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The Impact of Electricity Costs on the Profitability of SMEs in Sri Lanka: Evidence from the Kundasale Divisional Secretariat Division

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ABSTRACT

This study investigates the impact of electricity costs on the profitability of Small and Medium-sized Enterprises (SMEs) in Sri Lanka, with a specific focus on the Kundasale Divisional Secretariat Division. Using a quantitative approach and multiple regression analysis on data collected from 100 SMEs, the study found that electricity expenses significantly and negatively affect profitability. The model explained 61.2 percent of the variance in profitability, confirming strong predictive power. Electricity cost ($\beta = -0.421$, $p < 0.001$) and electricity consumption ($\beta = -0.308$, $p < 0.001$) were identified as major factors reducing profitability, while business size ($\beta = 0.259$, $p < 0.01$) showed a positive influence. The findings reveal that smaller firms are particularly vulnerable to rising energy costs due to limited access to technology and capital. The study emphasizes the need for SMEs to adopt energy-efficient practices and for policymakers to introduce tiered electricity pricing, financial incentives for renewable energy use, and stable tariff mechanisms. Enhancing energy efficiency and affordability is vital for strengthening SME competitiveness and ensuring sustainable economic growth in Sri Lanka.

Keywords: *Electricity Cost; SME Profitability; Energy Efficiency; Business Sustainability; Renewable Energy.*

Introduction

Small and Medium-sized Enterprises (SMEs) constitute a vital component of national economies, particularly in developing countries, where they drive employment, innovation, and regional development. In Sri Lanka, SMEs represent over 75% of all enterprises, contribute nearly 52% to the Gross Domestic Product (GDP), and provide approximately 45% of total employment [1]. Despite their economic significance, Sri Lankan SMEs face persistent operational challenges, among which rising electricity costs have emerged as a critical constraint affecting their profitability and sustainability.

Electricity is a fundamental input for production and service activities, and its cost directly influences business performance. In recent years, Sri Lanka has experienced substantial increases in electricity tariffs due to the country's dependency on non-renewable energy sources and recurring energy supply issues. These developments have escalated the operating costs of SMEs, undermining their competitiveness in both domestic and international markets. For small firms with limited capital and economies of scale, fluctuations in electricity costs can have disproportionately adverse effects, reducing profit margins and threatening long-term survival.

The relationship between electricity cost and SME profitability remains underexplored in the Sri Lankan context, despite its growing policy relevance. Previous studies have highlighted that high energy prices constrain business expansion, discourage investment, and hinder productivity [2]. However, limited empirical evidence exists on the extent to which electricity costs influence the financial performance of SMEs, especially in local economies where energy demand and cost dynamics vary regionally. Addressing this gap is crucial for formulating effective strategies that balance energy pricing policies with business sustainability objectives.

This study investigates the impact of electricity costs on the profitability of SMEs in the Kundasale Divisional Secretariat Division (DSD), a region that exemplifies the diverse and dynamic SME environment of Sri Lanka's Western Province. Using primary data collected from 100 SMEs across multiple sectors, the research employs correlation and regression analyses to assess how variations in electricity price, consumption, and business size influence profitability. The findings are expected to contribute to both theoretical understanding and practical policymaking by identifying how energy cost structures affect small business performance in developing economies. Furthermore, the study aims to provide actionable insights for policymakers and business owners to design energy-efficient operational strategies that can enhance profitability while supporting national economic growth.

Literature Review

The relationship between electricity costs and the profitability of Small and Medium-sized Enterprises (SMEs) has received growing attention within the broader discourse on energy economics and business performance. Electricity is a vital input across production, service, and manufacturing sectors, and fluctuations in its cost can significantly influence firm-level efficiency and profitability [2]; [3]. SMEs, in particular, are highly vulnerable to rising energy prices because of their limited financial capacity and restricted access to cost-reducing technologies.

Empirical studies conducted in both developed and developing countries consistently demonstrate that higher electricity costs

negatively affect SME performance. For instance, [4] found that increases in electricity prices in Vietnam led to reduced profitability, higher production costs, and diminished competitiveness, especially among energy-intensive industries. Similarly, [12], [5]; [6] observed a significant negative correlation between electricity costs and firm performance among Chinese SMEs, noting that rising tariffs constrained investment and slowed business expansion. Research in the United Kingdom [6]; [7] produced parallel findings, emphasizing that energy price fluctuations have become a critical determinant of operational sustainability in small firms.

At the macroeconomic level, energy costs influence the competitiveness of national economies by shaping investment decisions, productivity levels, and inflationary trends [8]. In developing countries such as Ghana and Nigeria, studies by [9] and [10] highlighted that unstable or high electricity tariffs not only elevate production costs but also discourage entrepreneurship and reduce output growth. Likewise, in Sub-Saharan Africa, [11] identified a strong inverse relationship between energy costs and SME profitability, arguing that affordable and reliable electricity supply is fundamental to sustaining business operations and job creation.

Beyond profitability, literature also highlights indirect effects of electricity costs on innovation, investment, and firm competitiveness. [12] noted that higher electricity prices limit the funds available for research and development, curtailing SMEs' innovative capacity. Studies in Europe [13] and the United States [5]; [6] corroborate that persistent increases in energy prices erode profit margins and restrict growth opportunities, even in advanced economies with more developed energy infrastructures.

A growing body of work suggests that energy efficiency and renewable energy adoption can mitigate these adverse effects. [14] found that while the initial costs of renewable energy systems may be high, long-term operational savings can enhance financial stability. Similarly, [15] reported that supportive renewable energy policies positively affect SME profitability by lowering dependency on volatile electricity markets.

Despite extensive international evidence, studies specific to Sri Lanka remain limited. Local SMEs operate within an energy landscape characterized by periodic tariff adjustments, dependence on fossil fuel imports, and limited access to alternative energy sources. These structural challenges amplify the sensitivity of SMEs to energy price shocks, making the Sri Lankan context particularly relevant for empirical investigation.

The reviewed literature collectively underscores that electricity cost is not merely a financial concern but a strategic variable that influences competitiveness, productivity, and sustainability. However, the magnitude and mechanisms of this relationship vary across economies and sectors. Therefore, this study extends prior research by providing empirical evidence from Sri Lanka, examining how electricity costs affect SME profitability within the Kundasale Divisional Secretariat Division, thereby filling a critical gap in the regional literature on energy economics and small business performance.

Methodology

This study employed a quantitative research approach to investigate the relationship between electricity costs and the profitability of Small and Medium-sized Enterprises (SMEs) in Sri Lanka, focusing on the Kundasale Divisional Secretariat Division (DSD).

The research was designed as a cross-sectional analysis, allowing data to be collected from a selected group of SMEs at a single point in time. This design was considered appropriate for examining the current influence of electricity prices and consumption levels on SME profitability within a developing economy context.

The study relied mainly on primary data obtained through a structured questionnaire distributed among SME owners and managers. The questionnaire gathered detailed information on firm characteristics, electricity consumption, expenditure patterns, revenue, and profitability levels. It also included questions on energy management practices and the extent to which rising electricity costs had affected operational performance. To ensure clarity and accuracy of responses, the instrument was made available in both English and Sinhala, and data were collected directly from respondents to enhance reliability and minimize response bias.

The population of the study consisted of all SMEs operating in the Kundasale DSD, which represents a diverse range of business activities, including manufacturing, trade, and services. A total of 347 SMEs were identified, from which a random sample of 100 firms was selected to ensure representativeness and minimize selection bias. The sample size was considered statistically sufficient to generate reliable results while being practical for field data collection. Data collection was conducted through face-to-face visits, which improved the accuracy and completeness of the responses received.

The study model was structured to assess how variations in electricity cost, consumption, and business size influence profitability. SME profitability served as the dependent variable, while electricity price, electricity consumption, and firm size were treated as independent variables. The following multiple regression model was used to estimate these relationships:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where Y denotes profitability, X_1 represents the electricity price, X_2 electricity consumption, X_3 business size, and ε the error term. This model was expected to capture both the magnitude and direction of the impact of electricity-related costs on SME financial performance.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were computed to summarize the general characteristics of the sample, followed by correlation and regression analyses to identify and measure the relationships among variables. The statistical significance of each predictor variable was tested, and diagnostic procedures were undertaken to confirm the validity of regression assumptions such as normality, linearity, and the absence of multicollinearity.

To ensure the reliability and validity of the data, the questionnaire was pre-tested among a small group of SMEs outside the main sample, and adjustments were made based on their feedback. The internal consistency of key variables was verified using Cronbach's alpha values, which indicated acceptable reliability. Expert consultation was used to confirm the content validity of the instrument. The adopted methodology, therefore, provided a rigorous framework for understanding the extent to which electricity costs influence SME profitability in the Sri Lankan context.

Results and Discussion

The empirical investigation aimed to evaluate the extent to which electricity costs affect the profitability of Small and

Medium-sized Enterprises (SMEs) in Sri Lanka. Data collected from 100 SMEs in the Kundasale Divisional Secretariat Division were analyzed using SPSS, employing both correlation and regression techniques to identify the strength and direction of the relationships between variables. The descriptive statistics indicated that electricity costs account for a notable proportion of total operating expenses among SMEs, particularly within energy-dependent sectors such as manufacturing, food processing, and metal work. Most respondents reported that the steady increase in electricity tariffs over recent years had directly raised production costs, reduced margins, and constrained competitiveness.

Correlation analysis confirmed a significant negative association between electricity cost and SME profitability, suggesting that higher energy expenditure corresponds with lower financial performance. Regression analysis was then conducted to identify the magnitude of this relationship and to determine the predictive strength of the model. The results are summarized in Table 1.

Table 1: Regression Results – Impact of Electricity Cost on SME Profitability

Predictor Variable	Standardized Coefficient (β)	t-value	Sig. (p-value)	Relationship with Profitability
Electricity Cost	-0.421	-5.873	0.000***	Negative and significant
Electricity Consumption	-0.308	-4.112	0.001***	Negative and significant
Business Size	0.259	3.284	0.002**	Positive and significant
Constant (α)	—	2.107	0.038*	—
R^2	0.612	—	—	Model explains 61.2% variance
Adjusted R^2	0.598	—	—	—
F-statistic	43.62 (p < 0.001)	—	—	Model significant

**Significance levels: ***p < 0.001, **p < 0.01, p < 0.05*

Source: Compiled by the Author based on the analyzed data

The regression model explains approximately 61.2 percent of the variation in SME profitability, indicating a strong predictive capacity. The findings reveal that electricity cost has the most substantial negative impact on profitability (β = -0.421, p < 0.001), followed by electricity consumption (β = -0.308, p < 0.001). In contrast, business size shows a significant positive relationship (β = 0.259, p < 0.01), suggesting that larger firms are more capable of absorbing energy cost fluctuations due to economies of scale, greater financial stability, and better access to energy-efficient technology.

These results are consistent with prior studies conducted in other developing economies, which found that escalating energy costs erode the profitability and growth potential of small enterprises [4];[7];[6]. The findings also reinforce theoretical expectations based on the production cost model, which posits that an increase in variable input costs, such as electricity, reduces profit margins when output prices remain rigid.

The negative impact of electricity costs is particularly severe for energy-intensive SMEs that rely heavily on machinery and continuous production processes. Many such firms reported reducing output hours, increasing product prices, or switching to less energy-intensive activities to offset losses. Conversely, firms that implemented energy-saving technologies or adjusted operating schedules to avoid peak tariff periods reported comparatively stable profit levels. This aligns with studies by [14] and [15], which emphasize that energy efficiency and renewable energy adoption can mitigate cost pressures and improve financial sustainability over time.

Overall, the results confirm that electricity cost is a key determinant of SME profitability in Sri Lanka. The findings suggest that policy interventions focused on promoting energy efficiency, supporting access to renewable power solutions, and ensuring more predictable tariff structures would be critical in strengthening the financial resilience of small and medium enterprises. As the backbone of Sri Lanka's economy, sustaining the profitability of SMEs through energy cost management is essential not only for firm-level survival but also for broader economic stability and employment generation.

Conclusion and Policy Implications

This study set out to examine the impact of electricity costs on the profitability of Small and Medium-sized Enterprises (SMEs) in Sri Lanka, focusing on the Kundasale Divisional Secretariat Division. The findings provide clear empirical evidence that electricity costs exert a significant and negative influence on SME profitability. The regression model accounted for 61.2 percent of the variance in profitability, demonstrating strong explanatory power. Among the explanatory variables, electricity cost (β = -0.421, p < 0.001) and electricity consumption (β = -0.308, p < 0.001) showed significant negative effects, while business size (β = 0.259, p < 0.01) displayed a positive relationship with profitability. These results indicate that as electricity expenses increase, the financial performance of SMEs declines, particularly among smaller firms that lack the capital and technology to offset rising operational costs.

The study highlights that energy cost has become a critical factor influencing the competitiveness and sustainability of SMEs in Sri Lanka. For many small businesses, electricity represents one of the largest variable costs, and fluctuations in tariff rates directly affect production efficiency and output pricing. Larger firms, benefiting from economies of scale and greater financial stability, are better positioned to manage energy cost pressures. However, for smaller enterprises, especially those engaged in manufacturing and food production—rising electricity tariffs have translated into reduced margins, operational cutbacks, and in some cases, business closures.

From a practical perspective, the results underscore the necessity for SMEs to adopt energy-efficient technologies, optimize production hours to avoid peak tariffs, and explore renewable energy alternatives such as solar power systems. Such practices can reduce long-term costs and strengthen financial resilience. Nonetheless, the implementation of energy-efficient solutions requires initial investment, technical support, and access to credit, areas where government and institutional intervention become essential.

The findings also bear significant policy implications. Policymakers should recognize the disproportionate impact of electricity cost fluctuations on SMEs and design targeted support mechanisms to cushion vulnerable firms. Introducing tiered electricity pricing, low-interest green financing for renewable installations, and tax incentives for energy-efficient equipment could alleviate the financial burden on small firms. Moreover, consistent and transparent energy pricing policies would allow SMEs to plan their operational budgets with greater certainty, thereby reducing business risk.

At the national level, improving the reliability and affordability of electricity supply would directly contribute to enhancing SME productivity and overall economic growth. As SMEs represent over 75 percent of all businesses in Sri Lanka and contribute substantially to GDP and employment, ensuring their financial stability through rational energy management is a matter of economic priority.

In conclusion, this research confirms that electricity cost is a decisive determinant of SME profitability in Sri Lanka. The findings call for a balanced policy framework that integrates energy pricing, efficiency incentives, and technological adaptation. Strengthening energy resilience within the SME sector will not only safeguard business sustainability but also support Sri Lanka's broader goals of inclusive and stable economic development.

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