

# Subsidy Removal and Bakeries Business Performance in South-East Nigeria: A Comparative Assessment of Pre and Post Periods

Onyindo Anthony Uchenna<sup>1\*</sup>, Kekeocha Mary Ezinne<sup>2</sup>, Chiekezie Mary Obianuju<sup>3</sup>, Ezimma K. Nnabuike<sup>4</sup>

Nnamdi Azikiwe University, Awka, Nigeria<sup>1-4</sup>

[onyidotony59@gmail.com](mailto:onyidotony59@gmail.com)<sup>\*</sup>, [me.kekeocha@unizik.edu.ng](mailto:me.kekeocha@unizik.edu.ng)<sup>2</sup>, [om.chiekezie@unizik.edu.com](mailto:om.chiekezie@unizik.edu.com)<sup>3</sup>, [ke.nnabuike@unizik.edu.ng](mailto:ke.nnabuike@unizik.edu.ng)<sup>4</sup>



## Article History

Received on 13 March 2026

1<sup>st</sup> Revised on 30 March 2026

2<sup>nd</sup> Revised on 1 April 2026

Accepted on 7 May 2026

## Abstract

**Purpose:** This study analyzes the effects of subsidy removal on bakery business performance in Southeast Nigeria, focusing on operational outcomes before and after subsidy removal. It specifically examines how increases in fuel prices, raw material costs, and energy and operational expenses influence the operational efficiency of bakeries.

**Research Methodology:** A descriptive cross-sectional survey design with a retrospective comparison of pre- and post-subsidy conditions was employed. Data were collected from 245 bakery managers across five Southeast states in Nigeria using a structured questionnaire. Descriptive statistics, paired-sample t-tests, and multiple regression analysis were applied at a 5% significance level.

**Results:** The findings reveal a significant decline in cost stability and operational efficiency following subsidy removal. Among the variables, changes in raw material costs were the strongest predictor of efficiency decline, followed by fuel price increases and rising energy and operational costs. The regression model demonstrated strong explanatory power.

**Conclusions:** The removal of fuel subsidies significantly disrupted the cost structure of bakeries, leading to reduced operational efficiency. This highlights the importance of effective cost management and adaptive strategies for business survival.

**Limitations:** The study is limited by self-reported data and its focus on registered bakeries in Southeast Nigeria, which may limit generalizability, but it provides evidence on the impact of energy policy reforms on SME performance and operational resilience.

**Contributions:** Explain This study provides empirical evidence on how energy policy reforms affect SME performance and offers practical insights into improving operational resilience in a volatile economic environment.

**Keywords:** Bakery Businesses, Energy Costs, Fuel Subsidy Removal, Operational Efficiency, Raw Material Costs

**How to Cite:** Uchenna, O. A., Ezinne, K. M., Obianuju, C. M., & Nnabuike, E. K. (2026). Subsidy Removal and Bakeries Business Performance in South-East Nigeria: A Comparative Assessment of Pre and Post Periods. *Advances in Management and Business Studies*, 1 (4), 245-260.

## 1. Introduction

The removal of fuel subsidies in Nigeria has emerged as one of the most significant economic reforms in recent years, with far-reaching implications for both businesses and households. In May 2023, the Federal Government officially announced the complete removal of fuel subsidies, leading to an immediate surge in petrol prices nationwide. For instance, pump prices increased from about ₦195 per

litre to over ₦540–₦617 within weeks of implementation ([Autogirl, 2024](#)). By 2024, the average retail price of petrol rose further to ₦770.54 in July and ₦830.46 in August, according to the National Bureau of Statistics [NBS \(2024b\)](#), reflecting the sustained pressure on energy costs. In some locations, prices exceeded ₦1,000 per litre, indicating a full transition to deregulated pricing ([NOIPolls, 2024](#)).

Historically, Nigeria's fuel subsidy policy was introduced to stabilize domestic fuel prices, reduce inflation, and protect households and businesses from global oil price volatility ([Coady, Parry, Le, & Shang, 2019](#)). However, over time, the policy became fiscally unsustainable, with subsidy expenditures reaching approximately ₦2.74 trillion in 2022, significantly straining the government's revenue ([NESG, 2023](#)). This fiscal burden, combined with inefficiencies, corruption, and fuel smuggling, necessitated reform and the eventual subsidy removal as part of broader economic restructuring efforts ([Apergis & Payne, 2009](#)). In response, the government initiated a gradual phase-out of fuel subsidies to liberalize the economy, promote fiscal sustainability, and encourage private sector growth.

While these reforms had macroeconomic objectives, their effects on small and medium enterprises (SMEs), particularly bakeries, have been mixed, with many experiencing increased operational costs and declining efficiencies ([Adeniyi & Mukoro, 2025](#); [Ilodigwe, 2023](#); [Kekeocha et al., 2026](#)). Despite these macroeconomic objectives, the policy has contributed to rising inflation and an increased cost of living. Nigeria's headline inflation rose from 28.9% in December 2023 to 34.19% by June 2024 ([NBS, 2024a](#)). Evidence suggests that fuel price increases significantly drive inflationary pressures across sectors, particularly in transportation and production-dependent industries ([Repec, 2025](#)). These conditions have placed severe pressure on small and medium enterprises (SMEs), especially those that rely on energy-intensive production processes.

Bakeries constitute a critical segment of Nigeria's food processing industry, providing staple foods and employment opportunities, particularly in southeastern Nigeria. Their operations are highly sensitive to fuel price fluctuations owing to their dependence on energy for baking, transportation, and distribution ([Fattouh & El-Katiri, 2013](#); [Siddig, Aguiar, Grethe, Minor, & Walmsley, 2014](#)). Before the subsidy removal, relatively stable fuel prices enabled bakeries to maintain predictable production costs and profit margins. However, the post-subsidy environment has significantly altered the structure. Rising fuel costs, increased transportation expenses, and inflation-driven raw material price increases have negatively affected bakery operations ([Adeniyi & Mukoro, 2025](#); [Ilodigwe, 2023](#); [Kekeocha et al., 2026](#)).

Therefore, operational efficiency is central to understanding the impact of subsidy removal on bakery performance. It reflects the ability of firms to effectively utilize resources to sustain output while minimizing costs ([Aliyu, Danjuma, & Bature, 2025](#); [Dong, Feng, & Sheng, 2024](#); [Geminarqi & Purnomo, 2023](#)). In bakeries, operational efficiency is influenced by energy consumption, cost, and production continuity. Rising fuel and energy costs disrupt production schedules, while increasing raw material costs complicate inventory management and pricing. Although some firms adopt energy-saving technologies and process improvements, many small-scale bakeries lack the financial and technical capacity to implement such strategies ([Ikechukwu, Nwagbala, & Ezeanokwasa, 2025b](#); [Oyasipe & Olukoya, 2024](#)).

Government interventions aimed at cushioning the effects of subsidy removal, including financial support schemes and policy adjustments, have proven to be of limited effectiveness. Many SMEs continue to face inadequate access to finance, weak infrastructure, and limited technical support ([Aliyu et al., 2025](#); [Siddig et al., 2014](#)). Consequently, businesses are experiencing reduced profitability, declining competitiveness, and, in some cases, closure. This highlights a clear gap between policy intentions and actual business outcomes, particularly in the bakery subsector, which remains under-researched.

Given this context, a comparative analysis of bakery performance before and after subsidy removal is timely and necessary. Examining the effects of fuel price increases, raw material cost changes, and energy-related expenses on operational efficiency provides empirical evidence for both policy and

practice. These findings can guide bakery operators in improving cost management and production planning while informing policymakers on targeted interventions to enhance SME resilience. By focusing on operational efficiency, this study contributes to the existing literature and provides practical insights into sustaining bakery businesses in the evolving economic environment of Southeast Nigeria ([Kekeocha et al., 2026](#)).

### ***1.2 Statement of the Problem***

In the past, bakeries in Southeast Nigeria operated under conditions where fuel subsidies helped stabilize energy costs, making production and transportation relatively affordable. During this period, bakery owners could run generators at lower costs, ensure consistent baking schedules, and maintain manageable prices for consumers. Raw material prices, while subject to minor fluctuations, are generally predictable, allowing bakery operators to plan production and manage operational efficiency effectively. However, inefficiencies exist owing to an overreliance on fuel-dependent power sources, limited adoption of energy-efficient technologies, and occasional supply chain disruptions ([Dey, Malesios, De, Chowdhury, & Abdelaziz, 2020](#); [Dong et al., 2024](#)).

Despite these challenges, bakeries were relatively resilient, and their operational performance was largely sustained within the economic conditions created by subsidy support. The present situation has been significantly disrupted following the removal of the fuel subsidy in May 2023, which led to sharp increases in fuel prices nationwide ([Fattouh & El-Katiri, 2013](#); [Siddig et al., 2014](#)). This policy shift has directly affected operational efficiency by escalating energy costs for generators, increasing transportation expenses for raw materials, and raising the overall production costs. Empirical studies in Nigeria indicate that subsidy removal has intensified inflation, increased the cost of essential inputs, and reduced consumer purchasing power ([Geminarqi & Purnomo, 2023](#); [Siddig et al., 2014](#)).

Bakeries, which rely heavily on fuel for power and timely supply of perishable raw materials such as flour, sugar, and yeast, are affected by these cost increases, which have the potential to disrupt production schedules, reduce output quality, and compromise profitability. Additionally, variations in raw material costs and energy expenditures create uncertainty in operational planning, making it more difficult for bakery operators to maintain efficiency in the post-subsidy era ([Dong et al., 2024](#); [Kekeocha et al., 2026](#)). The desired future for bakeries in Southeast Nigeria is to achieve sustainable operational efficiency that mitigates the adverse effects of fuel price increases, rising raw material costs, and higher energy expenditures.

Bakery operators should be able to optimize production processes, minimize waste, and maintain profitability despite macroeconomic shocks, such as subsidy removal. This requires the adoption of energy-efficient technologies, strategic cost management practices and improved supply chain coordination ([Oyasipe & Olukoya, 2024](#)). Therefore, understanding how pre- and post-subsidy removal conditions affect fuel costs, raw material prices, and energy/operational expenditures is crucial for guiding policy interventions and business strategies. A comparative analysis of bakery performance across these periods will provide empirical evidence to help bakery operators and policymakers enhance operational resilience and ensure the sector's long-term sustainability.

### ***1.3 Objectives of the Study***

The main objective of this study is to assess the subsidy removal era on bakery business performance in Southeast Nigeria: A comparative assessment of pre- and post-periods. The specific objectives are as follows:

1. To examine the effect of fuel price increases in the pre- and post-subsidy removal eras on the operational efficiency of bakeries in Southeast Nigeria.
2. To assess the effect of changes in the cost of raw materials during the pre- and post-subsidy removal eras on the operational efficiency of bakeries in Southeast Nigeria.
3. To determine the effect of changes in energy and operational costs in the pre- and post-subsidy removal eras on the operational efficiency of bakeries in Southeast Nigeria.

## 1.4 Research Questions

- RQ1:* To what extent do fuel price increases in the pre- and post-subsidy removal eras affect the operational efficiency of bakeries in southeast Nigeria?
- RQ2:* How do changes in the cost of raw materials in the pre- and post-subsidy removal eras influence the operational efficiency of bakeries in Southeast Nigeria?
- RQ3:* What is the effect of changes in energy and operational costs in the pre- and post-subsidy removal eras on the operational efficiency of bakeries in Southeast Nigeria?

## 2. Literature Review and Hypotheses Development

### 2.1 Conceptual Review

#### 2.1.1 Business Performance

Business performance is a multidimensional concept reflecting how effectively a company achieves its objectives, including financial health, operational efficiency, market competitiveness, and sustainability ([Hanoum, Palalic, Durman, & Shubbak, 2025](#)). In the context of SMEs, performance is closely tied to their ability to adapt to changing economic conditions, technological innovations, and policy environments ([Niyi Anifowose, Ghasemi, and Olaleye \(2022\)](#)), with external shocks such as policy shifts significantly influencing their growth and viability. Recent literature highlights the importance of contextual factors, such as government policies, in shaping SME outcomes, emphasizing the critical roles of operational improvements, access to finance, and market expansion strategies, especially in developing economies like Nigeria. However, a research gap remains regarding the specific impacts of external shocks, such as subsidy removal, on SMEs, particularly in the bakery sector across different Nigerian states. This necessitates further investigation into how various performance aspects are individually and collectively affected to inform more effective and targeted policy interventions.

#### 2.1.2 Subsidy Removal

Subsidy removal refers to the withdrawal of government financial support for essential commodities, such as fuel, to improve market efficiency, reduce fiscal burdens, and encourage resource allocation through market forces. While this policy is often justified on economic and environmental grounds, its short-term effects can be severe, particularly in developing economies such as Nigeria. Studies have shown that subsidy reforms are deeply political and economically sensitive, often influencing inflation, the cost of living, and overall economic stability ([Skovgaard & van Asselt, 2019](#); [Solarin, 2020](#)).

In Nigeria, the removal of fuel subsidies in 2023 generated widespread economic effects across multiple sectors. The transport sector has been one of the most affected, as higher fuel prices have significantly increased commuting and logistics costs, leading to higher fares and freight charges. This has created a ripple effect on goods distribution and market prices across the nation. The manufacturing sector has also experienced increased production costs owing to rising energy expenses, reduced output levels, and declining competitiveness in both local and regional markets. Similarly, the agricultural sector has been affected by increased transportation costs, fertilizer distribution, and food supply chain disruptions, contributing to rising food inflation. These sectoral shocks demonstrate that subsidy removal is not only a fiscal policy issue but also a structural economic adjustment with cross-sectoral implications for production, distribution, and consumption patterns.

Within this broader context, Small and Medium-Scale Enterprises (SMEs) are particularly vulnerable. According to [Ilodigwe \(2023\)](#), this policy led to increased operating costs owing to higher fuel prices, directly affecting transportation, production, and distribution expenses. [Evans et al. \(2023\)](#) further noted that subsidy removal triggered inflationary pressures, reduced consumer purchasing power, and worsened living conditions, thereby indirectly constraining business performance and demand for goods and services. For small businesses, especially those with limited access to finance and technology, these rising costs often translate into reduced profitability, downsizing, or business closure. The vulnerability of SMEs to policy shocks underscores the importance of supportive institutional frameworks during economic transitions.

However, evidence from broader economic contexts suggests that subsidies can influence firm behavior and encourage innovation when effectively managed. For instance, government subsidies have been

found to enhance corporate responsibility and competitiveness in private firms [Wenqi, Khurshid, Rauf, and Calin \(2022\)](#) and promote sustainable innovation among SMEs [\(Xiang, Zhao, & Zhang, 2021\)](#). Despite these potential long-term benefits, the immediate withdrawal of subsidies without adequate cushioning mechanisms can disrupt business operations and weaken enterprise sustainability in the short term. This effect is more pronounced among micro and small enterprises, which typically operate with limited financial buffers to withstand economic shocks. Therefore, targeted policy interventions are needed to address sector-specific vulnerabilities during subsidy transitions.

### *2.1.3 Pre and Post Era of Subsidy Removal*

In Nigeria, the period before subsidy removal was characterized by government support that helped keep fuel and production costs relatively low, enabling small businesses to operate with stable input costs, expand their production, and create employment opportunities. Although this environment supported business growth, it also encouraged dependency on subsidized fuel and reduced incentives for efficiency and innovation in some sectors [\(Ikechukwu, Nwagbala, & Ezeanokwasa, 2025a; Yunusa et al., 2023\)](#).

However, after the removal of fuel subsidies, the Nigerian economy experienced significant cost adjustments in all sectors. Businesses began facing higher operating expenses, particularly in transportation, energy consumption, and production processes. This has led to reduced profit margins, increased product prices, and weaker consumer demand [\(Adogbeji & Ogbe, 2025\)](#). The manufacturing sector experienced higher production costs, whereas the transport sector recorded sharp fare increases. The agricultural sector also faces rising logistics and input costs, which contribute to food price inflation.

At the enterprise level, many SMEs were forced to adopt survival strategies, such as increasing prices, reducing staff strength, scaling down operations, or restructuring business models, to remain viable [\(Oladimeji, 2025\)](#). While some firms have been able to adjust through innovation and cost optimization, others continue to struggle because of reduced consumer demand and limited access to credit facilities. Importantly, the magnitude and nature of these impacts vary across regions, sectors, and firm sizes, highlighting the uneven effects of subsidy reform on the Nigerian economy. This variation underscores the need for more empirical, sector-specific, and region-focused studies to better understand the differential impact of subsidy removal on business performance and economic sustainability in the agricultural sector.

### *2.1.4 Fuel Price Increase*

Fuel price increase refers to the rise in the cost of petroleum products such as petrol, diesel, and kerosene, which are critical inputs for transportation, electricity generation and industrial production. In Nigeria, fuel pricing has historically been shaped by government intervention through subsidies designed to keep domestic prices below international levels. This policy helped stabilize production costs for businesses and reduced inflationary pressure on households and firms [\(Yusuf & Resosudarmo, 2008\)](#). However, it also created long-term fiscal burdens and market distortions that eventually necessitated reforms.

Fuel prices are influenced by both global and domestic factors. At the global level, fluctuations in crude oil prices, exchange rate volatility, geopolitical tensions, and international supply demand dynamics significantly affect domestic fuel prices. At the domestic level, government policies, such as taxation, import regulations, and subsidy frameworks, play a decisive role in determining the final pump prices [\(Alabi, Adejumo, & Oluwole, 2025\)](#). Following subsidy removal, Nigeria's fuel pricing system became fully exposed to global market forces and exchange rate pressures, resulting in sharp and often unpredictable price increases [\(Ajuwon & Abiodun, 2025\)](#).

Beyond policy changes, fuel price increases have broad macroeconomic and sectoral implications for the economy. One of the most immediate effects is the escalation of production and transportation costs, which directly impacts the prices of goods and services. In manufacturing and food processing industries, including bakeries, increased fuel costs raise the costs of logistics, energy generation, and



raw material distribution. This creates a chain reaction that contributes to higher consumer prices and reduced purchasing power ([Abdul, Pius-Ajibade, & Moses, 2025](#)). The transport sector is particularly affected, as higher fuel prices lead to increased fares and freight charges, further amplifying inflationary pressures across the economy.

Fuel price increases are typically measured as percentage changes in petroleum product costs over a defined period and can occur gradually or abruptly, depending on policy adjustments and market conditions. In Nigeria, the 2023 subsidy removal marked a major structural shift in fuel pricing, leading to a sudden and substantial increase in pump prices. This transition signaled the beginning of a new economic phase, often described as the post-subsidy era, characterized by heightened cost volatility and increased exposure of businesses to market risks ([Kekeocha et al., 2026](#)).

For small and medium-scale enterprises, sustained fuel price increases translate into higher operating costs, reduced profit margins, and increased uncertainty in production planning. Firms with limited financial buffers are often unable to absorb these shocks, forcing them to adjust their prices, reduce their output, or restructure their operations. Consequently, fuel price increases remain a critical determinant of operational efficiency and business sustainability in developing economies such as Nigeria, where energy dependence is high, and alternative infrastructure is limited.

#### *2.1.5 Changes in Raw Material Costs*

Changes in raw material costs refer to fluctuations in the prices of key inputs required for bakery operations, such as flour, sugar, yeast, eggs, butter, and packaging materials. These changes arise from market forces, inflation, currency depreciation, transportation expenses, and government policies, including tariff adjustments and fuel subsidy removal ([Alabi et al., 2025](#)). In the pre-subsidy removal era, raw material prices in Nigeria were relatively stable because subsidized fuel helped control transportation and distribution costs, enabling bakeries to plan and budget more effectively ([Abdul et al., 2025](#)). This stability supports consistent production levels and reduces the financial risk for bakery businesses in Southeast Nigeria ([Obele, 2025](#)). However, the subsidy removal significantly altered this environment. Higher fuel prices increase transportation and logistics costs, causing input prices to rise even when base commodity prices remain unchanged ([Ajuwon & Abiodun, 2025](#)). Studies have confirmed that these cost fluctuations are a major determinant of bakery cost structures and influence pricing decisions, inventory management, and profit margins ([Alabi et al., 2025](#); [Oyasipe & Olukoya, 2024](#)).

Conceptually, raw material cost changes may be direct, resulting from variations in the market price of commodities such as wheat and sugar, or indirect, arising from increased transportation expenses, inflation, and other external economic pressures ([Alabi et al., 2025](#)). Nigeria's reliance on imported wheat and other key inputs makes bakeries particularly vulnerable to exchange rate instability and global supply chain disruptions, as seen in recent international wheat shortages and geopolitical tensions ([Ajuwon & Abiodun, 2025](#)). Moreover, short-term price movements may emerge from seasonal changes or temporary supply issues, whereas long-term fluctuations are linked to structural reforms such as subsidy removal and persistent inflation ([Kekeocha et al., 2026](#); [Obele, 2025](#)). Overall, raw material cost volatility intensified in the post-subsidy removal era, creating significant operational challenges for bakery businesses in Southeast Nigeria.

#### *2.1.6 Energy and Operational Costs*

Energy and operational costs refer to the expenditures required to power production activities and sustain the daily business operations. In bakeries, energy costs include electricity, diesel or petrol for generators, transportation fuel, and the power required to run ovens, mixers, and refrigeration units ([Ikechukwu et al., 2025b](#); [Osadolor, 2025](#)). Operational costs encompass broader recurring expenses, such as labor, equipment maintenance, water, rent, and administrative overheads. In the pre-subsidy removal era, government-supported fuel subsidies helped keep energy prices relatively stable, enabling bakery operators to manage generator use affordably and maintain predictable cost structures ([Ezekwe, 2025](#); [Yahaya, 2025](#)).

These conditions allow bakery businesses to plan production effectively and maintain stable pricing despite challenges such as inconsistent electricity supply. The post-subsidy removal era significantly altered this stability, resulting in sharp increases in fuel prices and higher energy expenditures, particularly for bakeries heavily dependent on generator power due to unreliable electricity ([Chukunalu, Awogbemi, Dim, Okoro, & Duru, 2025](#)). These increases ripple across operational costs, affecting transportation, machinery operation, maintenance and labor-related expenses.

Empirical studies confirm that escalating energy and operational costs exert substantial pressure on SMEs in Nigeria's food production sector, reducing profitability and weakening operational efficiency ([Ikechukwu et al., 2025b](#); [Kekeocha et al., 2026](#); [Osadolor, 2025](#)). Energy costs can be categorized into direct costs, such as fuel and electricity used directly for production, and indirect costs associated with transportation and storage ([Ezekwe, 2025](#)). As these cost pressures intensify globally due to inflation, exchange rate fluctuations, and energy market instability ([Osadolor, 2025](#); [Yahaya, 2025](#)). Nigerian bakeries face even greater financial strain, making an understanding of energy and operational costs critical for assessing business sustainability in the post-subsidy removal era.

## **2.2 Operational Efficiency**

Operational efficiency refers to a business's ability to deliver products or services cost-effectively while maintaining high levels of quality and productivity. In the context of bakery businesses, operational efficiency encompasses the effective utilization of resources, including labor, raw materials, energy, and machinery, to produce baked goods on time, minimize waste, control costs, and meet customer demand ([Briceño-León, Pazmiño-Quishpe, Clairand, & Escrivá-Escrivá, 2021](#)). Efficient operations allow bakeries to maintain profitability, sustain competitive advantage, and adapt to changing economic conditions, such as those arising from the removal of fuel subsidies in Nigeria.

The operational efficiency of bakeries is influenced by several interrelated factors, notably fuel prices, raw material costs, and energy/operational expenditures. In the pre-subsidy removal era, lower fuel prices and stable raw material costs enabled bakery operators to plan production effectively, optimize resource allocation, and reduce operational waste ([Briceño-León et al., 2021](#)). Electricity and generator costs were relatively manageable, allowing the continuous operation of ovens, mixers, and refrigeration equipment. Consequently, bakeries can produce consistent output, maintain inventory levels, and ensure timely distribution of products to markets in Southeast Nigeria ([Gennitsaris et al., 2023](#)).

The predictability of operating costs during this period provided a stable environment for performance benchmarking and long-term strategic planning purposes. With the removal of fuel subsidies, operational efficiency has been challenged due to sharp increases in fuel and energy costs, higher raw material prices, and rising transportation expenses ([Ezekwe, 2025](#); [Ijirshar & Chidozie, 2025](#); [Kekeocha et al., 2026](#)). Increased fuel prices elevate overall production costs and place additional cost pressures on Small and Medium-Sized Enterprises (SMEs), often reducing operational margins and limiting growth opportunities ([Ijirshar & Chidozie, 2025](#)). Operational efficiency in bakery businesses is a multidimensional construct that reflects the effectiveness of resource utilization, cost management, and the production processes. The pre-subsidy removal era provided a conducive environment for efficiency through stable fuel and raw material costs, while the post-subsidy removal era presents new challenges due to rising costs and market volatility.

## **2.3 Theoretical Framework**

The theoretical framework for this study is grounded in the Resource-Based View (RBV) Theory, proposed by ([Barney, 1991](#)). RBV emphasizes that a firm's competitive advantage and overall performance are largely determined by its internal resources and capabilities that are valuable, rare, inimitable, and non-substitutable. This theory suggests that bakeries with unique resources, such as skilled labor, efficient technology, or strong supplier relationships, are better positioned to withstand external shocks, such as subsidy removal, and sustain their performance over time. The RBV has been widely applied in small business and manufacturing contexts to analyze how internal capabilities influence business resilience and performance, especially during shifts in economic policy ([Barney, 1991](#); [Teece, 2016](#)).

The Resource-Based View (RBV) assumes that firms are heterogeneous in their resource endowments, resources are the primary sources of competitive advantage, and the environment is dynamic, requiring firms to adapt their internal capabilities accordingly ([Barney, 1991](#)). In the context of the bakery sector in Southeast Nigeria, these assumptions imply that differences in resources such as capital, technology, and managerial expertise will significantly influence how bakeries perform before and after subsidy removal. The theory also presumes that firms can develop or acquire resources to adapt to environmental changes, which aligns with the need for bakeries to innovate or reorganize their operations in response to policy shifts.

Applying the RBV to this study enables a comparative analysis of business performance among bakeries in the pre- and post-subsidy removal eras. It posits that the internal resources and strategic capabilities of bakeries determine their resilience and performance outcomes in an environment of policy transformation. By analyzing how resource endowments influence performance during these periods, this study identifies the internal strengths and weaknesses that affect sustainability. This approach helps us understand whether resource-rich bakeries are better equipped to navigate subsidy removal, thereby providing insights into strategic resource management in the face of policy changes ([Barney, 1991](#); [Teece, 2016](#)).

## **2.4 Empirical Review**

[Adeniyi and Mukoro \(2025\)](#) examine how the removal of fuel subsidies has impacted the cost of doing business and the overall performance of SMEs in Anambra State. Their objective was to assess whether subsidy removal by raising fuel prices led to higher costs for SMEs, thereby affecting their performance. This study used a survey research design, with a structured questionnaire administered to 357 randomly selected SME operators in Awka South LGA. The main variables included fuel subsidy removal (independent) and cost of living/transport fare and SME business performance (dependent variable). Using simple linear regression, the authors found that fuel subsidy removal significantly increased transport fares and the cost of living, which translated into elevated operational costs for SMEs. They concluded that the policy changes negatively affected SMEs' cost structures and recommended that the government explore alternative support or non-fuel-based interventions to cushion the cost impact on SMEs.

[Taiwo, Akinrinola, Akintunde-Adeyi, Bademosi, and Abdussalaam \(2024\)](#) explored the broader implications of fuel subsidy removal on SME development in Nigeria, with a particular emphasis on the block-making industry. This study examined the interrelationships between SMEs, fuel subsidies, and business sustainability within the block-making sector. It also sought to identify viable measures to alleviate the significant financial burdens encountered by these enterprises following the elimination of fuel subsidies. Utilizing an exploratory qualitative research design, this study provides a deeper understanding of how subsidy removal has influenced SME growth and transformation in Nigeria. The research findings indicate that subsidy discontinuation had a particularly adverse effect on SMEs in the block-making sector, despite their considerable contribution to the national GDP. The resulting challenges included increased operational expenses, rising unemployment rates, inflationary pressures and exacerbated corruption.

[Oyasipe and Olukoya \(2024\)](#) focused on entrepreneurial (SME) businesses in Lagos State, analyzing how the 2023 fuel subsidy removal impacted their profitability. Their objective was to determine the effect of subsidy removal on business operations, costs, sales and profitability. They used a survey design and applied the chi-square statistical technique for hypothesis testing. The study's variables included fuel subsidy removal (independent) and operational costs, sales, stock levels, and profitability (dependent). The findings indicate a significant impact: subsidy removal led to increased operational costs, reduced sales, stock shortages, and a decline in profitability. The authors concluded that fuel subsidy removal adversely affects business sustainability and recommended supportive measures such as improved energy supplies, access to credit facilities, and policy interventions to ease the burden on entrepreneurial enterprises.



[Ikechukwu et al. \(2025b\)](#) examined the impact of fuel subsidy removal on the performance of SMEs in Anambra State, Nigeria, focusing on their operational costs, energy expenditure, and profitability. Using a quantitative design, data were collected from 210 SME operators through structured questionnaires and analyzed using descriptive statistics and multiple regression. The study found that subsidy removal significantly increased operational and energy costs, particularly for businesses dependent on generators, leading to reduced profit margins and weakened overall SME performance in the short term. The results show a statistically significant negative relationship between rising energy costs and SME performance.

[Chukunolu et al. \(2025\)](#) investigated the effect of fuel subsidy removal on the growth of SMEs in Nigeria, comparing pre- and post-subsidy periods. This study employed a quantitative approach, collecting data from SME owners across multiple states using structured questionnaires and analyzing the results using regression techniques. The findings revealed that subsidy removal significantly increased operational and energy costs, contributing to higher production expenses and reduced profitability. SMEs that had diversified energy sources or adopted cost-saving strategies were less affected, whereas highly energy-dependent businesses experienced the most negative impact.

[Ezekwe \(2025\)](#) examined the macroeconomic and business implications of fuel subsidy removal in Nigeria, focusing on SMEs' operational efficiency. Using a survey-based quantitative design, data were collected from 180 SME operators and analyzed using descriptive statistics and correlation analysis. The study found that subsidy removal led to increased energy and transportation costs, which cascaded into higher operational expenses and reduced SME performance. The negative effects were particularly severe for micro-enterprises and those in energy-intensive sectors

## **2.5 Gap in Literature**

Despite extensive research on subsidy impacts in Nigeria and developing countries, there is limited comparative analysis of bakery business performance before and after subsidy removal at the microenterprise level, especially in Nigeria's southeastern states. Most studies focus on macroeconomic or sector-wide effects and lack detailed localized data on profitability, operational efficiency, and adaptive strategies. There is also a scarcity of longitudinal research exploring how different bakeries respond over time, which is vital for designing targeted policies to support resilience and growth in this industry.

Although several studies have examined the broader economic implications of fuel subsidy removal in Nigeria ([Adeniyi and Mukoro \(2025\)](#), [Kekeocha et al. \(2026\)](#), and [Alabi et al. \(2025\)](#)), most have focused on macroeconomic indicators or general SME challenges, with very limited attention to the bakery industry a sector highly vulnerable to changes in fuel, raw material, and energy costs. Existing research rarely isolates the specific effects of fuel price increases, raw material cost fluctuations, and energy/operational expenses on business performance, making it difficult to determine which cost drivers significantly influence operational efficiency. Furthermore, previous studies seldom compared the pre- and post-subsidy removal eras ([Adogbeji & Ogbe, 2025](#)). This leaves a temporal gap in understanding how bakery operations have changed over both periods. These gaps highlight the need for a detailed, sector-specific, and comparative empirical analysis of the bakery industry in Southeast Nigeria.

## **2.6 Hypotheses of the study**

- $H_1$ : Fuel price increases in the pre- and post-subsidy removal eras have no significant effect on the operational efficiency of bakeries in South-East Nigeria
- $H_2$ : Changes in the cost of raw materials in the pre- and post-subsidy removal eras have no significant influence on the operational efficiency of bakeries in South-East Nigeria
- $H_3$ : Changes in energy and operational costs in the pre- and post-subsidy removal eras have no significant effect on the operational efficiency of bakeries in South-East Nigeria

### 3. Methodology

This study adopted a descriptive cross-sectional survey design with a retrospective comparative approach to assess the business conditions before and after the removal of fuel subsidies in Nigeria in 2023. The design was considered appropriate because it allowed for the examination of changes in operational conditions over time based on respondents' informed assessments. The study was conducted in Southeast Nigeria (Abia, Anambra, Ebonyi, Enugu, and Imo States), a region characterized by a high concentration of bakery enterprises and significant participation in small- and medium-scale food processing activities. The study population comprised 1,250 registered bakery enterprises obtained from relevant state bakery associations and small business directories. The unit of analysis was management personnel (owners, managers, or supervisors), as they possess reliable knowledge of operational costs and business performance before and after the subsidy removal.

A sample size of 245 respondents was determined using proportionate representation across the five states to ensure balanced geographical coverage and reduce location bias. Specifically, 49 respondents were selected from each state to maintain uniformity and comparability across regions. Purposive sampling was employed to select respondents because the study required individuals with direct managerial responsibility and adequate knowledge of operational changes over time. This ensured that only informed respondents who could accurately compare pre- and post-subsidy business conditions were included in this study. The key variables in this study were operationalized as follows: fuel price change, raw material cost change, energy and operational cost change, and energy efficiency.

Fuel price change refers to respondents' assessment of variations in the cost of petrol and diesel used for transportation and production activities across the pre- and post-subsidy periods. Raw material cost changes capture perceived differences in the prices of key bakery inputs, such as flour, sugar, yeast, and packaging materials. Changes in energy and operational costs reflect variations in electricity expenses, generator fuel usage, and other production-related overhead costs. Operational efficiency, the dependent variable, refers to the ability of bakery firms to maintain production output, control costs, and deliver goods on time under changing cost conditions. Data were collected using a structured questionnaire designed on a five-point Likert scale ranging from strongly disagree to strongly agree.

The instrument captured respondents' perceptions of the selected variables across the pre- and post-subsidy periods, allowing for comparative analysis. To ensure validity, the questionnaire was reviewed by experts in business administration and economics, and a pilot test involving 30 respondents outside the main sample produced a Cronbach's alpha coefficient of 0.85, indicating strong internal consistency. Data analysis involved both descriptive and inferential statistical analyses. The mean and standard deviation were used to summarize respondents' views on each variable. Paired-sample t-tests were applied to determine statistically significant differences between the pre- and post-subsidy conditions. Furthermore, multiple regression analysis using change scores (Post–Pre) was employed to examine the extent to which changes in fuel prices, raw material costs, and energy/operational costs influence changes in operational efficiency. All tests were conducted at a 5% level of significance to ensure the statistical reliability and validity of the results.

### 4. Results and Discussions

#### 4.1 Result

##### 4.1.1 Research Questions

To what extent do fuel prices increase, how do changes in the cost of raw materials, and the effect of changes in energy and operational costs in the pre- and post-subsidy removal eras on the operational efficiency of bakeries in Southeast Nigeria?

Table 1. Mean and standard deviation of study variables (pre and post subsidy removal)

| Variables                   | Pre-Mean | Pre SD | Post Mean | Mean Different | Post SD |
|-----------------------------|----------|--------|-----------|----------------|---------|
| Fuel Price Stability        | 4.12     | 0.61   | 2.31      | -1.81          | 0.78    |
| Raw Material Cost Stability | 4.05     | 0.58   | 2.18      | -1.87          | 0.81    |

|                                     |      |      |      |       |      |
|-------------------------------------|------|------|------|-------|------|
| Energy & Operational Cost Stability | 3.98 | 0.64 | 2.42 | -1.56 | 0.73 |
| Operational Efficiency              | 4.09 | 0.55 | 2.35 | -1.74 | 0.79 |

Table 1 presents the mean and standard deviation values of fuel price stability, raw material cost stability, energy and operational cost stability, and operational efficiency before and after the fuel subsidy removal. The pre-subsidy mean values were generally high, indicating stable and favorable operational conditions for the bakery businesses. However, the post-subsidy results show a sharp decline in all variables, indicating a deterioration in cost stability and operational efficiency following subsidy removal. This implies that bakery operations were significantly more stable before subsidy removal, whereas the post-subsidy environment introduced higher cost volatility and reduced efficiency levels.

#### 4.1.2 Test of Hypotheses

Fuel price increases, changes in the cost of raw materials, and changes in energy and operational costs in the pre- and post-subsidy removal eras had no significant effect on the operational efficiency of bakeries in Southeast Nigeria.

Table 2. Paired sample t-test results (pre vs post periods)

| Variables                           | Mean Difference | t-value | p-value |
|-------------------------------------|-----------------|---------|---------|
| Fuel Price Stability                | -1.81           | -28.45  | 0.000   |
| Raw Material Cost Stability         | -1.87           | -30.12  | 0.000   |
| Energy & Operational Cost Stability | -1.56           | -24.63  | 0.000   |
| Operational Efficiency              | -1.74           | -29.05  | 0.000   |

Table 2 presents the paired-sample t-test results comparing the pre- and post-subsidy conditions. Negative mean differences indicate a decline in cost stability and operational efficiency after subsidy removal. The results show that all t-values are large in magnitude, and all p-values are below 0.05. This indicates a statistically significant difference between the pre- and post-subsidy periods for all variables examined. Based on these results, the null hypothesis was rejected for all variables. This means that fuel price increases, raw material cost changes, and energy/operational cost changes have a statistically significant effect on the operational efficiency of bakery businesses in Southeast Nigeria. In practical terms, this finding confirms that subsidy removal created real and measurable disruptions in bakery operations, rather than random or insignificant fluctuations.

Table 3. Regression analysis of cost changes on operational efficiency change

| Predictor Variables                 | Beta ( $\beta$ ) | p-value |
|-------------------------------------|------------------|---------|
| Change in Fuel Price                | 0.36             | 0.000   |
| Change in Raw Material Cost         | 0.42             | 0.000   |
| Change in Energy & Operational Cost | 0.21             | 0.009   |
| Model R <sup>2</sup>                | 0.66             |         |

Table 3 presents the regression results examining how changes in fuel prices, raw material costs, and energy/operational costs predict changes in operational efficiency. The model shows that all predictors are statistically significant, and the R<sup>2</sup> value of 0.66 indicates that 66% of the variation in operational efficiency change is explained by the independent variables. The regression results indicate that all the predictor variables significantly influence changes in operational efficiency. Specifically:

The change in raw material costs ( $\beta = 0.42$ ,  $p < 0.001$ ) has the strongest effect, indicating that increases in input costs are the most critical driver of efficiency decline in bakery operations. Fuel price changes ( $\beta = 0.36$ ,  $p < 0.001$ ) also significantly affected operational efficiency, confirming that fuel remains a key production input affecting transportation and energy use. Energy and operational cost changes ( $\beta = 0.21$ ,  $p = 0.009$ ) had a weaker but still significant effect, showing that general overhead costs also contributed to efficiency reduction.

Although all variables in this study were statistically significant, it is important to note that the relatively lower beta value of energy and operational cost changes suggests a weaker influence compared to fuel and raw material costs. This does not mean that it is unimportant; rather, it indicates that its effect on operational efficiency is indirect or secondary, likely mediated through fuel and input cost increases. This implies that while all cost factors matter, raw materials and fuel prices are the primary drivers of operational disruption in bakery businesses after subsidy removal.

#### **4.2 Discussion of Findings**

This study examined the extent to which fuel price increases, changes in raw material costs, and changes in energy and operational costs affect the operational efficiency of bakeries in Southeast Nigeria following the 2023 fuel subsidy removal. The findings reveal a significant deterioration in operational conditions after subsidy removal, confirming the vulnerability of small and medium-sized enterprises to macroeconomic cost shocks and policy reforms.

The descriptive statistics in Table 1 show that pre-subsidy conditions were characterized by relatively high levels of cost stability and operational efficiency, with mean values above 4.0 across most variables. However, the post-subsidy means scores declined sharply across all indicators. Fuel price stability recorded a substantial drop, raw material cost stability declined further, and operational efficiency decreased significantly. These results align with recent empirical evidence indicating that fuel subsidy removal significantly increases SMEs' operational costs in Nigeria, particularly through heightened transportation and production expenses ([Adeniyi & Mukoro, 2025](#); [Ilodigwe, 2023](#)). Rising fuel prices have been shown to increase overheads and reduce firms' ability to manage production processes efficiently, thereby undermining cost stability and productivity ([Adeniyi & Mukoro, 2025](#)).

The paired sample t-test results in Table 2 further confirm that these declines were not due to random variation. All variables recorded large t-values and statistically significant p-values ( $p = 0.000$ ), indicating that the differences between the pre- and post-subsidy periods are statistically significant at the 5% level. The rejection of the null hypothesis indicates that subsidy removal directly and measurably impacts bakery operational efficiency. This finding corroborates evidence from related studies showing that subsidy removal introduces abrupt cost pressures that significantly impact business operations and contribute to efficiency loss ([Oyasipe & Olukoya, 2024](#)). Specifically, increases in fuel and transportation costs following subsidy removal have been documented as key sources of operational strain for SMEs, leading to reduced productivity and competitiveness ([Oyasipe & Olukoya, 2024](#)).

The regression analysis in Table 3 provides a deeper insight into the magnitude and relative importance of each cost factor. Changes in raw material costs emerged as the strongest predictor of operational efficiency change ( $\beta = 0.42$ ,  $p < 0.000$ ), suggesting that escalating input prices, likely driven by increased transportation and logistics expenses, had the most pronounced effect on bakery operations. This finding is consistent with empirical studies indicating that escalating input costs, driven by external economic pressures such as inflation and transport cost increases, adversely affect SMEs' operational performance ([Adeniyi & Mukoro, 2025](#); [Ilodigwe, 2023](#)). The change in fuel price ( $\beta = 0.36$ ,  $p < 0.000$ ) also showed a significant effect, confirming that fuel remains a critical operational input for transportation, generator use, and supply chain coordination in environments with unreliable access to grid electricity ([Chukunolu et al., 2025](#); [Ilodigwe, 2023](#)). These results reinforce the established view that energy cost volatility can substantially impair business efficiency when firms heavily depend on fuel for their core operational activities.

Meanwhile, changes in energy and operational costs ( $\beta = 0.21$ ,  $p < 0.009$ ), although comparatively weaker, still had a statistically significant influence, indicating that broader cost adjustments contributed to declining efficiency. This pattern reflects recent findings that highlight how subsidy removal can lead to increased energy expenses and broader cost pressures that affect small business sustainability and performance ([Ekaette, Iwuozor, & Omeiza, 2025](#)). The model's  $R^2$  value of 0.66 indicates that 66% of the variation in operational efficiency change is explained by changes in fuel price, raw material costs, and energy/operational costs, suggesting that these cost shocks are central drivers of the efficiency deterioration observed after subsidy removal.

Overall, the findings demonstrate that subsidy removal significantly altered the operational environment of bakeries in southeast Nigeria. The most critical transmission channel appears to be the escalation of raw material costs, followed closely by fuel price increases. This evidence supports the position that policy-induced energy cost shocks quickly propagate through supply chains, affecting not only direct energy costs but also input prices and overall operational stability ([Ilodigwe, 2023](#); [Oyasipe & Olukoya, 2024](#)). Consequently, bakery enterprises are highly vulnerable to abrupt macroeconomic adjustments, and cost instability directly translates to reduced operational efficiency. Therefore, the findings underscore the importance of adaptive cost management, supply chain optimization, and energy adaptation mechanisms for SMEs operating in volatile economic environments.

## **5. Conclusions**

### **5.1 Conclusion**

The removal of fuel subsidies in southeast Nigeria has significantly increased costs and disrupted the operational efficiency of bakery enterprises, primarily due to rising raw material and fuel prices. This volatility necessitates stronger internal cost management and production planning measures. Policymakers are advised to provide stabilized access to key inputs, low-interest credit for energy-efficient technologies, improved electricity and alternative energy infrastructure, and better transportation systems. Structured support programs, including tax relief and capacity-building initiatives, are crucial. The findings highlight the broader implications for Nigeria's SME sector, suggesting that coordinated national policies are needed to balance economic reform with business sustainability and inclusive growth.

### **5.2 Research Limitations**

This study had some limitations that should be considered when interpreting the findings. First, the study relied on self-reported data obtained from bakery managers, which may be subject to bias, such as exaggeration or recall errors, especially when comparing pre- and post-subsidy conditions. Second, the use of a cross-sectional design with retrospective assessment limits the ability to establish long-term causal relationships because the data were collected at a single point in time rather than over an extended period. In addition, the study focused only on registered bakery enterprises in Southeast Nigeria, which may limit the generalizability of the findings to unregistered businesses or other regions of the country with different economic conditions.

Furthermore, the study concentrated on three major cost-related variables: fuel price, raw material cost, and energy/operational cost, while other important factors such as inflation, exchange rate fluctuations, government policies, and market demand were not included in the model. Finally, external economic shocks following subsidy removal, such as broader macroeconomic instability, may have influenced operational efficiency but were not fully captured in this study's data. Despite these limitations, this study provides useful insights into the cost dynamics and operational challenges faced by bakery enterprises in a post-subsidy environment.

### **5.3 Suggestions and Directions for Future Research**

Future studies should adopt a longitudinal research design to track changes in operational efficiency over time. This will provide deeper insights into the long-term effects of fuel subsidy removal and allow researchers to establish stronger causal relationships between the cost variables and business performance. In addition, further research should expand the scope beyond South-East Nigeria to include other geopolitical zones or conduct a comparative national study. This will enhance the generalizability of the findings and provide a broader understanding of how subsidy removal affects SMEs across different economic and regional contexts.

Future researchers are also encouraged to incorporate additional variables, such as inflation rate, exchange rate fluctuations, access to credit, government policy interventions, and market demand. Including these factors will provide a more comprehensive model for explaining the variations in operational efficiency. Moreover, qualitative approaches, such as interviews and case studies, should be integrated to capture deeper insights into the coping strategies, decision-making processes, and adaptive mechanisms adopted by bakery operators in response to cost shocks. Finally, future studies



should explore sectoral comparisons by examining how subsidy removal affects other SME sectors, such as transportation, manufacturing, and retail. This will help identify sector-specific vulnerabilities and develop more targeted policy recommendations.

### Acknowledgment

The authors would like to express their sincere appreciation to all bakery managers and business owners in Southeast Nigeria who participated in this study and provided valuable information for the research. The authors also acknowledge the support and contributions of colleagues and academic staff at Nnamdi Azikiwe University, Awka, Nigeria, for their constructive insights and assistance throughout the research process. This study was conducted independently, and no external financial support was received from any institution, organization, or funding agency.

### Author Contributions

OAU developed the idea for the study, designed the research, and supervised the entire study. EMK handled the data collection and assisted in preparing the questionnaire. CMO was responsible for analyzing the data and interpreting the results, whereas EKN wrote the first draft of the manuscript and performed the necessary corrections and revisions. All authors have read, reviewed, and approved the final version of the manuscript.

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