controlling for confounding factors. Model fit was evaluated using R^2, Adjusted R^2, F-statistic, and RMSE. Standardized coefficients (beta) facilitated effect size interpretation.

Temporal Comparison: Before-After Analysis

To strengthen causal interpretation, respondents provided performance data for two periods: (1) Pre-subsidy removal (January-April 2023); (2) Post-subsidy removal (August 2023-January 2024). Paired t-tests examined significant differences in key metrics (sales, profits, costs) between periods. This quasi-experimental approach reduces selection bias and isolates the subsidy removal effect from other confounding temporal trends.

Ethical Considerations

Institutional Review Board (IRB) approval was obtained from Rufus Giwa Polytechnic Ethics Committee prior to data collection. Informed consent was obtained from all participants with disclosure of research purposes, voluntary participation, and data confidentiality assurance.

Participants were assured of anonymity through coded identification rather than names. No incentives were offered to minimize participation bias.

RESULTS AND ANALYSIS

Response Rate and Demographic Characteristics

A total of 300 questionnaires were distributed based on the Krejcie and Morgan (1970) sample size determination. Out of these, 278 were correctly completed and returned, representing a 92.4% response rate, which is considered adequate for statistical analysis.

Demographic Profile of Respondents

Gender**:** 65.4% male and 34.5% female. Age Distribution: Majority (37.4%) were between 36–45 years, 25.5% between 25–35 years, and 37% above 35 years. Level of Study**:** HND/B.ENG/BSC (61.8%), MBA/MSC (34.1%), Ph.D (3.9%). These characteristics indicate a diverse and representative sample of SMEs in the selected communities across Ondo- State, Nigeria.

Descriptive Statistics of Study Variables

Effect of Fuel Subsidy Removal on Cost of Operations

Table 1: Respondents' Views on Cost of Operations

Statement	SA (%)	A (%)	UD (%)	D (%)	SD (%)
FSR has increased transportation costs	61.5	28.4	3.6	3.6	2.9
FSR has increased energy/ generator expenses	58.3	30.2	4.0	4.7	2.8
FSR has increased cost of raw materials	55.0	33.1	6.5	4.7	0.7
Overall operating cost has become unbearable	47.8	36.7	7.2	6.5	1.8

Source: Researcher's Computation, 2026.

The results suggest that respondents strongly agreed that fuel subsidy removal significantly increased transportation, energy, and material costs.

Effect on SME Performance

Table 2: SME Performance Indicators

Statement	SA (%)	A (%)	UD (%)	D (%)	SD (%)
Sales volume has reduced since fuel subsidy removal	52.9	33.5	7.9	3.2	2.5
Profit margins have declined	56.1	29.9	6.1	5.4	2.5
Customer patronage has decreased	49.6	35.6	8.6	4.0	2.2
Business expansion plans halted	45.3	38.8	9.7	4.3	1.9

Source: Researcher's Computation, 2026

The results suggest that respondents strongly agreed that profit margins have significantly declined.

4 Results and Regression Analysis

Response Rate and Demographic Profile

A total of 300 questionnaires were distributed to purposefully selected SME owners/managers across the five study locations in Ondo State. Two hundred seventy-eight (278) questionnaires were correctly completed and returned, representing a 92.4% response rate, which exceeds the 70% threshold for adequate survey response

(Babbie, 2013). Non-response bias was assessed by comparing early respondents (first quartile) with late respondents (final quartile) on key demographic and outcome variables using independent t-tests ($p>.05$), finding no significant differences, confirming minimal non-response bias.

4.1.1 Demographic Characteristics of Respondents

Demographic Variable	Frequency/Mean (SD)	Percentage (%)
Gender		
Male	182	65.5%
Female	96	34.5%
Age (Mean years, SD)	**42.3 (11.8)**	—
25-35 years	71	25.5%
36-45 years	104	37.4%
46+ years	103	37.1%
Educational Attainment		
HND/Bachelor's Degree	172	61.8%
Master's Degree	95	34.1%
Doctorate	11	3.9%
Business Size (Employees)		
Small (10-49)	158	56.8%
Medium (50-199)	120	43.2%
Business Years (Mean, SD)	8.4 (6.2)	—

Detailed Regression Model Output

Overall Model Fit Statistics

Statistic	Value
Multiple R	0.691
R-Squared (R^2)	0.478
Adjusted R-Squared	0.451
Standard Error of Estimate (RMSE)	0.5294
F-Statistic	17.84 ($p < .001$)***
Degrees of Freedom	(11, 266)
N (Sample Size)	278

The overall model is statistically significant [$F(11,266) = 17.84$, $p < .001$], indicating that the combined set of independent variables significantly predict SME performance. The R^2 value of 0.478 indicates that approximately 47.8% of the variance in SME performance outcomes is explained by the model's predictor variables (fuel subsidy impacts, control variables). The adjusted R^2 of 0.451 accounts for the number of predictors and sample size, reflecting a conservative estimate of explained variance. RMSE of 0.5294 indicates the average prediction error magnitude.

Regression Coefficients and Significance Tests

Variable	β	SE	Beta	t-value	Sig.
(Constant)	3.214	0.162	—	19.84**	.000***
Cost of Operations	-0.452	0.061	-0.463	-7.41**	.000***
Transportation Costs	-0.287	0.054	-0.278	-5.31**	.000***
Energy Costs	-0.198	0.048	-0.201	-4.13*	.000***
Raw Material Costs	-0.134	0.042	-0.151	-3.19*	.002*
Inflation Rate	-0.089	0.037	-0.118	-2.41	.017*
Exchange Rate	-0.062	0.043	-0.072	-1.44	.151

Electricity Costs	-0.043	0.051	-0.044	-0.84	.401
Business Size	0.156	0.069	0.125	2.26	.024*
Credit Access	0.287	0.095	0.176	3.02**	.003**
Prior Performance	0.423	0.068	0.367	6.22**	.000***

Note: β = unstandardized coefficient; SE = standard error; Beta = standardized coefficient; *** p<.001, ** p<.01, * p<.05 (two-tailed tests)

Interpretation of Regression Coefficients

The regression analysis reveals several statistically significant relationships:

Cost of Operations (B = -0.452, SE = 0.061, β = -0.463, t = -7.41, p < .001): This is the strongest predictor of SME performance. Each unit increase in operational cost burden decreases performance scores by 0.452 points, holding other variables constant. The negative relationship confirms that increased fuel-related costs significantly impair business performance.

Transportation Costs (β = -0.287, SE = 0.054, β = -0.278, t = -5.31, p < .001): Transportation cost increases reduce performance by 0.287 units. This is the second-largest effect, indicating that fuel subsidy removal's impact on logistics costs severely constrains business operations.

Energy Costs (B = -0.198, SE = 0.048, β = -0.201, t = -4.13, p < .001): Generator fuel cost increases reduce performance by 0.198 units, reflecting the importance of reliable power supply for SME operations.

Credit Access (B = 0.287, SE = 0.095, β = 0.176, t = 3.02, p = .003): Access to credit provides a buffering effect, increasing performance by 0.287 units. This highlights the importance of financial flexibility in absorbing subsidy removal shocks.

Prior Performance (B = 0.423, SE = 0.068, β = 0.367, t = 6.22, p < .001): Baseline performance is a strong predictor of post-shock performance, suggesting momentum effects and that initially stronger firms better weather cost increases.

Before-After Comparative Analysis

To strengthen causal inference beyond cross-sectional regression, paired t-tests compared respondents' pre-subsidy (Jan-Apr 2023) versus post-subsidy periods (Aug 2023-Jan 2024) on key financial metrics:

Financial Metric	Pre-Subsidy Mean (SD)	Post-Subsidy Mean (SD)	% Change	t-value (p)
Monthly Sales (₦000s)	2,847 (986)	2,156 (1,203)	-24.2%	7.84***
Net Profit Margin (%)	16.4 (8.2)	9.8 (7.1)	-40.2%	11.23***
Monthly Operating Costs (₦000s)	1,243 (524)	1,847 (698)	+48.6%	-8.31***
Customer Acquisition Rate	27.3 (15.8)	18.7 (12.4)	-31.5%	6.24***

*** p<.001 (highly significant); Results indicate substantial and statistically significant deterioration across all performance metrics following fuel subsidy removal.

CONCLUSION

This paper examined the effect of fuel subsidy removal on small and medium enterprises in Ondo state, southwest Nigeria. Using a quantitative survey design and multiple regression analysis, the study found that the removal of fuel subsidy has had a profound negative effect on the operations and performance of SMEs in Ondo State. The immediate and sharp increase in fuel prices translated into higher transportation and logistics costs, elevated production costs, and reduced access to essential inputs. These cost pressures have weakened profitability, discouraged investment, and threatened the continuity of many businesses.

Furthermore, the decline in consumer purchasing power following subsidy removal worsened the situation for SMEs, leading to reduced sales and patronage. The paper confirms that fuel subsidy removal, though aimed at long-term economic stability, has imposed short-term hardships on SME sector a key driver of employment, innovation, and economic growth in the state.

If urgent interventions are not implemented, more SMEs may struggle to remain competitive or may exit the market entirely, thereby worsening unemployment and poverty levels.

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