Research Paper

The Effect of Power Outages on Small- and Medium-sized Enterprises in South Africa

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Abstract

The frequent power outages in South Africa have had a detrimental impact on the nation's economy overall and on small and medium-sized enterprises in particular. The goal of this study is to determine how load shedding affects small- and medium-sized enterprises (SMEs) in South Africa. The research design pinpoints practical ways to reduce the negative effects of power outages on these companies. This study adopts a quantitative research approach. Fifty SME owners and managers from the Mahikeng local municipality were selected to represent the entire country using a descriptive single cross-sectional design and a non-probability convenience sample technique. The Statistical Package for the Social Sciences (SPSS), Version 27.0, was used to evaluate the collected data. The findings of the study indicate that load shedding has caused significant operational problems for South African small enterprises since 2008. As a result, to maintain output, many companies have had to make adaptations, including establishing backup power solutions and moving to manual labor. SMEs continue to face significant challenges because of the high cost of backup systems, the increase in criminal activity during blackouts, and the requirement for open and positive customer relations, despite efforts to mitigate these consequences. The present study underscores the criticality of SMEs' investments in crime prevention strategies and dependable backup power systems in Mafikeng and throughout South Africa to mitigate the adverse impacts of ongoing load shedding on commercial operations and economic stability. It is underlined that maintaining client confidence and ensuring continued business performance despite these challenges requires effective customer relationship management.

Keywords: *Effect; Electricity; Load Shedding; Economy; SMEs; Backup Power Supply*

INTRODUCTION

Around the end of 2007, South Africa experienced the first recurring series of nationwide power supply outages known as load shedding. The government-owned Eskom, which produces and distributes energy in South Africa, was forced to implement load shedding because there was not enough coal available to meet the country's high demand for energy and there were too many trips at various stations. The rising demand for electricity persisted, and in 2008, a measure was put in place to balance the supply of electricity with the rising demand and avoid a system-wide blackout (Lenoke, 2017). Due to the inability of Eskom to produce sufficient electricity, many small and medium-sized enterprises (SMEs) were forced to invest a significant amount of money on backup power solutions like generators, which these enterprises still make use of today (Schoeman dan Saunders, 2018). Trace (2020) argued that Level 6 load shedding was introduced for the first time in 2019 and that load shedding became a daily occurrence with power disruptions exceeding 530 hours in December 2019 and early January 2020. Businesses in the manufacturing sector cannot continue with operations during load shedding. Therefore, they experience loss of profit. A power outage can delay a company's daily operations. This can lead to significant revenue loss when the company cannot meet consumer demands and orders, which can cause product shortages.

Because frequent load shedding causes SMEs to suffer large losses, it is imperative that these companies update their technology to lessen the effects. Chibaro et al. (2024) asserted that although modern technology is commonly believed to benefit large organizations with substantial financial resources, studies have demonstrated that it can also be advantageous for smaller

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businesses. The economic and operational difficulties that businesses face worldwide have been thoroughly examined in earlier studies on the effects of power outages, with an increasing amount of research concentrating on developing countries. According to studies like Cissokho (2019) in Schoeman and Saunders (2018) in South Africa, frequent power outages reduce productivity, disrupt supply chains, and raise operating expenses for SMEs. The vulnerability of SMEs is worsened by high energy costs and irregular supply, as evidenced by existing research, which leaves gaps in our knowledge of how these businesses innovate and adapt to these difficulties. By focusing on the complex impacts of power outages on SMEs in South Africa—a nation dealing with one of the worst energy crises in the world—this study makes a unique contribution. This study fills a gap in the literature by focusing on the socioeconomic backdrop of these businesses and offers practical advice for reducing the effects of energy instability. This research stands out as a significant improvement in understanding the relationship between energy dependability and SME sustainability in South Africa because of its unique methodologies and focus on real-time data and sector-specific dynamics.

A force behind productive activities that support economic progress in the country is the availability of electricity. SMEs are usually believed to operate more effectively when they have access to a consistent electrical supply. Schoeman and Saunders (2018) found that most businesses that suffer from power outages are small, particularly those in low-income areas that cannot afford to install backup generators. Small firms must purchase backup generators of their own to guarantee an electrical supply, but these are frequently more expensive than energy from the grid. This is because generators require technical know-how, fuel, and spare parts, all of which can be expensive for certain SMEs. This study attempts to determine the impact of load shedding on SMEs in South Africa to analyze its crucial role in the expansion and development of a nation's economy. The goal of this study is to close the information gap regarding the effect of load shedding on SMEs. Thus, addressing the electricity supply issues is crucial not only for the survival and growth of SMEs and the overall economic stability and progress of South Africa.

LITERATURE REVIEW

To produce a thorough summary and synthesis, a literature review carefully studies and examines all available data on a particular topic of research, in addition to gathering individual reviews of books and papers. This study will adopt the model developed by Goldberg (2015), which describes the impacts of load shedding on retailers.

Impact of Load Shedding on Small- and Medium-sized Enterprises

The performance of SMEs is negatively impacted by load shedding because of their substantial electricity dependency. Load shedding negatively impacts small businesses by disrupting their operations, which lowers output, damages equipment, and lowers the quality of their products (Darko et al., 2014). SMEs lose revenue and output when power goes out, but they also lose wireless fidelity (Wi-Fi), which requires electricity and cannot connect to the network. As a result, these small businesses cannot send quotes, invoices, or other documents to their clients and partners or obtain critical information. Dewa et al. (2020) contend that during power outages, scheduled tasks that rely on energy may be interrupted, resulting in delays in client orders. An unreliable power supply could reduce the output of an organization and increase expenses due to maintenance, damage, and the requirement to purchase extra power sources. Assyofa et al. (2024) stated that the bulk of SMEs must nevertheless pay their employees' salaries and other essential business expenses even though they are unable to buy generators, inverters, or other alternative electricity power supplies to survive load shedding. Gustav (2020) stated that businesses located along main thoroughfares are particularly impacted by power outages because they are unable to

operate traffic lights. These highways experience heavy traffic congestion, which causes SMEs to lose clients or staff members to arrive late for work. Due to their lack of infrastructure and security, some small businesses are forced to close during load shedding because they cannot continue operating during power shortages.

Alternative Electricity Costs for Small Businesses During Load Shedding

Operating costs are rising across a variety of industries as small business owners are compelled to spend more money on alternative solutions for minimizing the effect of regular blackouts and experience decreased production levels that strain margins and lower profitability. Goldberg (2015) pointed out that most SMEs only backup the most crucial parts of their operations because backup power is more expensive than power from the South African electrical public utility (Eskom). Schoeman and Saunders (2018) stipulated that alternative energy investments reduce profit margins and enable expansion, which would be advantageous in creating more jobs. The initial cost of electricity generators and small Uninterruptible Power Supplies (UPS) is high, but their energy output is comparatively low. Because the costly petrol and diesel generators run on raise operational expenses, restrict the amount of capital a business can access, and damage the environment due to their high petrol emissions, generators are not the most efficient source of electricity. Large sums of money are spent on fuel, even if it is not a continuous expense, to run generators and buy generating capacity. For example, some supermarkets, like Shoprite, charge high monthly diesel costs that can reach R560 million over six months. Due to the energy-intensive nature of their cold chains, food retailers must employ generators; nevertheless, the cost of doing so is reportedly at least five times higher than that of using grid electricity (Darko et al., 2014).

Mitigation Measures for Small Businesses to Implement during Load Shedding

Many SMEs require an alternative source of power to enable them to continue functioning, which increases operating costs. The main tactic employed by SMEs to mitigate the consequences of load shedding is the deployment of a standby generator, which is followed by operational modifications and reduced hours (Henni, 2024). Certain mitigating solutions, such as generators, incur maintenance and operational expenses because of the fuel required to run them. Rechargeable batteries are housed in a single unit to form uninterruptible power sources. They usually last for five hours and provide surge protection, which shields electronics from damage because the power supply is not cut off. A solar Photovoltaic (PV) system with battery backup is an appropriate option if the company has a large roof area. Bensch (2019) stipulated that the most preferred alternative energy source is solar power; however, majority of small business owners are unaware of where or how to start looking for this solution to severe power outages in South Africa. Solar power systems incorporate energy from solar panels, batteries, and Eskom. In addition, they have no future expenses because they are not affected by Eskom or petrol prices. There is also no air pollution, little maintenance, and less noise than generators. Banderker (2022) indicated that to help South Africans stay informed about the load-shedding schedule, small business organizations can minimize the consequences of the schedule by planning their activities around it. The EskomSePush app was created in the midst of the severe power disruption. SMEs can use cloud-based business solutions to sustain productivity.

How Small Businesses Operate During Power Outages

Businesses in townships and rural areas, where there is typically a lack of knowledge, restricted access to alternative energy alternatives, and affordability limits, face particularly severe challenges during power outages. Some small businesses are forced to close for a considerable portion of the day due to load shedding, which negatively impacts their earnings and revenues

(Darko et al., 2014). Instead of stopping production, several SMEs have implemented strategies to maintain it. The most sensible course of action is to plan their days around load-shedding, since many small businesses cannot afford alternate power sources. During power outages, they use a head torch or cap that is fastened to their heads so that they can move around the office area with ease (Banderker, 2022). Small businesses need to discover other ways to run their operations to survive and stay in business. This involves investing in renewable energy sources, ultimately raising running expenses. Small business owners should install electricity backup generators to prevent service interruptions, even if this increases their operational expenses (Makgopa and Mpetsheni, 2022). Many firms employ backup sources to minimize operations and productivity loss; however, the production schedule needs to be changed to align with Eskom's load-shedding timetables. Maintaining corporate operations, preserving customer loyalty, and fostering trust will all be achieved by keeping customers informed of load-shedding-related concerns and outlining the steps the company is taking to mitigate their consequences through communication.

Model Description of the Impact of Load Shedding on SMEs.

Goldberg (2015) developed a model to describe the effect of load shedding on small businesses. This model indicates that the degree of impact is frequently substantial, interfering with day-to-day activities and resulting in lower output. During load-shedding periods, firms either run at reduced capacity or cease operations completely, resulting in significant revenue losses. These monetary losses make it more difficult for SMEs to invest in expansion plans and sustain long-term operations. Although mitigation techniques are important, they often only offer short-term comfort and can be expensive. Therefore, in areas where load-shedding problems are ongoing, the capacity of SMEs to prosper and make positive contributions to the overall economy is severely hindered. The model describing the impact of load shedding on SMEs, as proposed by Goldberg (2015), is depicted in Figure 1.

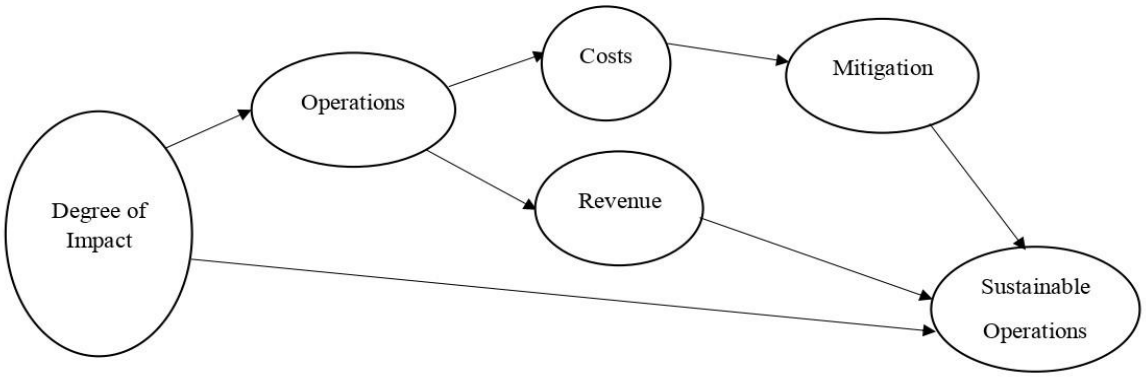

Figure 1. Model Description of the Impact of Load Shedding on Small and Medium Enterprises
Source: Goldberg (2015)

According to Goldberg (2015) model description of the effect of load shedding on SMEs, as portrayed in figure 1 above, load shedding has a huge impact on small businesses in South Africa. The degree of impact is the independent variable that characterizes the reason behind load shedding on SMEs. The two main aspects that form the basis of this concept are revenue and costs. The costs caused the business' profitability to decline, and the most significant costs were related to mitigating the effects of load shedding, which requires significant capital investments and

variable operating expenses to provide backup power generation when load shedding occurs. In the absence of load shedding, SMEs will be able to continue functioning without incurring additional expenditures, and since their operations will be sustainable, more employment will be created. The majority of SME owners have little control over what occurs to their companies, but they do have some control over how they respond to difficult situations.

RESEARCH METHOD

This study employs a quantitative research approach, adopting a descriptive single cross-sectional design with non-probability convenience sampling. Kesmodel (2018) describes such studies as capturing data from a population sample at a specific time point. Conducted in the North West province, specifically Mafikeng Local Municipality, the study focuses on SME owners and managers who face load-shedding challenges, reflecting issues similar to those experienced nationwide. According to Stats SA (2020), there are 79,203 small businesses in the West and 2.4 million SMEs in South Africa. Although this study involves only 50 SMEs in Mafikeng, the findings are considered representative of SMEs across the region. Conducted in 2023, this study examined the effects of power outages on SMEs in South Africa, focusing on variables such as customer satisfaction, financial performance, and operational efficiency. Metrics like supply chain disruptions, additional costs for backup power, and production delays assessed operational efficiency, whereas service delivery delays, customer retention, and complaints evaluated customer satisfaction (Bhattacharya et al., 2021). Measurement items were adapted from existing literature to ensure validity and reliability within the South African SME context, highlighting the extensive impact of power outages on business viability.

The officially recognized SMEs in the Mafikeng local municipality region of the North West province of South Africa, as recorded by the national supplier database of the nation, comprised the study target population. Using a non-probability sampling technique, 50 business owners and small business owners made up the sample. Because this study used a quantitative research design, the distribution of questionnaires served as the main means of gathering data. Mupfiga et al. (2024) found that because it offers structure, frequently yields numerical data, can be administered without the researcher's presence, and is frequently extremely easy to analyze, the questionnaire is a popular and practical technique for collecting survey data. Survey data revealed trends between sizable groups and respondents' assessments of how power interruptions affect SMEs in South Africa. The primary instrument used to gather comprehensive data from the participants was a closed-ended survey. The questionnaire was administered to the managers and owners of 50 SMEs, and the completed forms were subsequently collected. The Statistical Package for the Social Sciences (SPSS), Version 27.0, was used to evaluate the collected data. On the empirical datasets, the following statistical techniques were applied: significance testing, descriptive analysis, validity analysis, and reliability analysis. SPSS was also used to examine the profile of the participants and their responses to different survey statements, which helped to provide a more detailed description of how the study was developed.

FINDINGS AND DISCUSSION

The data analysis software SPSS version 27.0 was used to evaluate the data collected from the participants. For this investigation, demographic data on the managers and owners of SMEs in the Mafikeng area were gathered. Fifty owners and managers of SMEs who completed the questionnaire and participated in the study were included in the demographics. The majority of managers and owners of small businesses in Mafikeng have been in operation for less than five years, according to the demographic data gathered from the 50 survey participants. This section presents the results, including the sample profile of respondents who are the 50 SME owners and

managers, descriptive statistics of the data collected, a summary of the findings and the validity of the scales supplied in the questionnaire.

Reliability results

The validity and reliability of a questionnaire designed to collect participant perceptions about how power outages affect SMEs in the Mafikeng local municipality and throughout South Africa were assessed using a reliability test. Through expert evaluations and pilot testing with a sample of SME owners and managers, the methodology established construct validity and content validity and verified that the questions accurately addressed concerns such as financial losses and operational interruptions. The test-retest procedure, which entails having individuals complete the questionnaire twice over the course of two weeks, was used to further assess reliability. Strong internal consistency was found when consistency was assessed using Cronbach's alpha. To guarantee impartial interpretation, inter-ratter reliability was further examined by having many independent ratters assess the responses.

Fifty small business owners and managers operating in the Mafikeng Local Municipality comprise the sample profile of respondents in this study. These participants were chosen with care to offer thorough insights into how power outages affect small enterprises and come from various industries. A organized questionnaire that was intended to gather comprehensive data on their experiences, difficulties and coping mechanisms despite frequent power outages. A comprehensive analysis of respondents' demographics, business attributes, and operational effects is provided by the findings, which are compiled in Table 1. This approach provides a nuanced understanding of the ways in which power outages impact several aspects of business operations. A deeper comprehension of the trends and patterns in the responses is made possible by this tabular arrangement.

Respondent's Profile

The demographic data for the 50 owners and managers of small- and medium-sized enterprises (SMEs) that participated in the Mafikeng research are detailed in the table above. Important elements of the participants' business characteristics, such as the number of years they have been in the industry and the size of their workforce, are highlighted by the demographic data. Interestingly, the results show that 98% of the respondents actively run or own small businesses, demonstrating a high level of awareness of the difficulties SMEs in the area confront. A very small percentage of entrepreneurs with medium-term expertise in running and maintaining their enterprises is indicated by the fact that just 14% of these individuals have been in business for more than five years but less than 10.

Table 1. Respondent Profile

Gender (%)		**Race (%)**		**Highest qualification**		**Length of business in operation (%)**		**Number of employees (%)**	
Male	38	African	98	Below Matric	4	<5 years	76	1-5	66
Female	58	White	2	Matric	36	5 to 10 years	14	6-10	16
		Colored		Diploma	6	10 to 15 years	2	11-15	6
		Indian		Degree	42	>15 years	6	16-25	6
		Other		Postgraduate	10			26-40	4
Missing	2 (4%)			Missing	1 (2%)	Missing	1(2%)	Missing	1 (2%)
Total	48 (96%)		50 (100%)		49 (98%)		49(98%)		49 (98%)

Furthermore, only 16% of these SMEs have employees, indicating their modest operational scale and frequently reducing their capacity to withstand more significant economic shocks. These results highlight the fact that most Mafikeng SME managers and owners have been operating their companies for less than five years. This implies that the majority of these business owners are still learning how to navigate the intricacies of the business world, and they are comparatively new to the entrepreneurial scene. These owners' minimal expertise makes them potentially vulnerable to outside issues like power outages, because they might not have the institutional knowledge or resources necessary to implement effective mitigation procedures. The findings demonstrated that the questionnaire is a trustworthy instrument for obtaining insightful information about how power outages affect SMEs, as depicted in table 1.

Table 1. Results of reliability test

Cronbach's Alpha	N of Items
.845	20

Oktavia et al. (2018) asserted that if measurement validity reflects measurement precision, instrument reliability reflects the consistency of scores obtained using the instrument. When Spearman first coined the term "reliability" in 1904, he defined it as the ratio of the true score variance to the observed score variance. Frost (2023) emphasized that Cronbach's alpha measures the reliability of a set of survey items. High Cronbath alpha values indicate that the response values for each participant across the set of questions is consistent and acceptable. Low values indicate that the set of items used is not reliable for measuring the same construct. The common rules of thumb are as follows: 0.7 or above is good; 0.8 or above is very good; 0.9 or above is excellent; values greater than 0.95 may indicate redundancy, and values lower than 0.5 are unacceptable. After calculating the results using Cronbach's alpha, the outcome was 0.845, which is very good and acceptable. A high Cronbach's alpha value of 0.845 indicates that the response values for each participant across the set of questions were consistent because the participants provided high responses for the items. This consistency indicates that the measurements are reliable and that the items may measure the same characteristic.

Descriptive results

The primary characteristics of the information gathered from questionnaires intended to gather the opinions of participants on the effects of power outages on SMEs in the Mafikeng local municipality and throughout South Africa were summed up and described through a descriptive analysis. For this analysis, significant variables such as the frequency and length of power outages, the degree of operational disruptions, monetary losses, and the coping mechanisms used by SMEs were calculated, along with their means and standard deviations. The results of the descriptive statistics are depicted in Table 2.

Table 2. Descriptive statistics of the questionnaire responses

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std Deviation
This business sends email alerts to customers with updates of how their orders and appointments may be affected by load shedding	50	1	4	2.92	.877
This enterprise has set up online	50	1	4	2.84	1.076

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std Deviation
ordering system so that orders do not need to be placed in person during power outages					
Our business offer discount or vouchers for future purchases as a way of compensating for any incomvenience or poorservice delivery cause by load shedding	50	1	4	2.68	.978
This enterprise is building strong relationships with its customers to cooperate to overcome the future electricity problems such as load shedding	50	1	4	3.42	.702
Valid N (listwise)	50				

Because load shedding makes it more difficult for small businesses in Mafikeng to operate, managers and owners of SMEs must find innovative solutions to respond to enquiries from their clients. From Table 2 above, a mean score of 3.42 demonstrates that the majority of SME owners and managers agree that they are fostering solid relationships with their clients to work together and resolve any potential electricity-related issues. With a mean score of 2.68, small business owners and managers had no opinion regarding their company providing discounts or coupons for future sales to make up for any inconvenience or unsatisfactory service provided as a result of load shedding. The findings suggest that a notable segment of SMEs experienced regular and extended power disruptions, resulting in substantial operational difficulties and financial losses. This investigation provides a thorough overview of the widespread and complex effects of power outages on the SME sector in the region. Common coping techniques included investing in backup generators and modifying working hours.

Operations of small businesses: Small business managers and owners were happy with Eskom's electricity supply before load shedding. Small business operations and performance have suffered since load shedding was implemented in 2008 and have continued ever since. To maintain business operations during power outages, SME owners and managers proactively plan and implement backup power supplies. These companies have shifted the majority of their activities to manual labor and non-electric machinery to maintain production and profit margins during load shedding. Businesses that cease operations and shut down during load shedding may not be able to turn a profit in the long run, and some may close entirely. This will increase unemployment and have a negative impact on the economy of South Africa.

Reducing the high level of crime: The Mafikeng area has a high crime rate, particularly at night while load shedding is in effect. The majority of business owners does not have a battery-operated alarm system that would notify them in the event of a crime occurring within their establishment during load shedding. This suggests that because most small businesses do not have alarm systems installed, they are vulnerable to theft and a high degree of crime. More intriguingly, however, is that several managers and owners of small businesses have employed security guards permanently to monitor and protect their properties during load shedding, which also helps to lower the high crime rate in the Mafikeng area.

Backup electricity supply: The majority of Mafikeng's small business owners and managers who participated in the study claimed to have experienced a loss of productivity, which led them to temporarily close and ultimately resulted in income loss. SME owners and managers must maintain

that power disruptions harm their gadgets and necessitate expensive repairs or replacements. SMEs possessing solar panels and backup generators have requested financing from banks associated with backup or renewable energy suppliers so that they can acquire alternative energy solutions at reduced cost. Small businesses can reduce load shedding by implementing various backup supply options, such as LED solar lights, electrical generators, power banks, and routers. The issue for this backup power source is that most SMEs cannot afford it because of its high cost. The majority of small businesses are occupied with building up their funds to buy backup systems later on.

Customer demands and enquiries: Consumers are important to SMEs because they generate revenue, which is necessary for the survival and expansion of a company. Businesses cannot survive operations or prosper in a competitive market without a consistent consumer base. Building strong relationships with their clients is the main emphasis of SMEs owners and managers to guarantee customer retention and repeat business. This entails keeping channels of communication open, providing top-notch goods and services, and establishing a satisfying client experience that encourages steadfastness and confidence. By doing so, SMEs may set themselves apart from rivals and build a devoted clientele that fosters long-term success. SMEs must quickly react to changes in the market and client needs. Being open and honest with clients regarding any operational modifications, such as those brought on by load shedding, is part of this. SMEs can preserve customer trust and satisfaction by proactively informing customers about how load shedding impacts business operations and the steps that have been taken to alleviate these effects. Notifying clients of such modifications demonstrates dedication to dependability and high-quality service, which is essential for maintaining good client relations and guaranteeing ongoing business despite external obstacles.

Since 2008, load shedding has caused serious operating issues for small businesses in South Africa. While SMEs were initially content with Eskom's electricity supply, they have since had to adjust and use backup power options like solar panels and generators, to keep their businesses running. To preserve profitability and productivity, many small businesses in South Africa have switched to manual labor and non-electric machinery. Despite these initiatives, there is still a risk of business closures due to power outages and the high cost of backup systems, which might raise unemployment rates and have a detrimental effect on the economy. Load shedding has made crime rates worse, especially in places like Mafikeng, where businesses are more susceptible to robbery due to a lack of battery-operated alarm systems. By employing security guards to patrol their properties during blackouts, some SMEs have lessened this danger and contributed to a decrease in crime. SME owners place a high priority on open communication and openness regarding operational changes brought about by load shedding to preserve customer satisfaction and loyalty. Despite the difficulties brought on by power outages, SMEs can maintain long-term success by building consumer confidence and providing top-notch services.

DISCUSSION

The findings of this study broaden the conversation on how infrastructure issues affect SMEs in South Africa and offer important new insights into the complex impacts of power outages on SMEs in the country. It appears that most SME owners and managers in Mafikeng and in extension, in South Africa lack the institutional expertise and resources necessary to handle significant external shocks, like power outages, given the preponderance of small enterprises with less than five years of operational experience. This finding supports Amankwah-Amoah and Sarpong (2016) findings that younger businesses are more susceptible to infrastructural deficiencies. This study supports results by Fatoki (2018) and Mutambo et al. (2023) about the financial losses and

operational problems SMEs face during power outages. However, by examining the demographic traits and distinctive coping strategies of SME owners and managers in Mafikeng, this study introduces something new. One adaptation technique that is in line with the ideas of dynamic capacities theory is the use of manual labor and non-electric machinery, along with investments in solar panels and backup generators (Fernandes et al., 2017). By demonstrating that SMEs with limited resources must innovate within their limitations to ensure operational continuity, this study broadens the theoretical framework.

Businesses that have access to valuable, uncommon, and nonreplaceable resources maintain a competitive edge, according to Barney (1991). The results show that the absence of dependable electricity in Mafikeng poses serious problems for SMEs, limiting their capacity to grow and make efficient use of their resources. This study emphasizes how resource scarcity influences operational outcomes in rural and semi-urban contexts, in contrast to studies that focus on urban SMEs with access to a variety of resource pools. The results also lend credence to institutional theory, especially regarding the role of external institutional frameworks in addressing infrastructure issues. The lack of strong institutional assistance for dealing with power outages highlights the gaps in public-private cooperation required to keep SMEs afloat in underprivileged areas. This is consistent with Yıldırım and Gökalp's (2016) work, which highlighted how institutional contexts impact economic performance. The study urges institutional changes to help SMEs in areas such as Mafikeng and South Africa, at large, have more affordable access to renewable energy options.

The socioeconomic effects of power failures, such as increased crime rates during blackouts, are further clarified by the study. This is in line with earlier studies by Obokoh and Goldman (2016), who emphasized how infrastructure deficiencies lead to more significant societal issues. The questionnaire utilised in this study has a high reliability score (Cronbach's alpha = 0.845), which confirms that it successfully captures the complex effects of power outages on SMEs. Future research assessing comparable issues will be held to a higher standard by the methodological rigor, which includes inter-rater reliability tests and pilot testing. This study enhances research designs for examining operational and infrastructure difficulties in SMEs by emphasizing methodological strengths. Therefore, this study advances the understanding of how power outages affect SMEs by situating its findings within a broader theoretical and empirical discourse. This study highlights the intersection of resource dependency, institutional inadequacies and adaptive strategies in shaping SME resilience. By addressing the unique challenges faced by SMEs in Mafikeng, this research underscores the importance of local policy interventions and resource allocation. Future research could build on these findings by exploring comparative analyses across different regions to develop a more comprehensive understanding of the challenges facing SMEs.

CONCLUSIONS

The purpose of this study was to examine how power interruptions affect the sustainability and operations of SMEs in South Africa, with an emphasis on Mafikeng. The report emphasizes the serious disruptions caused by load shedding, such as decreased output, financial losses, and increased operating expenses, as a result of the need to employ alternate power sources. Businesses find it difficult to adjust to inconsistent energy supply, especially those with less than five years of operational experience. This affects their competitiveness and profitability. While SMEs attempt to lessen these consequences by investing in backup solutions and altering operational procedures, this study shows that these efforts frequently lack long-term sustainability by examining these impacts through the prism of resource-based and dynamic capabilities theories. This study highlights the importance of institutional support and resource availability in determining the resilience of SMEs to external shocks and adds to the theoretical conversation. From a practical standpoint, the study emphasizes how urgently targeted actions are needed to increase SMEs'

resistance to power disruptions. To overcome load-shedding challenges, SMEs are encouraged to prioritize investments in renewable energy solutions, obtain funding through alliances with energy suppliers, and implement adaptable operating plans. Financial institutions should create specialized finance structures for SME energy investments, and policymakers should create supportive frameworks that encourage infrastructure upgrades and make it easier for people to obtain affordable renewable energy. Therefore, enhancing security during blackouts can lessen the socioeconomic risks associated with increased crime.

LIMITATION & FURTHER RESEARCH

The methodology of this study has several limitations that affect how its results should be interpreted. Capturing the temporal fluctuations and changing nature of power outages and their impact on SMEs is limited by the use of cross-sectional data. Despite being representative, the sample size may not adequately represent the variety of SMEs in various industries and geographical areas, which could limit the broad application of the findings. Self-reported questionnaires were used to gather data, which increases the possibility of response bias because respondents may overestimate or underestimate how much an outage has affected their business operations. The relevance of the study to other economic and infrastructure contexts is limited by its focus on South African SMEs, which may have an impact on how the results are interpreted more broadly in other areas. These deficiencies should be addressed in future studies using mixed-method approaches to provide deeper insights, extend the sample to include additional industries and locations, and use longitudinal data to evaluate changes over time.

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