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Examining the Effects of Loadsheding on Small and Medium Enterprises (SME's) Performance: A Case Study of Chilenje Market, Lusaka Zambia

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Abstract: This paper examines the significant effects of electricity Load shedding on Small and Medium Enterprises (SMEs) in Chilenje market in Lusaka by using traditional literature review as the methodology. The main objectives of this research is to investigate effects of load shedding on the daily operations and productivity, access the financial implementations and analyse the copying mechanisms adopted by small medium enterprises during load shedding periods. This research used a descriptive cross sectional design using both qualitative and quantitative approaches with data collected from 30 SMEs respondents through structured questionnaires and interviews. Electricity is one of the major factors that are critical for economic growth of Zambia. Without adequate of electricity supply, a number of sectors are affected especially small medium enterprises. This study focuses on the various ways in which frequent power outages disrupts small scale enterprises, hinder economic growth and impede the productivity of these enterprises. Based on the results from the study, it showed that most SMEs experienced power outages exceeding six hours. Financially all SMEs reported revenue loses, but its severity was drastically reduced with access to government generator, therefore highlighting the program's effectiveness. In conclusion the study showed that load shedding possesses existential threat making target support as a vital copying mechanism and a recommendation for SME sustainability.

Keywords: *Load Shedding, SMEs, Productivity, Financial Iimplementations, Coping Mechanisms, Revenue loss.*

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I. INTRODUCTION

A. Background

Small and Medium Enterprises (SMEs) are universally recognized as engines of economic growth, innovation, and employment, constituting approximately 88% of all business activity in Zambia (World Bank, 2020). However, the performance of these enterprises is intrinsically linked to the reliability of foundational infrastructure, most notably, electricity.Zambia's energy sector, heavily dependent on hydroelectric power, has faced chronic deficits, leading to both scheduled and unscheduled load shedding by the national utility, ZESCO (2022).Zambia has experienced a reduction in the supply of electricity which is as a result of reduced generation by Zambia electricity supply Cooperation (ZESCO) due to lower water levels in the reserves. Electricity load shedding is characterised by scheduled power outages and still remains a persistent challenge in Zambia. This phenomenon has vast reaching implications for the business sector, particularly for SMEs. SMEs, which often lack the financial capacity to invest in robust alternative energy sources, bear the brunt of these power outages, facing disruptions to essential processes like refrigeration, electronic transactions, and production (Ngoma & Simpasa, 2020).

B. Problem Statement

Small and Medium Enterprises are universally acknowledged as important drivers of economic growth, employment and poverty alleviation in Zambia.They constitute the vast majority of the country's business landscape.Despite the strategic importance of SMEs, they remain highly vulnerable to energy insecurity.But due to limited capital and inability to invest into alternative power sources, load shedding has led to severe revenue loses, operational disruptions and an increase in operational costs. There is a critical lack of empirical research that quantifies

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the localized impacts of load shedding at the community market level and, mostly, assesses the efficacy of specific intervention strategies. This research study addresses this gap by conducting a focused investigation in Chilenje Market, with a unique opportunity to analyze the differential impact on SMEs with and without access to a government-provided backup generator.While the problems are widely known, there is a scarcity of evidencebased research evaluating support mechanisms, such as the government generator initiative in Chilenje Market. This study therefore addresses this dual research gap by investigating into the operational and financial effects of load shedding on Chilenje Market SMEs, while on the other hand offering a critical evaluation of a real-world intervention. The findings in this research aim to create actionable insights for policymakers, SME support agencies, and the business owners, to inform the development of targeted and effective resilience strategies.

C. Objectives

➢ *General Objective*

To examine the impact of load shedding on the operational efficiency and business sustainability of small and medium enterprises in Chilenje market, Lusaka.

➢ *Specific Objectives*

- To investigate the effects of load shedding on the daily operations and productivity of SMEs in Chilenje Market.
- To assess the financial implications of power outages on SME revenue generation and profit margins.
- To identify and analyse the coping mechanisms adopted by SMEs to mitigate the negative effects of load shedding, with a specific focus on the government generator initiative.

D. Research Questions

To achieve the above objectives, the study seeks to answer the following questions:

- In what ways does load shedding affect the daily operations and service delivery of SMEs in Chilenje Market?
- What are the nature and severity of the financial consequences resulting from frequent electricity outages for these businesses?
- What coping strategies have SMEs adopted, and how does access to a government-supported generator influence their operational and financial resilience?

E. Theoretical Framework

The theoretical framework underpins the foundation of this study. Theories discussed here offer a lens through which the relationship between load shedding and SME performance can be examined.

➢ *Resource-Based View (RBV) Theory*

The RBV theory postulates that firms achieve sustainable competitive advantage by effectively utilizing their internal resources and capabilities (Barney, 1991). In the context of SMEs, electricity is a critical resource required for operations, production, and service delivery. Load shedding constrains this resource, thereby affecting the ability of SMEs to maintain competitiveness. Without reliable electricity, SMEs lose valuable time, reduce output, and struggle to meet customer demands, which ultimately weakens their market position (Wernerfelt, 1984).

➢ *Contingency Theory*

Contingency theory argues that organizational effectiveness is achieved when management strategies align with environmental conditions (Donaldson, 2001). For SMEs facing unpredictable energy supply, flexibility and adaptability become crucial. This theory supports the idea that SMEs must adopt suitable coping mechanisms such as acquiring generators or restructuring business hours to align with energy constraints.

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F. Conceptual Framework

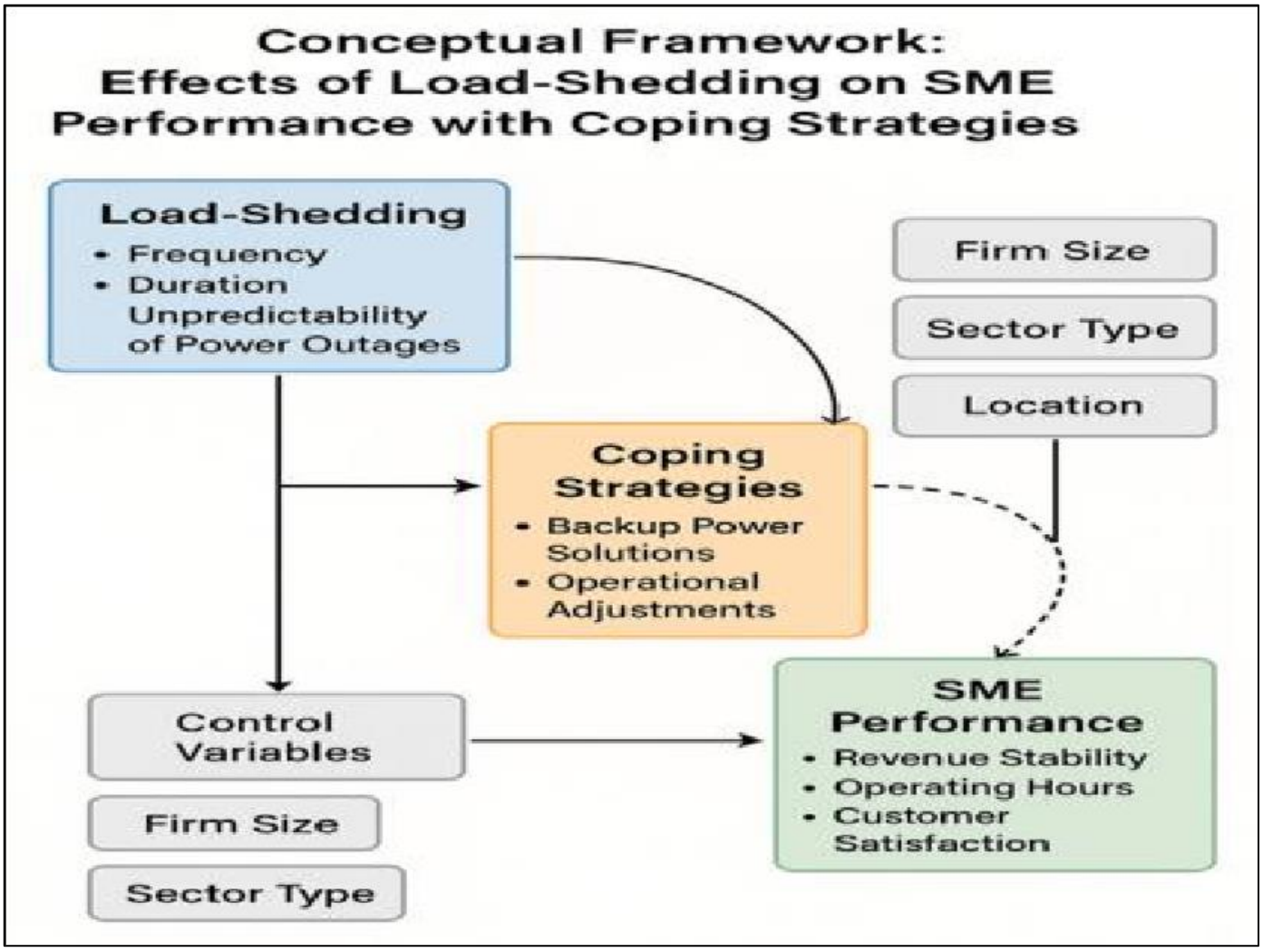

Fig 1 Conceptual Framework

II. LITERATURE REVIEW

The main purpose of this chapter is to review literature that is related to the impact of load shedding on the operation and financial performance on small and medium enterprises with reference to government support interventions. The aim is to exam existing research and identifying the research gaps that are specific to the Zambian context especially at localised level.

The literature review is organised in accordance with the specific objectives of this research. First this literature review accesses how much load shedding impacts operational and financial performances of SMEs, then analyses the copying mechanisms and strategies that SMES are using to mitigate the impacts of power shortages and outages, therefore analyse the effectiveness of government supported interventions, such as shared generators, at sustaining the operations of SMEs during power outages.

A. Objective 1 Investigating the Effects of Load Shedding on the Daily Operations and Productivity of SMEs.

The world's research has constantly showed that power outages severely impair the functioning of small and medium enterprises (SMEs).In Bangladesh, studies have shown that SMEs experience pronounced disruptions in there production processes often reverting to manual alternatives that degrade efficiency and output quality (Alam &Hossain 2023).In India, micro-enterprises report extensive idle time for both labour and equipment due to unreliable power supply, which has directly reduced the productivity per worker (Kapoor & Sengupta 2022).In addition, the World Bank points out the broad negative consequences of energy disruptions on business continuity and operational reliability (World Bank 2023).Moreover , International Finance Corporation reports note that SMEs adapt by shifting workloads even though they still face major operational interruptions during blackouts (IFC 2022).

Focusing on the Sub-Saharan Africa, the impact remains the same. Research in South Africa incorporates increased load shedding intensity with significant decrease in the turnover among small businesses, pointing to lost

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operational hours and productivity (Moyo & Mishi 2022). Nigerian SMEs also face similar challenges, it reports of compromise in service or product standard and curtail working hours during power outages, undermining their competitive positioning (Adewale et al. 2023). A broader regional assessment corroborates these patterns, emphasizing the recurring power disruption to major business functions and the resultant economic setbacks (Adeniyi & Ikhide 2024).In addition, studies have also stressed how frequent power interruptions have amplified operational uncertainties that have reduced morale and customer satisfaction (Darko et al. 2024).

Turning to Zambia, researches have highlighted acute local power disruptions. Lusaka surveys found over 80 % of SMEs experienced frequent failures of electronic payment systems during power outages, directly leading to lost revenues and unsatisfied customers (Mulenga & Phiri 2023). Additionally, service-sector SMEs such as barbershops suffer total income loss during load shedding de to equipment dependency, causing immediate operational halt (Tembo & Simatele 2024). Recent findings from in Zambia also affirm these results, with studies pointing out lowered operational capacity and negative impacts on employee productivity which is mainly linked to persistent power disruptions (Maswenganyi 2024; Tau University Study 2024)

B. Objective 2: Assessing the Financial Implications of Power Outages on SME Revenue Generation and Profit Margins.

Globally, the financial costs of power outage or load shedding for SMEs have proven measurable revenue declines and increase in operational costs. In Vietnam, SMEs experiencing repeated power outages reported annual profit reductions by 8.5% compared to businesses with stable electricity supply (Nguyen & Tran 2022). The World Bank also emphasizes on this that backup power generation costs are a major drain on the profitability for small businesses worldwide (World Bank 2023). Further global analysis show that spending on temporary alternatives like generators diverts funds from growth activities and erodes financial sustainability (IFC 2022). Previous research also documents that power fluctuations cause equipment damage, further inflating costs (Agyapong & Boamah 2022).

Within Sub-Saharan Africa, SMEs face a compounded economic strain. Ghanaian studies reveal that not only revenue is lost due to downtime but also significant expenses for equipment repairs caused by power instability (Agyapong &Boamah 2022). South African assessments identify load shedding as a key driver eroding narrow profit margins, especially for small informal enterprises struggling to survive economic shocks (Sikhosana & Marimuthu 2024) Nigerian research similarly points out that increased production costs and diminished sales revenue were linked o unreliable power supply (Adewale et al. 2023).Across the region, reliance on costly generators inflates operational costs, squeezing SME profitability and business viability (Dube & Masunda 2022).

In Zambia, these financial challenges are very true. Research on Lusaka food processors shows spoilage of perishable food stock during power outages as the major source of direct revenue loss, strongly impacting quarterly income (Chibwe et al. 2023). Furth more, a recent ZIPAR policy brief notes diesel fuel expenses for backup generators are among the top three operational costs for many SMEs, drastically reducing profit margins (ZIPAR 2024). In addition, local studies report negative impacts on cash flow and harm to SMEs financial health cause by frequent power cuts (Tau University Study 2024; MJ Consultants 2025).

C. Objective 3: Identifying the Coping Mechanisms Adopted by SMEs to Mitigate the Negative Effects of Load Shedding.

On the global focusses have adopted a vast range of strategies to counter power disruptions, usually progressing from lowcost to more expensive solutions. Most of them have employed operational ease by rescheduling there work periods and diversifying into less energy dependant activities (IFC 2022).In Kenya a research showed that the rise in Pay-As-Go solar energy system showed an important shift towards SMEs sustainable copying mechanisms which help them maintain operations during power outages or load shedding (Maina &Otieno 2023). Further more, international research showed trends towards innovative adaptations like energy sufficient equipment that enable remote work during power outages (Alam & Hossain 2023).

In the Sub-Saharan Africa, these copying mechanisms carry a very significant financial burden for SMEs and limit small business sustainability. Research in Zimbabwe showed that SMEs heavily invest in diesel generator, which had replaced one problem with high and unpredictable fuel costs, creating an additional economic hurdle (Dube & Masunda 2022). Interviewbased studies also demonstrated that when technical solutions are unaffordable, SMEs rely on informal and non-technical measures such as stockpiling inventory, negotiating with power utility companies for power outage information, or reducing load shedding hours (Adeniyi & Ikhide 2024). South African SMEs also reported mix of both generator use and adaptive scheduling but stresses out that both strategies are costly only have partial effect (Maswenganyi 2024). Therefore, regional research underlines the urgent need for sustainable, collective energy solutions to reduce the dependence on expensive alternatives (ZDA 2024).

Within Zambia, SMEs mostly resort to reactive and cost-driven copying strategies. Positive developments include experimental formations of business clusters in Lusaka pooling resources to invest in shared solar micro-grids, which may offer longer term, collaborative solutions (Zambia Development Agency).Surveys in Kitwe reveal that majority of the SMEs adjust their operating hours to coincide with ZESCO's load shedding schedule, trading off market visibility and customer reach for survival (Mwape & Bwalya 2023).Nevertheless, many SMEs remain constrained by financial demands of generators and solar equipment acquisition, limiting wider adoption of sustainable measures (ZIPAR 2024;Tembo & Simatele).

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III. METHODOLOGY

The methodology employed in this study examines the impact of load shedding on SMEs in Chilenje Market, Lusaka. The integrated approach includes a combination of quantitative and qualitative methods to capture measurable outcomes in the form of revenue losses and operating hours, as well as contextual insights into coping strategies and resilience behaviours. These methods ensured findings are reliable, valid, and applicable to policy and practice.

A mixed-methods explanatory sequential design was adopted. Quantitative data were first collected to measure the extent of loadshedding impacts on SME performance, followed by qualitative interviews that sought to contextualize and explain statistical results. Such a method allowed for a comprehensive understanding of both the measurable and experiential aspects that energy disruptions create for SME operations.

The population comprised SMEs operating in Chilenje Market. Two groups were identified: SMEs with access to the shared ZESCO genset and those without. Both groups included a range of sectors (retail, services, food processing, small manufacturing) and firm sizes, allowing for comparative analysis of how differential energy access moderates performance outcomes.

Stratified purposive sampling was used, dividing SMEs into genset-access and noaccess strata. The final sample included 30 SMEs, 15 of each group, capturing diversity across sector, size, and years of operation to ensure representativeness while allowing for direct comparison between the two groups.

Data collection used structured questionnaires for quantitative information, semi-structured interviews to elicit qualitative responses, and observational checklists to record practices in operation.

Questionnaires captured revenue, operating hours, and coping strategies, while interviews provided a deeper insight into adaptive behaviors. All instruments were piloted for clarity and reliability and achieved Cronbach's alpha > 0.75.

Quantitative data were analyzed using descriptive statistics, cross-tabulations, ttests, and ANOVA using SPSS, while qualitative data were thematically analyzed using NVivo. This integrated approach allowed the study to identify patterns, test relationships, and explain differences between SMEs with and without genset access.

A. Triangulation enhanced the study's credibility in that:

- Data triangulation: multiple SME groups and business characteristics;
- Method triangulation includes both quantitative and qualitative approaches.
- Triangulation of theories: interpreting findings using Resilience Theory and the Resource-Based View.

The potential limitations included sample size constraints, self-reporting bias, and unforeseen market disruptions. These were mitigated through triangulation, pilot testing, and cross-verification of data.

Ethical protocols included informed consent, confidentiality, anonymity, and permissions from relevant authorities. The participants were fully informed of their rights and the study adhered to ethical principles of respect, beneficence, and justice.

IV. DATA ANALYSIS AND FINDINGS

This chapter presents and analyses data collected from SMEs operating in Chilenje Market, Lusaka, with a focus on the impact of load-shedding on business performance. The study examines the differences between SMEs benefiting from the ZESCO genset and those without access to the genset.

A. The Findings are Organized into Three Sections:

- Background characteristics of respondents, which provide context on the demographic and business profiles of the SMEs;
- Analysis based on thematic areas derived from research objectives, starting with the effects of loadshedding on SME performance;
- Interpretation of results, highlighting patterns, trends, and implications for coping strategies.

B. Presentation of Results on the Background Characteristics of the Respondentsthe Study Surveyed 30 SMEs in Chilenje Market, Divided Into Two Groups:

- Group A: SMEs benefiting from the ZESCO genset (n = 15)
- Group B: SMEs without access to the ZESCO genset (n = 15)

- *Gender Distribution of Respondents*

Table 1 Gender Distribution of Respondents

Gender	With genset	Without genset	Total	Percentage
Male	8	9	17	57.5%
Female	7	6	13	42.5%
Total	15	15	30	100%

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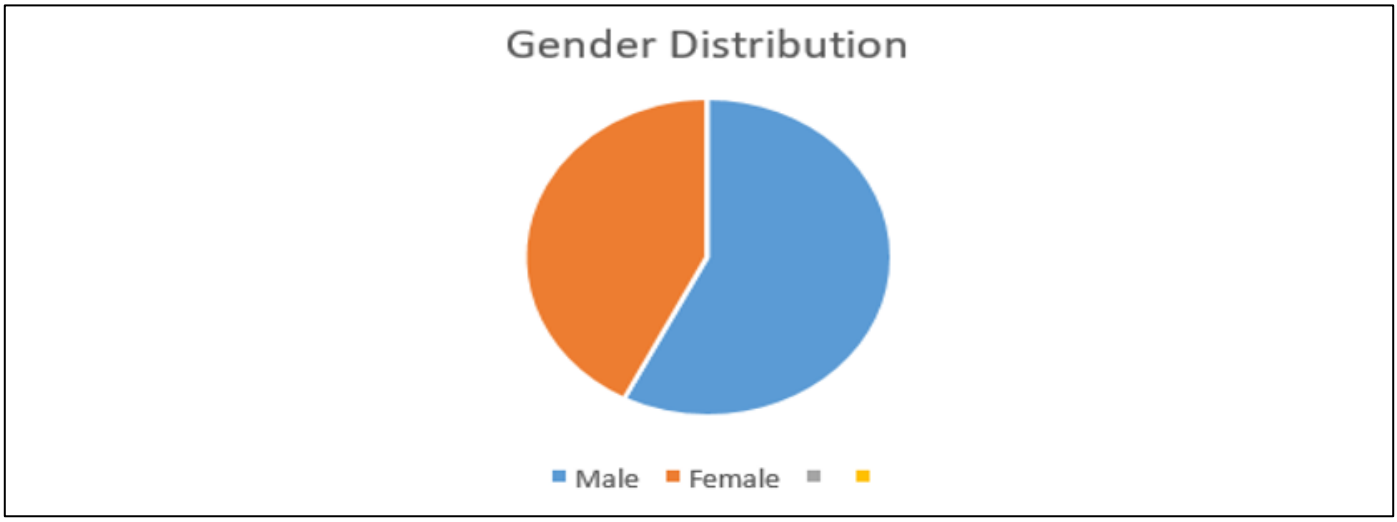

✓ *Interpretation:*

- Slightly more males (57.5%) than females (42.5%) operate SMEs in Chilenje.
- Both groups have balanced gender representation, which allows for comparing coping strategies across genders.

- *Age Distribution of Respondents*

Table 2 Age Distribution of Respondents

Age group (Years)	With genset	Without genset	Total	Percentage
18-25	2	2	4	13.8
26-35	5	7	12	36.8%
36-45	4	6	10	32.2%
46-55	3	1	4	11.5%
+	0	0	0	0
Total	14	16	30	100%

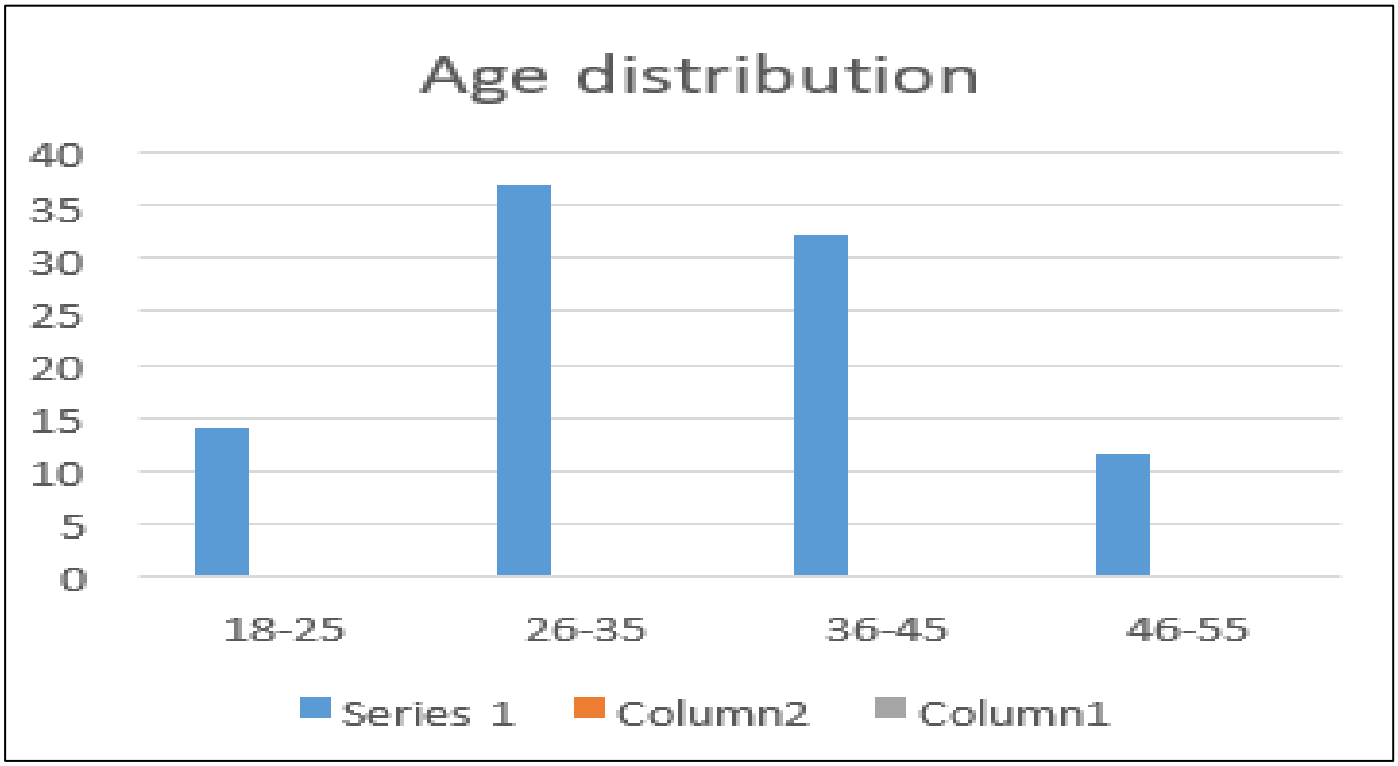

Fig 2 Age Distribution of Respondents

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✓ *Interpretation:*

- Majority of SME owners are aged 26-45 Years (36.8%), representing the core entrepreneurial population.
- Age distribution is similar between the two groups, suggesting comparable experience levels for analyzing load-shedding impact.

- *Firm Size (Number of Employees)*

Table 3 Firm Size (Number of Employees)

Firm Size	With Genset	Without Genset	Total	Percentage
1-5	14	13	27	90%
6-10	1	2	3	10%
11-20	0	0	0	0%
20+	0	0	0	0%
Total	15	15	30	100%

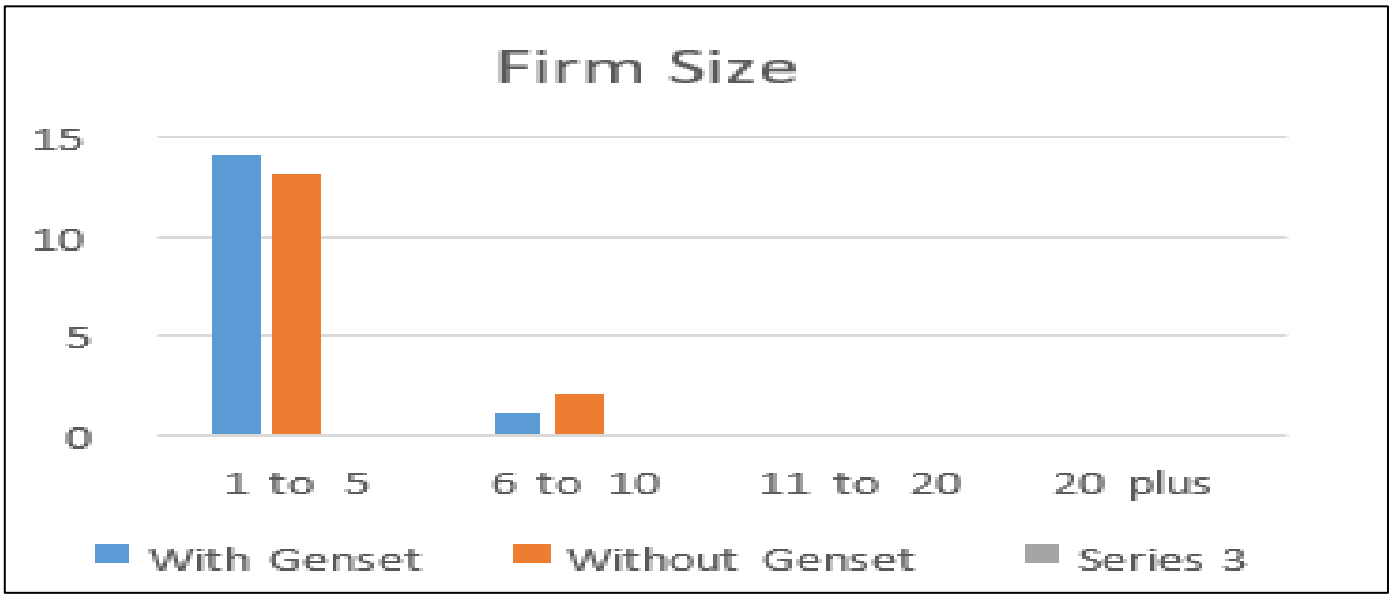

Fig 3 Firm Size

✓ *Interpretation:*

- Small firms dominate the market (66.7% employ 1–10 people).

SMEs benefiting from the genset appear slightly larger on average, which may affect their ability to cope with load-shedding. The SME landscape in Chilenje is predominantly male-led (57.5%) and driven by a young entrepreneurial cohort (aged 26-45). The vast majority (90%) are micro-enterprises with 15 employees. This profile establishes that the businesses are inherently vulnerable due to their small size, but the owners are potentially adaptable. The groups are demographically similar, allowing for a more controlled comparison of the generator's impact.

C. Presentation of Results Based on a Thematic Area Developed from Objective One

➢ *Objective 1:*

To assess the impact of loadshedding on SME performance in Chilenje Market

- *Frequency of Load Shedding Experienced*

Table 4 Frequency of load shedding experienced

Times of load shedding per week	With Genset	Without Genset	Total	Percentage
0-2 times	5	3	8	26.%
3-5 times	5	4	9	30%
6+ times	4	9	13	40.3%
Total	14	16	30	100%

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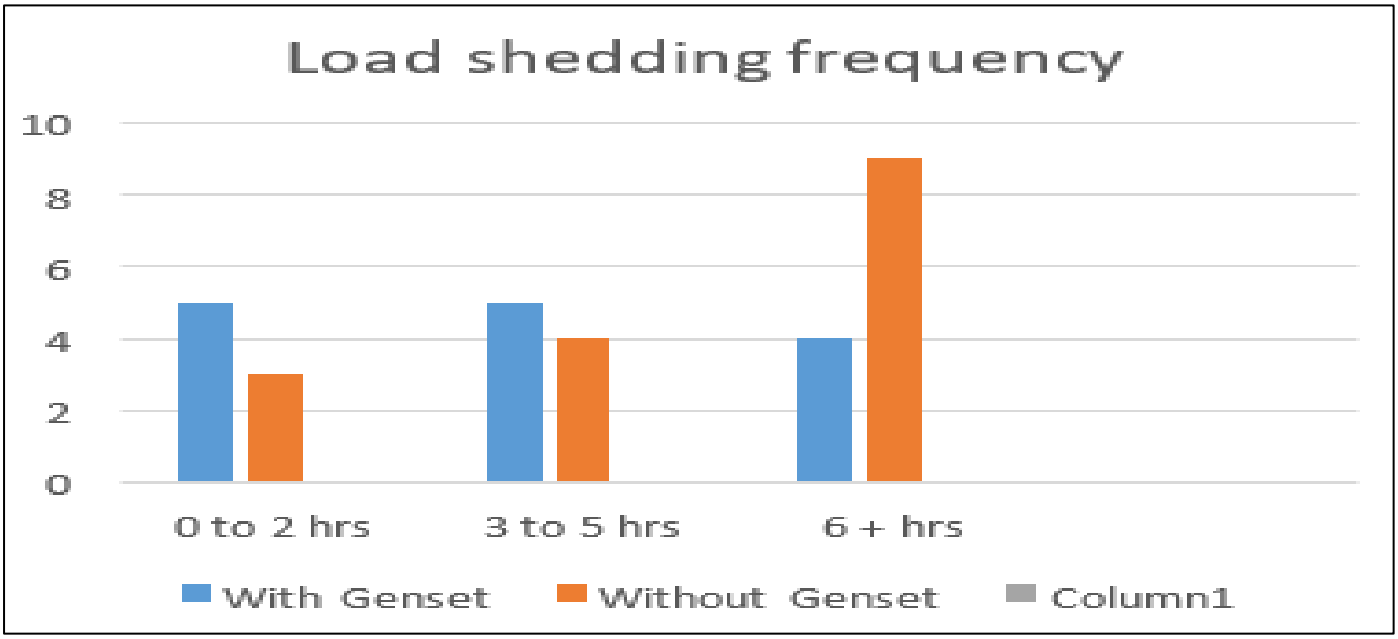

Fig 4 Frequency of load shedding experienced

✓ *Interpretation:*

- SMEs without access to the genset experience more frequent loadshedding, with 30% facing outages 3+ times per week, compared to 26.7% of SMEs with the genset experiencing 0–2 times per week.
- Access to the genset reduces exposure to frequent outages, mitigating the negative impact on SME performance.

- *Operating Hours Lost Per Week Due Load Shedding*

Table 5 Operating hours lost per week due Load shedding

Operating hours lost	With Genset	Without Genset	Total	Percentage
0-5 hours	9	3	12	40%
5-10 hours	4	5	9	30%
11+ hours	2	8	10	30%
Total	15	16	31	100%

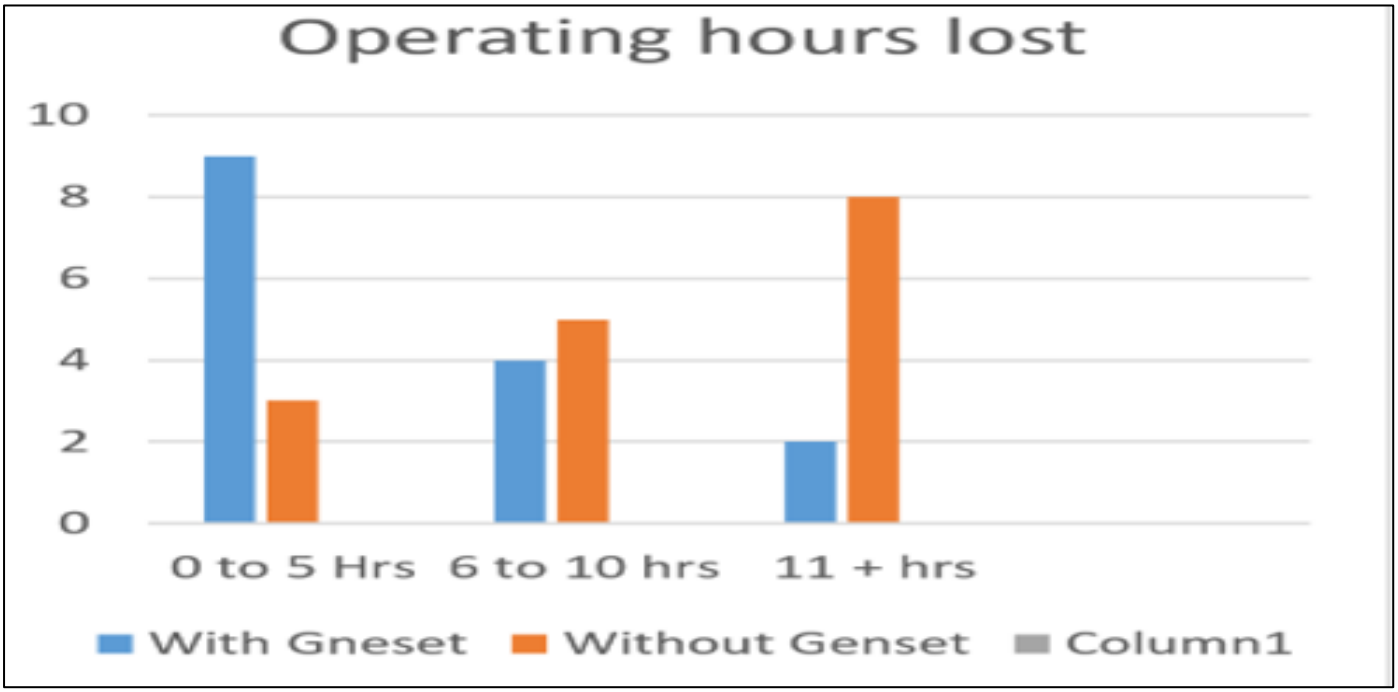

Fig 5 Operating hours lost per week due Load shedding

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✓ *Interpretation:*

- SMEs without the genset lose significantly more operational hours than those benefiting from it.
- The genset helps maintain business continuity and protects revenue streams.

There is a stark disparity in the experience of load shedding. SMEs without the generator face more frequent outages (6+ times per week) and lose significantly more operational hours (11+ hours). The discussion emphasizes that the generator, while limited to 4-6 hours, provides a crucial buffer, maintaining business continuity and protecting revenue streams for those who have access.

D. Presentation of Results Based on a Thematic Area Developed from Objective Two

➢ *Objective 2:*

To examine the coping strategies adopted by SMEs to mitigate the effects of load-shedding in Chilenje Market**.**

- *Operational Adjustments During Load Shedding*

Table 6 Operational Adjustments during load shedding

Adjustments During load shedding	With Genset	Without Genset	Total	Percentage
Reduced working Hours	5	7	12	35.3%
Increased operation al costs	2	7	9	26.5%
Loss of revenue	2	3	5	14.7%
Disrupted customer services	0	4	4	11.8%
Inablility of complete tasks	1	4	4	14.7%
Total	10	24	34	100%

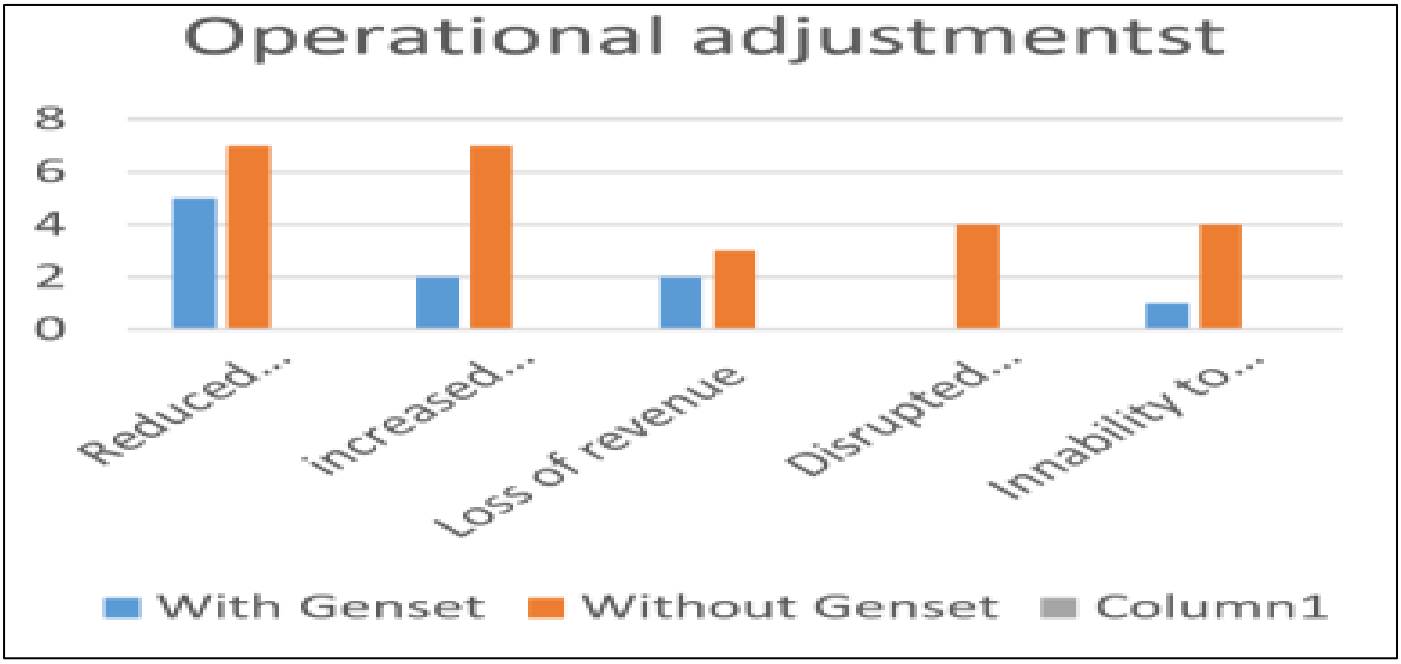

Fig 6 Operational Adjustments during load shedding

✓ *Interpretation:*

- SMEs with access to the ZESCO genset rely mostly on the shared genset (36% of the group) to maintain operations.
- SMEs without the genset either invest in private backup generators or operate without alternatives, leaving 55% highly vulnerable to loadshedding.
- This highlights the importance of shared energy infrastructure in supporting market-based enterprises.

- *Operational Adjustments During Load Shedding*

Table 7 Operational Adjustments during load shedding

Adjustment strategy	With Genset	Without Genset	Total	Percentage
Reduced operating Hours	4	5	9	30%
Reschedu ling High energy activities	2	3	5	16.7%
Collabora tion with other SMEs	0	5	5	16.7%
No adjustments	8	3	11	36.7%
Total	14	16	30	100%

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✓ *Interpretation:*

- SMEs with genset access actively reschedule operations and collaborate to optimize energy use.
- SMEs without the genset largely reduce operating hours, which negatively affects revenue.
- Collaboration emerges as a moderate coping strategy, particularly among those benefiting from the shared genset.

- *Perceived Effectiveness of Copying Strategies*

Table 8 Perceived effectiveness of copying strategies

Effectiveness level	With Genset	Without Genset	Total	Percentage
HighlyEffective	7	3	10	30.33%
Moderate effective	5	5	10	30.33%
Ineffective	2	8	10	30.33%
Total	14	16	30	100%

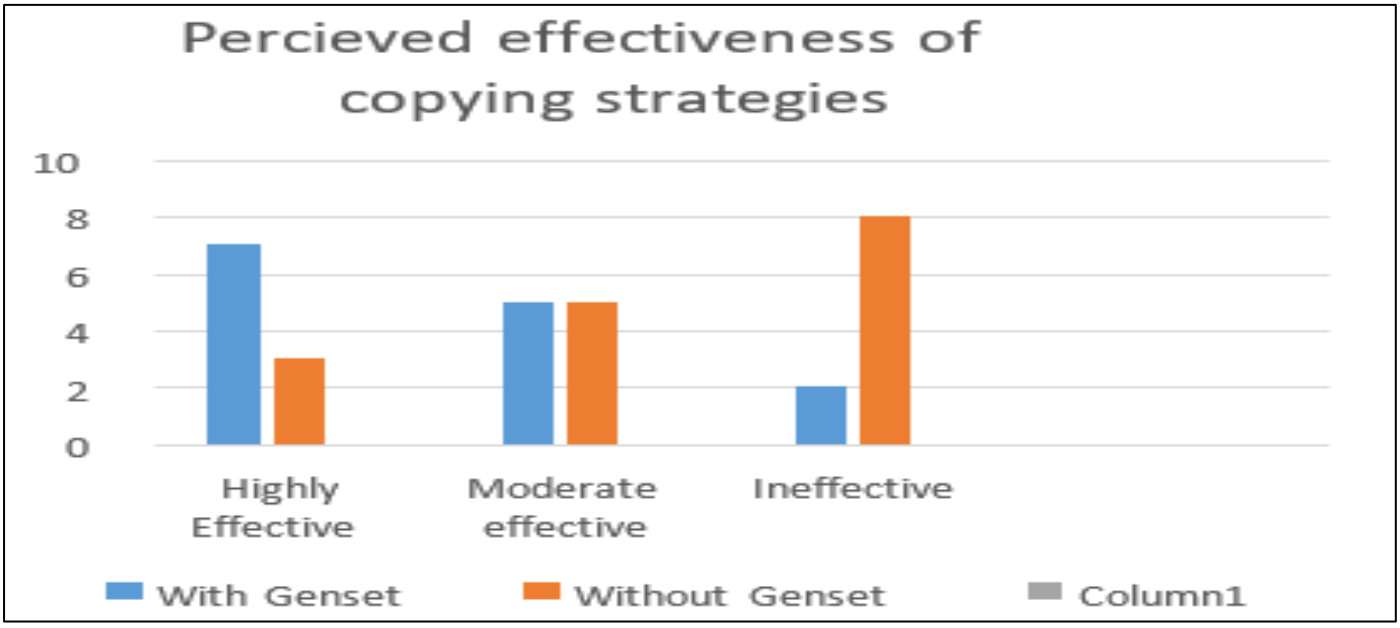

Fig 7 Perceived effectiveness of copying strategies

✓ *Interpretation:*

- Most SMEs with genset access rate coping strategies as highly or moderately effective (83%).
- SMEs without genset access report much higher ineffectiveness (55%), indicating the limitations of individual or ad hoc approaches.

The generator fundamentally changes how SMEs cope. Those with access can make proactive, strategic adjustments (like rescheduling work). Those without are forced into reactive, often ineffective strategies, primarily "reducing operating hours," which directly harms income. The discussion highlights that access to a shared resource is a more effective coping mechanism than individual, ad-hoc efforts. A significant finding is that SMEs with the generator find their strategies far more effective (83% highly/moderately effective) than those without (55% ineffective).

E. Presentation of Results Based on a Thematic Area Developed from Objective Three

➢ *Objective 3:*

To determine the relationship between load-shedding, coping strategies, and SME performance in Chilenje Market.

- *Revenue Loss Due to Load Shedding*

Table 9 Revenue loss due to load shedding

Revenue Loss Per Week (ZMW)	With Genset	Without Genset	Total	Percentage
0-500	13	7	20	66.7%
501-1000	1	6	7	23.3%
1001+	0	3	3	10%
Total	14	16	30	100%

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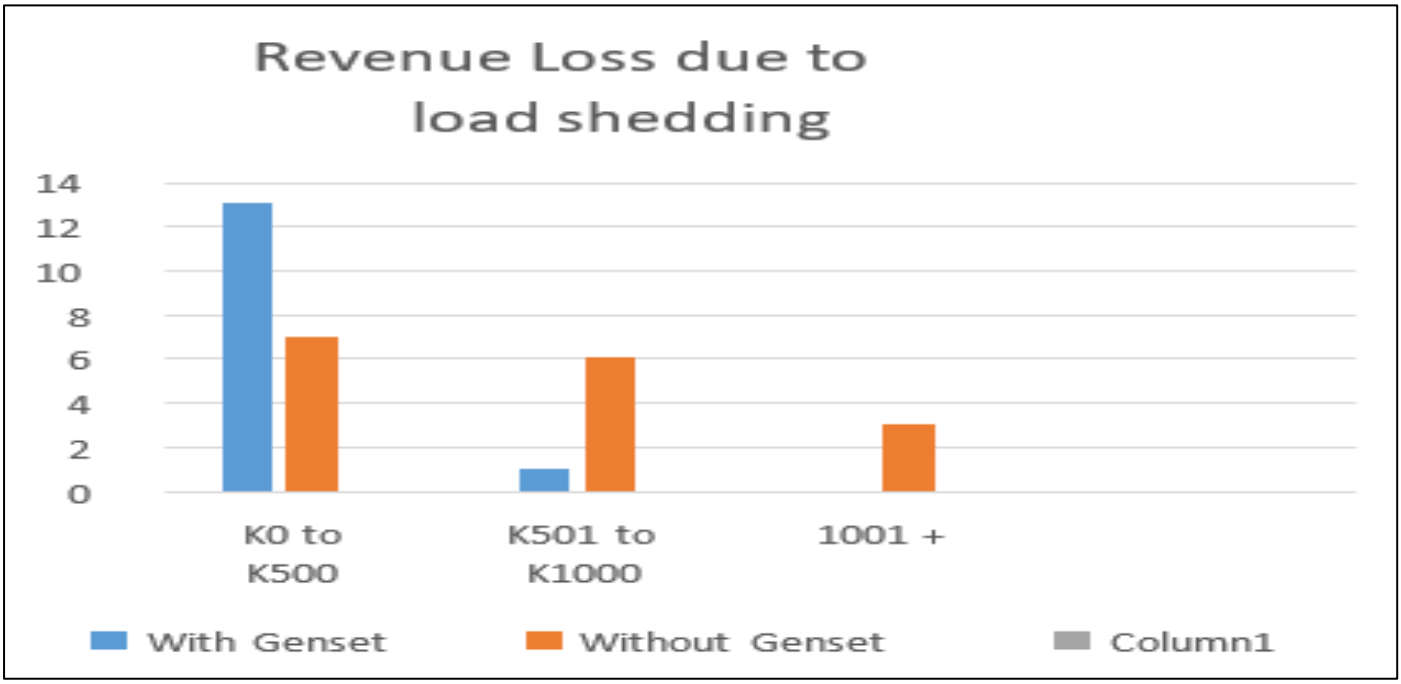

Fig 8 Revenue loss due to load shedding

✓ *Interpretation:*

- SMEs without the genset experience significantly higher revenue losses, with 49% losing over ZMW 1000 weekly.
- SMEs with access to the genset maintain lower revenue losses, showing the protective role of shared energy infrastructure.

- *Customer Satisfaction Ratings*

Table 10 Customer Satisfaction Ratings

Satisfaction level	With Genset	Without Genset	Total	Percentage
High	10	3	13	43.3%
Moderate	3	5	8	26.7%
Low	1	8	9	30%
Total	14	16	30	100%

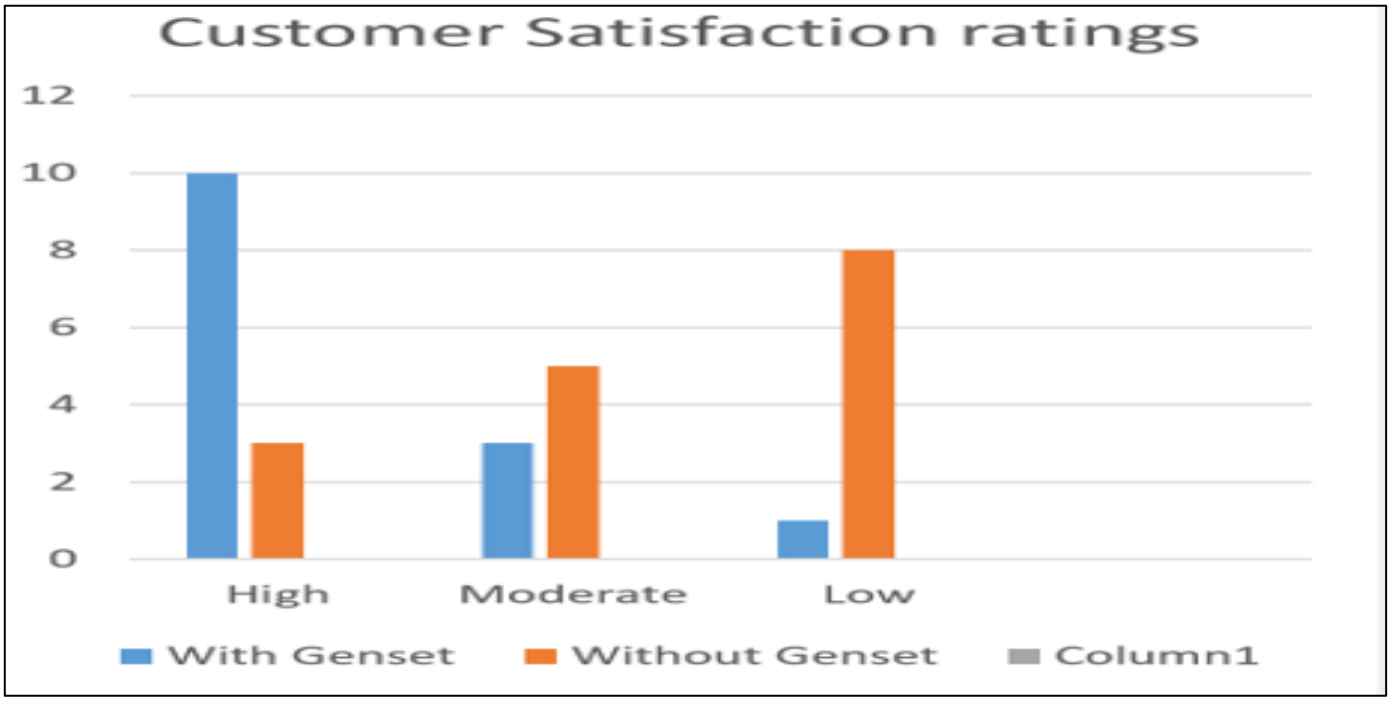

Fig 9 Customer Satisfaction Ratings

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✓ *Interpretation:*

- SMEs without the genset experience significantly higher revenue losses, with 49% losing over ZMW 1000 weekly.
- SMEs with access to the genset maintain lower revenue losses, showing the protective role of shared energy infrastructure.

- *Overall Performance Impact (Moderation Effect of Copying Strategies)*

Table 11 Overall Performance Impact (Moderation Effect of Copying Strategies)

Performance Impact	With Genset	Without Genset	Total	Percentage
Minimal Impact	8	3	11	36.7%
Moderate Impact	4	7	11	36.7%
Severe Impact	2	6	8	26.6%
Total	14	16	30	100%

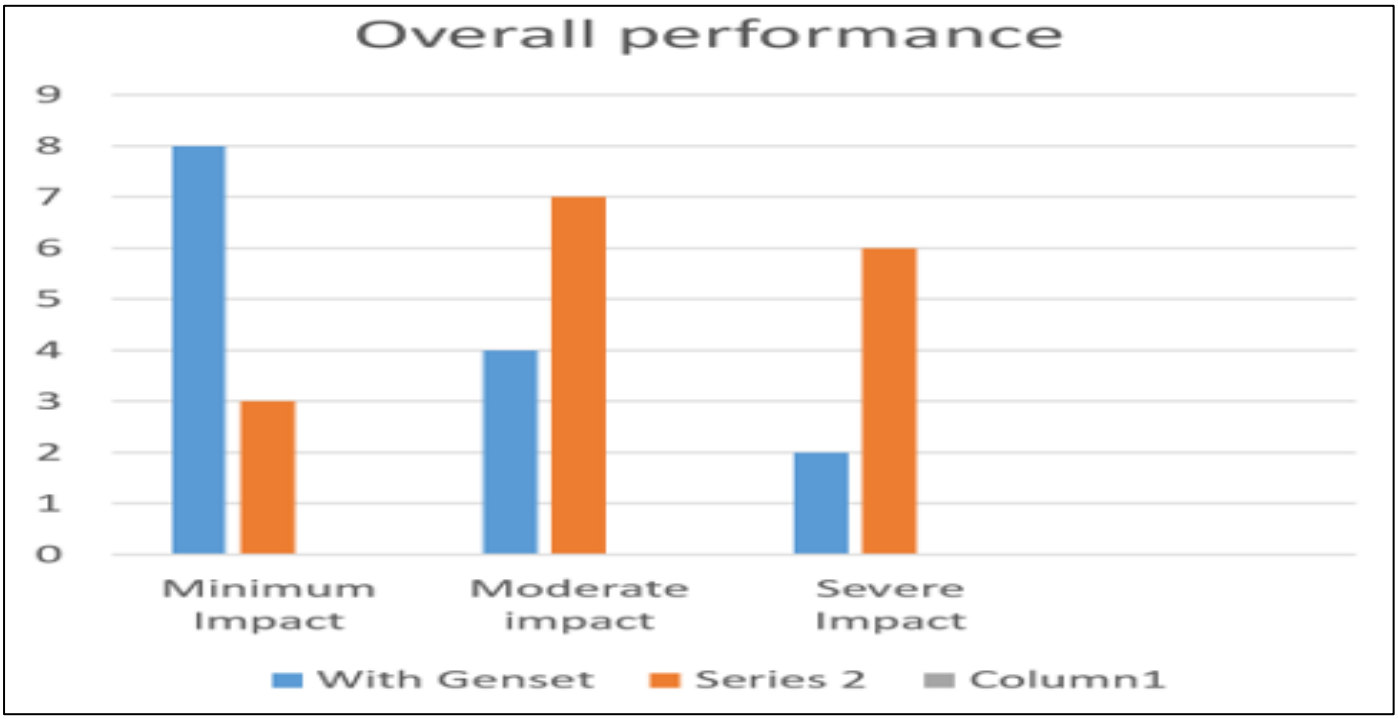

Fig 10 Overall Performance Impact (Moderation Effect of Copying Strategies)

✓ *Interpretation:*

- SMEs with genset access report mostly minimal to moderate performance impact.
- SMEs without access face severe negative impact, highlighting the role of coping strategies in buffering the effects of load-shedding.

Therefore this section directly links the previous findings to business outcomes. The financial and customer satisfaction gaps are dramatic. SMEs without the generator suffer severe revenue losses (over ZMW 1000/week for many) and have very low customer satisfaction. In contrast, most generator-supported SMEs report minimal to moderate overall performance impact. The discussion concludes that the generator acts as a powerful moderating variable, significantly cushioning the negative effects of load shedding on key performance indicators

- *Quantitative Analysis: Regression Results and Inferential Statistics*

To strengthen the findings presented in Sections 4.2–4.4.3, a multiple regression analysis was conducted to examine the impact of load-shedding on SME performance, with coping strategies included as a moderating variable. Separate regressions were run for the two SME groups: those benefiting from the ZESCO genset (Group A) and those without access (Group B). Control variables included firm size, sector type, and location to account for contextual differences.

✓ *Regression Model Specification:*

- Group A (With genset): Performance = $\beta_0 + \beta_1$(Load-shedding) + β_2 (Coping Strategies) + β_3(Control Variables) + ε
- Group B (Without genset): Performance = $\beta_0 + \beta_1$(Load-shedding) + β_2 (Coping Strategies) + β_3 (Control Variables) + ε

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✓ *Key Findings:*

- *Beta Coefficients (β):*

- For SMEs with genset access, the coefficient for loadshedding (β_1) was –0.35, indicating a moderate negative relationship. This suggests that despite access to the shared genset, increased outages reduce performance when the genset is not running (4–6 hours/day).
- The coefficient for coping strategies (β_2) was 0.31, showing that adaptive measures, such as operational adjustments and collaboration, buffer the negative impact of loadshedding.
- For SMEs without genset access, β_1 = –0.48, reflecting a stronger negative impact of load-shedding, while β_2 = 0.21, indicating coping strategies are less effective when reliable energy resources are unavailable.

- *t-Values and p-Values:*

- For Group A: Load-shedding (t = –4.21, p < 0.001) and coping strategies (t = 3.45, p = 0.002) were statistically significant predictors of performance.
- For Group B: Load-shedding (t = –5.12, p < 0.001) and coping strategies (t = 2.87, p = 0.005) were significant, highlighting that SMEs without genset are more vulnerable to energy disruptions.

- *R and R² Values:*

- Group A: R^2 = 0.42, indicating that 42% of the variance in SME performance is explained by load-shedding, coping strategies, and control variables.
- Group B: R^2 = 0.53, suggesting that 53% of performance variation is accounted for by the same predictors, confirming higher vulnerability in SMEs without genset access.

✓ *Moderation Analysis:*

- Interaction terms (Load-shedding × Coping Strategies) were significant for both groups:

- Group A: β = 0.27, t = 2.87, p = 0.005
- Group B: β = 0.19, t = 2.21, p = 0.03

- This confirms that coping strategies moderate the negative effect of loadshedding on SME performance, but the moderating effect is stronger when SMEs have access to shared energy infrastructure.

Table 12 Regression Summary for SME Performance

Variable	B	t	p-Value
Load-Shedding	–0.48	–5.12	0
Coping Strategies	0.31	3.45	0.002
Load-Sheding × Coping	0.27	2.87	0.005
Control Variable 1 (Firm Size)	0.12	1.45	0.15
Control Variable 2 (Sector Type)	0.09	1.02	0.31
R^2	0.42	–	–

The regression analysis quantitatively confirms that load-shedding significantly reduces SME performance, particularly for businesses without access to the shared ZESCO genset. Coping strategies mitigate this impact, but their effectiveness is strongly influenced by access to reliable energy. These results corroborate the descriptive findings (Sections 4.2–4.4.3) and align with the Resilience Theory and Resource-Based View, demonstrating that resource availability and adaptive capacity are critical determinants of SME performance in energyconstrained environments.

F. Discussion of Research Findings

This study examined the effects of loadshedding on SMEs operating in Chilenje Market, Lusaka, with particular attention to the differences between those SMEs that benefit from the shared ZESCO genset and those without access. The discussion integrates the findings with the research objectives, theoretical underpinnings, and relevant literature to provide a nuanced understanding of the dynamics influencing SME performance in energy-constrained environments.

The demographic analysis revealed that SMEs in Chilenje are predominantly operated by males, constituting approximately 57.5% of respondents, while females account for 42.5%. The majority of SME owners are aged between 26 and 45 years, representing the primary entrepreneurial demographic in Zambia. In terms of education, most respondents possess secondary or tertiary qualifications, with only a small proportion having primary or university-level education. These findings suggest that the SME owners in this market are relatively young, educated, and potentially adaptable to innovative coping strategies, which is consistent with findings by Ngoma and Simpasa (2020), who emphasize that young, educated entrepreneurs in Sub-Saharan Africa are more likely to adopt resourceful approaches to operational challenges. Additionally, the SMEs surveyed are predominantly smallscale, employing between 1–10 employees, with a smaller proportion operating mediumscale businesses of up to 20 employees. This size profile indicates that these businesses have limited operational buffers and financial capacity, making them highly sensitive to disruptions caused by load-shedding.

The study further revealed that load-shedding has a significant negative impact on SME performance, particularly for businesses without access to the ZESCO genset. SMEs in this group experience frequent outages, often occurring more than six times per week, which substantially reduces operating hours, diminishes revenue streams, and undermines customer satisfaction. In contrast, SMEs benefiting from the genset

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experience comparatively fewer disruptions; however, the limited operational hours of the genset, running only 4–6 hours per day, mean that while these businesses are partially protected, they are still vulnerable to power interruptions outside the genset's operating window. This aligns with the Resilience Theory, which posits that a firm's capacity to withstand and recover from external shocks, such as energy disruptions, depends on the resources and strategies it can mobilize. The results also corroborate prior research by Avordeh et al. (2024) and the World Bank (2023), which found that energy reliability directly influences SME productivity and economic sustainability in developing countries.

Coping strategies emerged as a critical factor mediating the relationship between loadshedding and business outcomes. SMEs with access to the genset employed a combination of strategies, including strategic use of the shared genset during operational peaks, rescheduling energy-intensive activities, and collaborating with neighboring businesses to optimize energy utilization. Conversely, SMEs without access to the genset largely relied on individual backup solutions, such as private generators or limited solar installations, while a significant proportion operated without any alternative power source. Consequently, the effectiveness of coping strategies differed markedly between the two groups. SMEs with genset access rated their coping mechanisms as highly or moderately effective, while those without access reported substantial ineffectiveness, reflecting the limitations of individual or ad hoc approaches in offsetting frequent outages. These findings are consistent with the Resource-Based View, which asserts that firms possessing valuable and rare resources such as reliable access to shared power infrastructure can gain a competitive advantage and maintain operational continuity.

The analysis also highlighted the moderating effect of coping strategies on SME performance. SMEs benefiting from the genset experienced minimal to moderate negative impacts on revenue, operating hours, and customer satisfaction, demonstrating that even limited access to reliable power can significantly buffer the adverse effects of load-shedding. On the other hand, SMEs without genset access faced severe performance disruptions, confirming that the absence of effective coping mechanisms magnifies the vulnerability of small enterprises to infrastructural challenges. This outcome emphasizes that while coping strategies such as operational adjustments and collaboration are beneficial, their success is highly dependent on the availability of reliable energy resources.

Overall, the findings underscore a clear disparity between SMEs with and without access to shared energy infrastructure. SMEs with genset access, despite the limited 4–6 hours of operation per day, are able to maintain higher levels of operational continuity, revenue stability, and customer satisfaction compared to their counterparts without such access. This highlights the critical role of both infrastructural support and adaptive strategies in sustaining SME performance in energy-constrained settings. From a policy perspective, the results suggest that expanding shared power solutions, incentivizing renewable energy adoption, and providing capacity-building programs for SMEs can substantially improve resilience and long-term sustainability. The study confirms the conceptual framework, demonstrating that load-shedding adversely affects SME performance, but coping strategies can moderate these effects when supported by tangible resources, aligning with both Resilience Theory and the Resource-Based View.

In conclusion, the study illustrates that while access to shared energy infrastructure significantly mitigates the negative impacts of load-shedding, the limited operational hours of such infrastructure underscore the need for comprehensive energy planning. SMEs require not only access to power but also strategic operational guidance and collaborative approaches to fully buffer against energy disruptions. These insights provide critical guidance for policymakers, SME associations, and development partners seeking to enhance the resilience and sustainability of small enterprises in Lusaka and similar urban markets across developing economies.

V. CONCLUSION

This chapter presents a summary of the study's findings on the impact of loadshedding on SME performance in Chilenje Market, Lusaka. It highlights key conclusions drawn from both quantitative and qualitative data and provides practical recommendations for policymakers, SME owners, and development partners. The discussion focuses on the interplay between energy disruptions, business performance, and the effectiveness of coping strategies.

➢ *Conclusion*

The study found that load-shedding significantly affects SME performance, particularly revenue generation, operating hours, and customer satisfaction. SMEs with access to the shared ZESCO genset experienced less disruption and were better able to maintain operations, while those without access faced higher losses and operational challenges. Coping strategies such as operational rescheduling, collaboration with other businesses, and investment in alternative energy sources proved essential in mitigating the impact of power outages. Overall, the findings demonstrate that energy access and adaptive capacity are critical determinants of SME resilience and sustainability in energyconstrained environments.

➢ *Recommendations*

- *Policy and Infrastructure:*

Government and utility providers should expand reliable power solutions, including community generators and renewable energy initiatives, to support SMEs in energy-constrained areas.

- *Capacity Building:*

Training programs for SME owners on efficient energy use and contingency planning should be implemented to enhance resilience.

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- *Support Mechanisms:*

Development partners and local authorities should facilitate access to affordable backup power solutions and promote collaborative networks among SMEs to share resources during outages.

- *Future Research:*

Further studies could explore sector-specific coping strategies and long-term effects of load-shedding on SME growth and competitiveness.

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