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Effect of Monthly Fuel Price Reviews on Operational Sustainability of Lusaka's Minibus Operators in Zambia

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ABSTRACT*:* The transportation sector plays a vital role in Zambia's economy, with minibuses being the primary mode of public transport in Lusaka. However, the frequent and unpredictable nature of monthly fuel price reviews presents significant challenges to the sustainability of minibus transport operations. This study investigated the effects of these fuel price fluctuations on financial stability, service quality, and long-term viability. Using a qualitative exploratory approach, data was collected through structured interviews with 10 minibus drivers and 5 operators, selected using the saturation method. Additional insights were obtained from regulatory authorities and commuter representatives. Findings reveal that fuel price fluctuations negatively impact profitability and operational efficiency. Operators often respond to rising fuel costs by increasing fares, which results in commuter dissatisfaction and a shift toward alternative transport options, such as illegal taxis and ride-sharing services. Uncertainty around fuel pricing discourages investment in fleet upgrades, leading to the continued use of older, less fuel-efficient vehicles. To manage financial pressures, operators cut maintenance costs, reduce driver wages, and extend working hours, which actions reduce service quality and affect driver welfare. The absence of an automatic fare adjustment system forces operators into reactive decisions rather than strategic planning. Although fuel price reviews aim to align with global market trends, their current structure undermines operational sustainability. To mitigate these effects, the study recommends introducing a more predictable and transparent fuel pricing framework, targeted subsidies for public transport operators, and incentives for adopting fuel-efficient technologies. It also calls for stronger collaboration among government agencies, fuel suppliers, and transport associations to develop policies that support stability in the sector. In conclusion, while fuel price reviews are economically necessary, their unpredictable implementation significantly burdens minibus operators. A more comprehensive transport policy is needed to support sustainability, with further research into alternative fuels and long-term pricing strategies.

KEYWORDS: Fuel, Price, Monthly, Reviews, Operational, Sustainability, Minibus Operators, Lusaka.

1. 1 INTRODUCTORY BACKGROUND

In recent years, fuel price volatility has increased substantially, driven by factors such as geopolitical tensions, supply chain disruptions, and currency fluctuations (IEA, 2023). For countries like Zambia that are heavily reliant on fuel imports, these external pressures are often exacerbated by local economic challenges, making fuel costs a fluctuating expense that is difficult to predict or manage (Kabandala, 2022). Consequently, the monthly review of fuel prices by Zambia's Energy Regulation Board (ERB) was introduced as a policy measure to ensure that domestic fuel prices align with global oil markets. While this approach aims to reflect real-time changes in global oil prices, the regular fluctuations place a significant operational burden on sectors reliant on fuel, especially public transport, which is essential to Zambia's socio-economic infrastructure (Jesuit Centre for Theological Reflection, 2024).

In Lusaka, minibuses are a primary means of transportation for the urban population, connecting various parts of the city and providing an affordable travel option for low- and middle-income residents. For the CBD, which is the economic hub of Lusaka, reliable and affordable minibus services are essential for daily commuting and economic activity. However, frequent changes in fuel prices directly affect the operational costs for these minibus operators, who often operate with limited financial reserves and face considerable challenges in adjusting fares to match fuel costs (ZAM, 2022; Manzi, 2023). Price volatility affects not only the income stability of operators but also influences fare structures, which can affect the affordability of transport for commuters and

the quality of service provided. Such financial pressures have been known to lead to the deterioration of service quality or even reduced service availability, effecting socio-economic access and mobility for city residents (Siamachoka, 2024).

In 2021, Zambia adopted a monthly fuel pricing cycle to respond to global oil price volatility and currency fluctuations, a policy managed by the Energy Regulation Board (ERB). This approach, while aimed at reflecting real-time global oil price shifts, has led to significant price swings that affect various industries, particularly those highly dependent on fuel. For instance, the removal of fuel subsidies in Zambia has led to increased costs that effect daily commuters and transportation service providers alike, as Zambia's reliance on imported petroleum products subjects domestic prices to global trends (Siamachoka et al., 2024; Kabandala, 2022).

1.1. Table Showing Fuel Pricing from Independence to 2024

Period	Fuel Price Range (ZMW per Liter)	Key Fuel Price Trends	Major Influencing Factors
1964 - 1970	0.06 - 0.10	Stable and subsidized fuel prices	Government-controlled economy, state subsidies
1971 - 1980	0.10 - 0.50	Gradual price increases	Oil crises of 1973 & 1979, increased import costs
1981 - 1990	0.50 - 3.00	Sharp price hikes	Economic decline, IMF structural adjustments, subsidy reductions
1991 - 2000	3.00 - 5.50	Market liberalization led to price volatility	Shift to free-market policies, kwacha depreciation
2001 - 2010	5.50 - 8.50	Periodic price increases	Global oil price fluctuations, regulatory reforms
2011 - 2019	8.50 - 17.00	Fuel price instability	Kwacha fluctuations, regional supply chain issues
2020 - 2024	17.00 - 35.00	Frequent price adjustments	COVID-19, Russia-Ukraine war, ERB monthly reviews

1.1 Statement of the Problem

In an ideal environment, stable fuel prices would allow minibus operators to plan effectively, manage costs, and set sustainable fares critical for ensuring affordable public transport in low-income areas. Zambia has had fuel adjustments fuel price review cycle of around 120 to 60 days allowing minibus operators relief to plan their cost effectively (JCTR, 2023). However, Zambia faces persistent fuel price volatility due to factors such as a weakening Kwacha, global conflicts, and disrupted supply chains (PMRC). In response, the Energy Regulation Board (ERB) introduced monthly fuel price reviews to align with international prices and reduce subsidy burdens. While fiscally responsible, this policy creates uncertainty in fare planning and operational budgeting for minibus operators. Additionally, increases of fares is not effected by minibus operators themselves as this is done by government through Road Transport and safety Agency (RTSA) which most of the times delay to effect fare increases when fuel prices increase, Zambia's dependency on fuel imports and lack of stabilization mechanisms further intensify the problem. Since 2021 ERB has been adjusting fuel prices every month and almost 75% of the adjustments has been on the increase posing a significant financial strain on many businesses (JCTR, 2023). Existing research largely overlooks how this volatility affects public transport, focusing instead on general economic outlook, consumer goods and manufacturing.

It is against this background, therefore, that this study be conducted to addresses the research gap by investigating challenges, experiences and coping strategies of minibus operators in Lusaka's CBD and offer empirical information that will help in supporting both the Eighth National Development Plan and SDG 11 on sustainable and inclusive urban transport.

1.2 Study Objectives

i. To identify the financial challenges faced by Lusaka's minibus operators due to monthly fuel price adjustments.

ii. To establish the adaptive strategies employed by minibus operators to maintain operational consistency despite fuel price volatility.
iii. To examine the implications of fuel price volatility on service quality and commuter affordability as perceived by minibus operators.

2 LITERATURE REVIEW

2.1 Introduction

Research on the effects of fuel price volatility indicates that transportation sectors worldwide, especially in lower-income urban areas, are vulnerable to the operational disruptions caused by fluctuating fuel costs. Studies by Akumu and Mahalu (2022) highlight that in many African cities, public transport operators face increased operational costs with each fuel price rise, leading to fare hikes that disproportionately affect low-income commuters. This financial pressure is compounded in cities like Lusaka, where operators lack adequate support mechanisms to stabilize operations, forcing many to adopt short-term coping strategies that can erode service quality and affordability for commuters (Kabandala, 2022; ZAM, 2022).

This literature review aims to examine the extent to which fuel price volatility affects the operational sustainability of Lusaka's minibus operators, exploring existing research on cost management, resilience strategies, and adaptive mechanisms in response to fuel price changes.

2.2. Empirical review

2.2.1 Financial Challenges Faced by Bus Operators Due to Unstable Fuel Price Prices

Studies worldwide indicate that frequent fuel price adjustments impose significant financial challenges on small-scale transport operators, including those in Zambia. In a study conducted by Siamachoka et al. (2024), it was found that fluctuating fuel costs place a financial strain on Zambia's minibus operators, who operate on tight margins with limited resources to absorb sudden increases in operational expenses. For these operators, each price increase directly translates to higher costs in fuel, which is a core expense in their budget, ultimately squeezing profit margins and leading to increased financial instability.

Similar trends have been observed in other African countries. For example, Kabandala (2022) found that in Kenya, operators frequently struggle to maintain profitability when fuel prices spike, as they cannot easily increase fares without risking a drop in ridership. This predicament often leaves them with fewer funds for vehicle maintenance and savings, both critical for sustained operations. Globally, this issue is echoed in Latin American public transport systems, where operators experience fluctuating costs that threaten long-term operational sustainability (Morales & Cardoso, 2021).

2.2. 2 Adaptive strategies employed by minibus operators to maintain operational consistency despite fuel price volatility

A study by Masondo and Dlamini (2022) on South African minibus and taxi operators found that many operators adjust their schedules, reduce service hours, or optimize routes to conserve fuel when prices rise, thereby reducing the frequency and duration of trips to offset additional fuel costs. These adaptations help them manage expenses without resorting to fare increases, which could drive away passengers.

Additionally, research in India by Sharma and Gupta (2021) highlights that some operators form cooperatives or informal alliances to pool resources for bulk fuel purchases, allowing them to obtain better fuel prices and minimize operational costs. These collective strategies are often essential for operators in emerging economies, where formal financial support is limited. Another study from Brazil by Cardoso and Ferreira (2020) revealed that urban bus operators often invest in fuel-efficient vehicles or retrofitting existing fleets to enhance fuel efficiency and reduce dependency on fluctuating fuel costs. Together, these studies illustrate a range of resourceful approaches used by minibus operators globally to mitigate the effects of fuel price volatility, highlighting the adaptability of transport operators when faced with unpredictable operational environments.

2.2. 3 Implications of Fuel Price Volatility on Service Quality and Commuter Affordability as Perceived by Minibus Operators

Fuel price volatility significantly effects service quality and commuter affordability, as shown by studies across various countries. Research by Akumu and Mahalu (2022) in Nigeria found that operators often respond to fuel price increases by raising fares, a practice that disproportionately affects low-income commuters who rely heavily on affordable public transportation. This situation mirrors findings in Zambia, where the Jesuit Centre for Theological Reflection (2024) reported that fare hikes due to rising fuel prices led to a noticeable reduction in commuter satisfaction, as higher fares reduced access to essential services and employment.

Globally, operators also note that fuel price volatility reduces their ability to maintain high service quality. A study in Indonesia by Raharjo et al. (2021) revealed that operators often have to cut back on vehicle maintenance when fuel costs rise, which compromises passenger safety and comfort. Likewise, Morales and Cardoso (2021) observed that public transport operators in Argentina sometimes reduce service frequency and skip low-demand routes to save on fuel, actions that limit mobility for less

accessible communities. These studies highlight the double burden of fuel price volatility on both service providers and users, with minibus operators struggling to balance operational costs while maintaining affordable and reliable service for commuters.

2.3 Gaps in literature

The reviewed literature indicates that while fuel price volatility has well-documented effects on public transportation globally, there is limited empirical data on how small-scale operators, such as minibus operators in Lusaka, adapt to monthly fuel price adjustments. Much of the existing literature, particularly from global and regional perspectives, focuses on fare adjustments and economic modeling to assess the effects of fuel prices. However, these studies often lack qualitative insights that capture the lived experiences of operators who deal with financial instability on a daily basis. This gap is especially relevant in the Zambian context, where minibus operators do not have access to financial tools like fuel hedging or bulk purchasing, unlike their counterparts in developed economies (Litman, 2021; Akumu&Mahalu, 2022).

2.4 Theoretical frameworks

This study was guided by two theories relevant to the study. These are the Resource Dependency Theory (RDT) and the Contingency Theory

2.4.1 Resource Dependency Theory

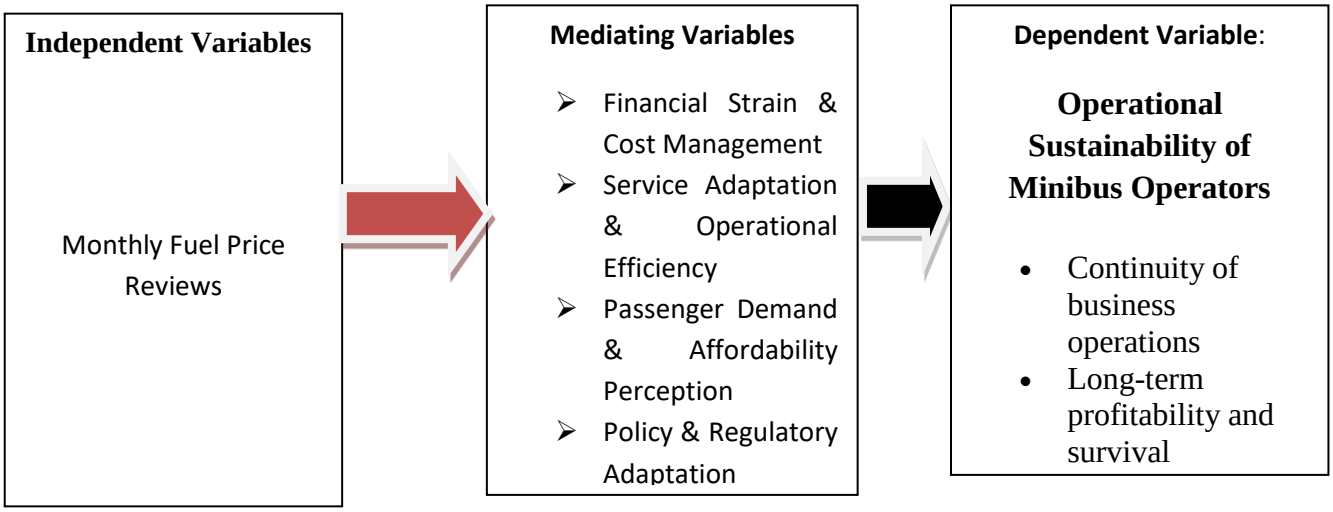
Resource Dependency Theory (RDT), developed by Pfeffer and Salancik (1978), explains how organizations depend on external resources like fuel, which influences their strategies and adaptability (Hillman et al., 2009). In Zambia, monthly fuel price reviews intensify minibus operators' dependency, creating financial uncertainty and threatening operational sustainability (Nabukeera & Mpiima, 2022; Kabandala, 2022). RDT highlights the need for support frameworks to mitigate these vulnerabilities.

2.4.2 Contingency Theory

Contingency Theory, developed by Lawrence and Lorsch (1967), posits that there is no single best way to manage an organization; instead, success depends on adapting to situational factors like environmental volatility and resource availability (Donaldson, 2001). This theory is relevant to Lusaka's minibus operators, who face operational uncertainty due to monthly fuel price adjustments. According to the theory, organizations succeed by aligning their structures and strategies with external challenges. Operators must adapt by adjusting routes, schedules, or fares to remain sustainable. These responses reflect Contingency Theory's emphasis on flexibility for survival (Tosi & Slocum, 1984).

2.5 Conceptual Framework

Below is a conceptual framework designed to examine the study topic on monthly fuel reviews and effect on operational sustainability among Lusaka's minibus operators. This framework includes key variables that help to structure the investigation of the relationships between fuel price volatility and the operational sustainability of minibus operators.



Source: Author's Construction (2025)

Conceptual Relationships

The framework posits that monthly fuel price reviews exert pressure on minibus operators through increased operational costs. These pressures necessitate adaptations in service delivery and fare adjustments, which can influence passenger demand and

perceptions of affordability. The interplay of these factors, within the existing policy and regulatory environment, ultimately determines the operational sustainability of minibus operators.

Understanding these relationships is crucial for developing strategies that support the resilience of minibus services amidst fuel price volatility. Potential measures include policy interventions for more predictable fuel pricing, financial support mechanisms for operators, and initiatives to enhance fuel efficiency and service quality.

3. METHODOLOGY

The study was anchored in interpretivism, a research philosophy that emphasized understanding social phenomena from the perspective of the individuals involved. Using a qualitative exploratory research approach, data was collected from a sample of 10 minibus drivers and 5 minibus operators, providing insights into their experiences and adaptive strategies in response to fuel price fluctuations. Data analysis followed an inductive thematic approach, which is widely used in qualitative research to identify and interpret patterns within data (Braun & Clarke, 2019).

4. FINDINGS

4.1 What financial challenges do minibus operators in Lusaka experience due to monthly fuel price adjustments?

This study found that monthly fuel price increases posed significant financial difficulties for minibus operators in Lusaka. Both bus owners and drivers expressed concerns about the rising costs and their impact on earnings and operational stability.

Participant Bus Owner 1 said, "Every time fuel prices go up, I have to adjust my budget. It becomes harder to manage maintenance costs and driver salaries."

Participant Bus Driver 2 shared, "On days when fuel prices increase, I take home less money because the operating costs eat into my cashing."

4.2 What Adaptive Strategies Do Lusaka's Minibus Operators Employ to Manage Operational Consistency amid Frequent Fuel Price Changes?

This study found that minibus operators in Lusaka have developed various strategies to cope with frequent fuel price changes in order to maintain operational consistency. These strategies include adjusting fare prices, modifying routes, reducing idle time, forming cooperative groups, and adopting fuel-efficient driving techniques. The following quotes illustrate these adaptive measures as described by the minibus operators.

4.2 1 Adjusting Fare Prices

Participant (Bus Owner 1) said, "When fuel prices go up, we do not immediately adjust fares because this is done by RTSA which most of the times delay to effect high fares. Increase of fares is the only way to keep the business running, but passengers don't always understand."

4.2.2 Route Adjustments and Efficiency Measures

Participant (Driver 2) explained, "I now choose routes with less traffic to save fuel. The more time I spend in a jam, the more fuel I waste."

This study found that minibus operators rely on collective decision-making and adaptive scheduling to minimize fuel wastage while maintaining profitability. Many drivers and owners emphasized efficiency as a key strategy to counterbalance fluctuating fuel prices.

4.3How Do Minibus Operators Perceive the effect of Fuel Price Volatility on Service Quality and Affordability for Commuters?

This study found that minibus operators in Lusaka recognize fuel price volatility as a major challenge affecting service quality and commuter affordability. Operators often struggle to balance rising operational costs with maintaining reasonable fares. Respondents highlighted concerns regarding fare stability, service reliability, and passenger retention.

4.3.1 Fare Stability and Commuter Affordability

Participant (Driver 1) said, "Every time fuel prices go up, we have no choice but to increase fares. Passengers complain, but we also need to survive."

4.3.2 Service Quality and Reliability

Participant (Bus Owner 2) remarked, "We used to maintain our buses regularly, but now we delay to maintain our fleet to cut costs. This affects vehicle conditions and, ultimately, service quality."

Respondent (Driver 4) added, "Sometimes we carry more passengers than legally allowed to make up for fuel costs, but this compromises comfort and safety."

This study found that minibus operators are forced to make trade-offs between profitability and service quality. While some strive to maintain affordable fares through periodic discounts, others resort to cost-cutting measures that negatively impact commuters.

5 DISCUSSION OF FINDINGS

5.1 Effect of Monthly Fuel Price Reviews on Operational Costs

The study reveals that monthly fuel price reviews significantly affect the operational costs of minibus operators in Lusaka. This finding aligns with research indicating that fuel price volatility directly influences transportation expenses and profitability (Storeygard, 2016). In sub-Saharan Africa, fuel price fluctuations have been shown to impact transportation costs, thereby affecting trade and urban growth (World Bank, 2009). The economic principle of supply and demand suggests that rising input costs, such as fuel, lead to increased service prices (International Monetary Fund [IMF], 2023). However, in developing economies where consumers have limited purchasing power, public transport fares cannot always be adjusted proportionally to fuel price hikes, resulting in financial strain on operators (IMF, 2021). This scenario is evident in various sub-Saharan African countries, where fuel price volatility has led to increased transportation expenses and affected the volume of goods and services traded (World Bank, 2009).

5.2 Strategies for Coping with Fuel Price Fluctuations

The study identifies that Lusaka's minibus operators employ various strategies to cope with fluctuating fuel prices, including fare adjustments, route optimization, and fuel conservation practices. These strategies are corroborated by global research indicating that transportation businesses facing fuel price volatility must develop adaptive measures to remain viable (IMF, 2023). One primary strategy is fare adjustment. However, in contexts where fare increases are regulated, operators often face constraints in passing costs onto passengers. This situation necessitates negotiations between transport associations and regulatory bodies to establish fare structures that reflect operational costs while remaining affordable for commuters (IMF, 2021).

Another coping mechanism is the adoption of fuel-efficient vehicles. Investing in such vehicles can lead to reduced operational costs despite fuel price hikes. Additionally, implementing digital route optimization technologies can help transport operators maximize efficiency and minimize unnecessary fuel consumption (World Bank, 2009). Collective bargaining through transport associations has also been identified as an effective strategy. Collaborative models can enable operators to secure bulk fuel purchase agreements, mitigating the direct impact of price fluctuations (Spiller & Stephens, 2022).

5.3 What Adaptive Strategies Do Lusaka's Minibus Operators Employ to Manage Operational Consistency amid Frequent Fuel Price Changes?

The study found that Lusaka's minibus operators employ various adaptive strategies to sustain their operations amid frequent fuel price fluctuations. These strategies align with global best practices in fuel cost management within the transport sector (International Energy Agency [IEA], 2023). One commonly used approach is trip scheduling and route optimization, which minimizes fuel wastage by prioritizing high-demand routes (World Bank, 2019). Operators adjust routes based on passenger density and traffic patterns, ensuring that trips are cost-effective. Studies have shown that digital route optimization technologies can significantly reduce fuel costs while maintaining service efficiency (OECD, 2020).

In summary, Lusaka's minibus operators employ a combination of scheduling adjustments, collaborative procurement, fuel diversification, and efficiency-focused maintenance to navigate fuel price fluctuations. These findings reinforce the need for transport policies that support adaptive strategies, ensuring the sustainability of the public transport sector.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The study aimed to investigate the role of monthly fuel reviews in influencing the operational sustainability of minibus operators in Lusaka. It specifically focused on the perceived effect of fuel pricing and adjustments on their daily operations, financial viability, and long-term sustainability. The research found that monthly fuel reviews significantly affect the financial stability of minibus operators, with fuel price fluctuations directly influencing operating costs, profit margins, and service delivery. From the data collected, it was evident that operators frequently face challenges in adapting to rising fuel prices, as it often leads to increased fares and decreased passenger demand. Fuel price hikes were found to erode profit margins, making it more difficult for operators to maintain their vehicles, pay drivers, and meet daily operational requirements. While some operators employ cost-cutting strategies and pass fuel cost increases onto passengers, these strategies have limited effectiveness in ensuring long-term sustainability as fare adjustments are not in the hands of minibus operators but government through RTSA.

The study highlighted the importance of fuel price predictability for long-term planning. Operators expressed a preference for stable or predictably adjusted fuel pricing mechanisms, as this would allow them to make informed decisions regarding budgeting, pricing, and fleet management.

6.2 Recommendations

1. Policy Adjustments for Fuel Price Stability

Policymakers should consider establishing a more predictable fuel pricing framework that minimizes frequent and drastic price hikes. The introduction of a more stable pricing mechanism could provide operators with a clearer financial outlook, allowing them to plan for operational sustainability.

2. Introduction of Fuel Subsidy Programs for Operators

To alleviate the burden on minibus operators, a fuel subsidy program could be implemented for the transport sector. This initiative could help mitigate the impact of fuel price increases, especially for operators running essential services in economically disadvantaged areas. In cases where there is a large increase in international oil prices, only excess costs on domestic fuel prices could be subsidized by the Government. For example, limiting subsidy free fuel price increment per liter to K2, such that whenever domestic fuel prices increase by more than K2, only excess costs above K2 will be subsidized by the Government.

6.3 Suggestions for Further Research

Longitudinal Study on Fuel Price Impacts:

Future research could adopt a longitudinal approach to track fuel price fluctuations and their cumulative effect on the financial sustainability of minibus operators over a longer period. This would help to better understand long-term patterns and adaptation strategies.

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