Mabunda *et al.*
Journal of Innovation and Entrepreneurship (2023) 12:57
https://doi.org/10.1186/s13731-023-00327-7

Journal of Innovation and Entrepreneurship

RESEARCH Open Access

The effects of loadshedding on small and medium enterprises in the Collins Chabane local municipality

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Abstract

South Africa is at present experiencing electricity shortages resulting in loadshedding. Loadshedding is the action from an electricity supplier (Eskom) of rolling power cuts that intend to lessen the load on the power supply system when Eskom is not able to supply a high electricity demand. Loadshedding remains one of the country's most critical challenges and has affected day-to-day business activities leading to some small businesses closing their operations. In developing economies, small businesses play a significant role in the wellbeing of rural dwellers and are a major tool for local economic development. At present, there is limited evidence in the literature pointing out the small and medium-sized enterprises (SMEs) in Collins Chabane Local Municipality (CCLM) in terms of the effects of loadshedding but there is literature describing similar issues in other geographical areas. The exploration of the effects of loadshedding on SMEs in the Collins Chabane Local Municipality was crucial to empower small SMEs, cover scholarly gaps, contribute to policy development, and participate in academic discourse. The study uses a mixed-methods approach, adopting a triangulation research design. The sample consisted of 125 members of the target population, which included the SME owners/managers and officials from the Collins Chabane Local Municipality such as the Local Economic Development (LED) manager, Electricity manager, and a technician. The sample was selected using purposive, snowball non-probability sampling, and cluster probability sampling. A total of 100 respondents were selected for the quantitative study, while 25 participants were selected for the qualitative study. Therefore, 100 respondents completed questionnaires and 25 respondents participated in the face-to-face semi-structured interviews. The quantitative data were analysed using the statistical package for the social sciences (SPSS), while the qualitative data were analysed using the thematic method of analysis. According to the quantitative findings, loadshedding costs small and medium-sized businesses in the Collins Chabane Local Municipality an average of 61% of their total revenue. Additionally, 59% of these companies had to lay off their employees because they were unable to pay their wages. The Chi-square results demonstrate that loadshedding has been experienced uniformly by everyone, irrespective of their demographic and business demographic status. Therefore, demographics have no significant influence on the experience of loadshedding. The qualitative results reveal that the losses

associated with the effects of loadshedding on SMEs' production are untenable. There is an urgent need to alleviate the effects of loadshedding on SMEs. An alternative source of power is a requirement for small businesses in the Collins Chabane Local Municipality. It is for this reason that the South African government should grant small businesses a subsidy for the purchase of alternative sources of energy such as strong generators and solar panels to support them during periods of loadshedding. In addition, the South African government should encourage and capacitate small businesses in the Collins Chabane Local Municipality to participate in producing and supplying renewable energy by funding them, and further, foster cooperation among small businesses and companies that are successful in the production of renewable energy. This will assist in adding electricity generation capacity to the national grid and help eliminate electricity instability.

Keywords: Small and medium enterprise, Eskom, Technology, Electricity deficiency, Loadshedding, Local economic development, Municipality, South Africa

Introduction and background

Small businesses have found expression in development agendas such as the National Development Plan 2030, African Agenda 2063, and Sustainable Development Goals. The role small businesses play mainly in rural areas is directly linked to employment creation and income generation. For these reasons, small businesses located in rural economies are regarded as a sustainable avenue for local economic development (Rohini et al., 2018). In Limpopo province and Collins Chabane Local Municipality (CCLM), the number of small businesses initiated has increased over the past decade. According to the General Household Survey (2018), Collins Chabane Local Municipality has a considerate number of small businesses, which shows a positive economic trend in terms of the development of the municipality. Additionally, the number of small businesses operating in the tourism and agricultural sectors has increased and is highly reliant on prepaid electricity for daily operations (Community Survey, 2016). Against this background, small businesses in the Collins Chabane Local Municipality depend on the electricity supply as one major utility. However, CCLM has no licence for the supply and reticulation of electricity, and therefore relies heavily on Eskom for the supply and reticulation of electricity within the area of its jurisdiction (Collins Chabane Local Municipality Integrated Development Plan, 2019).

On the other hand, Eskom, South Africa's major supplier of electricity, has been battling with the imbalance between demand and supply of electricity since 2007, which compelled them to implement loadshedding for all customers; however, loadshedding has become more severe since 2019, when South Africa began to see a higher stage of loadshedding for the first time, such as stage 6 (Schoeman & Saunders, 2018). Since 2022, loadshedding in South Africa has been almost perpetual, with stages up to stage 8 (Businesstech, 2023a, 2023b). However, Eskom is currently proposing up to stage 16 of loadshedding (eNCA, 2023). Ateba et al. (2019) argue that these imbalances are mainly caused by electricity theft (bridging), cable theft, the breakdown of power stations, and tariff cross-subsidisation. In contrast, Phiri (2017) argues that the introduction of technology into manufacturing processes has led to an insignificant increase in electricity demand. Jain and Jain (2017) and Botha (2019) reveal that the imbalance mentioned is mainly because Eskom has been trying to address the social injustices or inequalities

caused by the apartheid government. This includes a deliberate effort to accelerate the provision of electricity to most black citizens who were disadvantaged because of apartheid. Nevertheless, customers, which include businesses, citizens, and academics, complain about the negative effect that loadshedding has on the country's capacity for economic development. Even now, the Pretoria High Court has granted Eskom a loadshedding exemption order for hospitals and schools (Businesstech, 2023a, 2023b). This is due to the role played by electricity in the mentioned sectors of the economy. It has been discovered that several businesses shut down as a result of loadshedding, including small businesses. Small businesses in CCLM are not immune to loadshedding challenges since Eskom is their main source of electricity and there are no backup options for electricity supply. The small businesses in CCLM experience production challenges because of loadshedding because electricity plays an important role in service delivery and the production processes of these small businesses. This study argues that the quality of electricity delivered influences the performance of SMEs and their contributions to municipal economic prosperity. The studies conducted by Nkwinika and Munzhedzi (2016) also support the fact that electricity is essential to business production and contributes to sustainable development in the country. A study conducted by Mbungu and Inglesi-Lotz (2022) endorses the fact that a secure and uninterrupted supply of electrical energy is essential to certain sectors of the economy. Therefore, loadshedding affects the SMEs' potential for survival, their competitiveness, and their contributions to the municipality's prosperity.

At present, there is limited evidence in the literature pointing out the SMEs in CCLM in terms of the effects of loadshedding but rather there is literature describing similar issues in other geographical areas. It is therefore critical to understand how loadshedding affects SMEs' in Collins Chabane Local Municipality to empower SMEs, fill a noticeable academic gap, and contribute to the academic dialogue. The study provides strategies that SMEs can use to lessen the challenges experienced due to loadshedding. Furthermore, the results of the study are useful to the supporting structures within small business development, such as the Department of Small Business Development. More so, the results of this study are valuable for future researchers to further develop strategies for small-business development. Lastly, the study gives recommendations for further research to enrich the literature on loadshedding since it is an area of concern to policymakers. Accordingly, the effects of loadshedding on small and medium enterprises within the mentioned municipality are explained.

A mixed method was used in this study, adopting a triangulation research design to best answer the research questions. A sample of 125 was selected using non-probability purposive and snowball sampling and cluster probability sampling and a total of 100 respondents were selected for the quantitative study. The mentioned sample included 122 Small Enterprise Owners within CCLM, one electricity supply manager, one electrical technician, and one manager from the Local Economic Development section of the Municipality. Therefore, 100 respondents took part in the completion of the questionnaires and 25 respondents participated in the face-to-face semi-structured interviews. The quantitative data were analysed using SPSS, while the qualitative data were analysed using a thematic analysis. In the next segment, a summary of the literature survey,

theoretical framework underpinning the study, and research methodology are presented, followed by the results and discussion of the results, conclusion, and recommendation.

Literature review

The current literature maintains that electricity has a significant impact on the living conditions of citizens, the economy, social life, sustainable development, productivity and poverty alleviation (Emovon et al., 2018; Gehringer et al., 2019). Despite this, research shows that most developing nations, particularly those in sub-Saharan Africa, including South Africa, are unable to supply sustainable electricity. This is evident from the implementation of never-ending loadshedding (Amadi, 2015; Boakye et al., 2016; Schoeman & Saunders, 2018).

Loadshedding as the deliberate shutdown of electricity supply to parts of the economy has been experienced in South Africa for the past decade (Ateba et al., 2019). The main causes of loadshedding in South Africa are linked to the breakdowns in the main power plants such as unplanned cuts of the conveyor belts, which often leads to breaking turbines (Head, 2019). The breakdowns result in insufficient electricity available to meet the demands of customers, leading to scheduled loadshedding. There are several effects of loadshedding on the economy, such as hindered growth of SMEs. In South Africa, SMEs operate in an open system where the demand and supply of goods are affected by market forces (Prabowo & Noegraheni, 2019). Concerning market forces, the supply of goods and services to SMEs has a positive impact on the production processes hence the growth of the businesses.

In light of the above-mentioned challenges, limited electricity supply has the potential to, directly or indirectly, affect the socio-economic development, production, and service delivery within industries that contribute to economic development (Boakye et al., 2016; Steenkamp, 2016; Stockholm Environment Institute Working Paper, 2017). Goldberg (2015) examines the impact of an unstable electricity supply on South African retailers. The results indicate that R13.72 billion rand was lost in revenue for the first 6 months of 2014, revealing the impact unstable electricity supply has on the economy. In a similar field of study to that of Goldberg (2015), Schoeman and Saunders (2018) investigate the impacts and costs of power outages on small businesses in six shopping centres located in the north-western parts of the City of Johannesburg. The results indicate that loadshedding causes them to lose customers, decreases business income, and makes it expensive to run the business since they must obtain backup systems. In another study, Botha (2019) evaluates the impact of loadshedding on restaurant productivity in Nelson Mandela Bay. The results confirm that loadshedding is a major concern since it harms productivity.

Boakye et al. (2016) explore the impact of a power outage ('Dumsor') on the hotel industry in Ghana. The results indicate that unreliable power causes a decrease in hotel industry production. Furthermore, the insufficient and unsustainable power supply has, therefore, been observed as a major problem in Ghana. Similarly, Bouri and Assad (2016) contribute to the political and scientific debate surrounding the economic costs entailed by the regular power cuts in Lebanon. Results indicate that electricity shortages continue to harm the economy and society as a whole.

Amadi (2015) investigates the causes of persistent power outages in Port Harcourt City. The study discovered that the main causes of persistent power outages are inadequate power generating capacity, a shortage of gas, weak and dilapidated electrical transmission and distribution network, and inadequate power infrastructure facilities. Politano (2019) further explores how consumers use social media networking sites during power outage events. This study reveals that power outages affect access to websites, and business, and affect the daily routine of residents. Haes Alhelou et al. (2019) state that the root cause of blackouts globally is faulty, aging equipment, and human error.

The above-mentioned authors, including studies conducted by Baker and Phillips (2019), Hedden and Hedden (2015), Inglesi-Lotz and Pouris (2016), Jain and Jain (2017), Jamal (2015), Lovins and Eberhard (2018), Mapane (2017), Pouris (2016), Sewchurran and Davidson (2016), Schwerhoff and Sy (2017), Taliotis et al. (2014), Valasai et al. (2017) are of the same view that electricity generation and supply play a significant role in the economy countrywide and that unreliable electricity generation has an enormous negative effect on input and output within the business sector.

Noticeably, most energy studies have been conducted in Nigeria and Zimbabwe. Paris et al., (2016: 07) highlight that more South African research is needed in the field of electricity. Furthermore, the majority of these studies are conducted in the field of business management, therefore, there is a need for this subject matter to be conducted in the field of public administration. Moreover, no study seeks to investigate the effect of loadshedding on the small and medium enterprises within Collins Chabane Municipality. As a result, this study aims to determine the effect of loadshedding on these enterprises in the selected municipality.

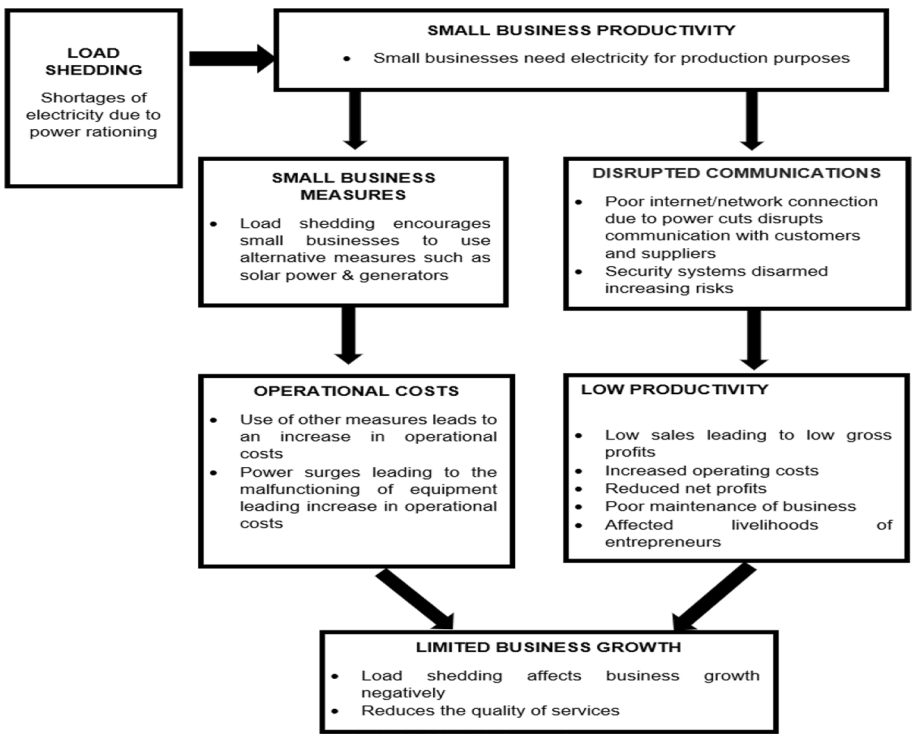

Fig. 1 Conceptual framework. Author (2020)

Conceptual framework of the study

Figure 1 illustrates the conceptual framework of this study.

As illustrated in Fig. 1, the loadshedding conceptual framework of this study is grounded mainly on four factors: small business measures, disrupted communication, operational costs, and low productivity. The framework follows that electricity shortages are mainly caused by loadshedding, which in turn affects small-scale business productivity. Electricity is an important factor of production and is needed in any business for quality products and services, considering that all other factors are normal. Therefore, loadshedding as outlined in the literature and captured in the conceptual framework leads to disrupted communication between businesses and their stakeholders. As an example, online transactions are usually disrupted and productivity is lowered affecting sales volumes. The given example negatively affects the customer's perception of the business while the business suffers damage to its brand, resulting in poor customer retention.

Furthermore, security systems may be interrupted affecting their normal flow and paving the way for possible security breaches to occur. As a result, small businesses are reasonably exposed to potential threats that could affect the productivity of the business such as fire, theft, and poor stock management. Consider a fresh meat supplier who relies heavily on constant electricity for quality products to be delivered: due to power cuts, the supplier is forced to opt for alternate sources of power or rather cope with an intensive meat quality reduction. Due to measures implemented by small businesses to manage power cuts, operational costs are likely to fluctuate, which affects effective cost management and collectively limits small business development and growth. Hence, this study was conducted within the perimeters of the conceptual framework to develop an intervention plan founded on practical strategies that SMEs may use to survive the unstable source of power the targeted municipal area experiences.

Theoretical framework

Various models and theories for comprehending small business structures have been developed and applied throughout the world (Maziriri & Chinomona, 2016). Nevertheless, this study uses complexity and resource-based view theory to comprehend the extent to which small businesses in the Collins Chabane local municipality have been affected by the loadshedding. Therefore, complexity theory was useful in understanding how small businesses interact and how their interaction is affected by loadshedding. Resources-based theory, on the other hand, was used to determine the resources available to SMEs to keep them competitive and alive, as well as how loadshedding affects their resources and limits their competitive advantages.

Complexity theory

This theory holds that organisations are made up of interconnected and well-structured parts and the decision or action of one component affects the other (Park & Jo, 2017). Thus, a goal of complexity theory is to understand how parts of the system interact, how they change over time, emphasises how systems tend to evolve in a nonlinear fashion and how feedback loops affect the evolution system (Rosenhead et al., 2019). The literature reveals that both internal and external factors can be forecast using this theory

(Cairney & Geyer, 2017). Therefore, it was useful in understanding how small businesses interact and how their interaction was affected by the loadshedding.

This study supports this theory by confirming that organisations operate in a complex internal and external system. According to the results of this study, small businesses operate within internal systems consisting of input, transformation, and output. In addition, they operate within an external system consisting of the government, which includes the national, provincial, and local government (municipalities), suppliers, Eskom, customers, and the community at large. Small businesses interact with the mentioned organisations to be competitive, survive and contribute to local economic development.

The findings show that the national and provincial governments provide policies and financial support and establish institutions to support small businesses with the aim of improving the economy. Municipalities interact with small businesses by giving them rules and regulations on how they should operate, supplying them with services such as water, sewage, and waste removal, and issuing permits for them to operate. In turn, SMEs should pay for such services. As a result of their payments to municipalities, small businesses become an essential component of municipalities' development. Small businesses interact with suppliers of raw materials to purchase what they need to use in the manufacturing process. Small businesses turn to Eskom for electricity to run their manufacturing machines, which in turn leads to innovation and technology adoption, and Eskom, in turn, receives money from small businesses. The business interacts with the community, which is also its customer; the community purchases the small business's output, which helps the business survive financially; in turn, the small business provides employment opportunities to the community. This results in the reduction of poverty and the local economic development of the area.

The theory states further that a decision made in one component affects the whole system (Lai & Lin 2017; Rosenhead et al., 2019). The study agrees with the theory by pointing out that Eskom's loadshedding, which disrupts small businesses' manufacturing processes, has made the whole system dysfunctional. As a result of loadshedding, raw materials are not supplied on time by suppliers, which causes a delay in SME manufacturing, which leads to a lack of trust and a decline in customer loyalty. As a result, small businesses are no longer able to play an effective role in addressing socio-economic challenges such as unemployment, poverty eradication, and inequality, and preventing government policies from achieving their goals of economic development.

The theory also points out that this system consists of feedback loops in which the system's components receive inputs from the environment, convert them into outputs, and then return the outputs to the environment in a continuous feedback loop (Lai & Lin, 2017). Whether the data generated are positive or negative, it provides benchmarks to measure and improve SMEs' performance (Esu & Ufot, 2017). As predicted by the theory, the results demonstrate that the outcome of the process has feedback, whether positive or negative. It has been found that their performance feedback manifests in more referrals, customers, sponsors, and job opportunities, as well as advancements in technology and innovation. In cases where they are not performing well, customers decline, job opportunities disappear, poverty increases,

and the use of technology becomes slow. Given that loadshedding is still occurring, SMEs in the Collins Chabane Local Municipality are unable to respond to criticisms or feedback. Unless an alternative source of power is arranged for them or subsidies are provided for them to purchase backups as the study suggests, they will not able to do their best.

Resource-based view

Resource-based view (RBV) theory urges that the possession of strategic resources provides an organisation with a golden opportunity to develop a competitive advantage over its rivals (Idowu et al., 2020). This theory was used to determine the resources available to SMEs in the Collins Chabane Local Municipality to keep them competitive and alive, as well as how loadshedding affects their resources and limits their competitive advantages. The results of this study support the theory by asserting that businesses use unique resources to remain competitive. It was discovered that small businesses in CCLM use unique technology equipment for production and marketing strategies, as well as human resources with varying skills and levels of innovative thinking, to be productive and remain competitive. However, loadshedding has made it difficult for them to remain competitive because they have had to let go of some of their valuable resources. The results reveal that 59% of small businesses in the CCLM retrenched their employees due to inability to pay their salaries, and production machines were damaged. According to this study, the provision of sustainable electricity can end the loadshedding-related disturbances of small enterprises. Although the provision of sustainable electricity is not achievable at this point, the recommendations made in this paper can help minimise the effects of loadshedding on small businesses.

Research methodology

A mixed-method approach was used, adopting the triangulation research design to best answer the research objectives of the study. This approach assisted the researcher with different but complementary data on the same topic to best understand the research problem. The sample of this study was selected from the target population. The ideal target population is defined as the population that incorporates the total collection of all units of analysis about which the researcher wishes to make specific conclusions (Asiamah et al., 2017). The Collins Chabane Local Municipality consists of a population of approximately 347,975 people (Collins Chabane Local Municipality Integrated Development Plan, 2021–2022). The population was then reduced to meet the study criteria. Study subjects were only small businesses of any kind that are autonomous, affected by loadshedding, and run by individuals or entities that are not branches of larger corporations with less than 200 employees. Small business owners, regardless of race or nationality, in the Collins Chabane neighbourhood were considered. Moreover, Collins Chabane Local Municipality officials with experience facilitating local economic development and delivering electricity were considered. As a result, 125 samples were chosen from the population who satisfied the aforementioned requirements.

A sample size of 100 out of 125 was drawn to participate in the quantitative study through the guidance of the Raosoft sampling size calculator, and the samples used in

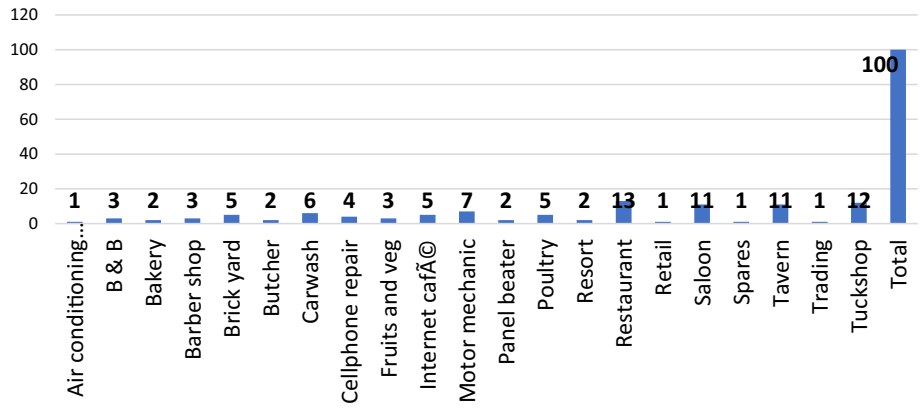

Fig. 2 Type of business consulted

previous studies conducted on similar issues were also considered. Therefore, this study consisted of 76 owners and 24 managers of small businesses who participated in the completion of questionnaires. The types of small businesses consulted are illustrated in Fig. 2.

A total of 25 participants were selected to participate in the qualitative study through face-to-face, semi-structured interviews, and saturation was reached. Out of that number, there were 22 small enterprise owners within CCLM, one electricity supply manager, one electrical technician, and one manager from the local economic development section of the municipality. This study was dominated by small businesses, which constituted 122. The sample size was arrived at considering issues of improving data trustworthiness, credibility, transferability, and the general rule of thumb for phenomenological studies as is the case for this study (Creswell, 2015). The respondents who participated in the quantitative study were selected using probability cluster sampling and non-probability snowball sampling. The participants who took part in the interviews were selected using purposive non-probability sampling, since it focused on well-informed participants to provide detailed experiences and rich information on this subject.

The data collected through questionnaires were analysed using the Statistical Package for the Social Sciences (SPSS). Accordingly, descriptive statistics such as frequency counts, percentages, and mean were used to analyse the data, and inferential statistics such as Chi-square and linear regression were used to test the associations between the variables. The data collected by interview were analysed using inductive thematic analysis. Moreover, before undertaking this research, approval was granted both by the participants and the municipality to conduct the research, and ethical clearance approval was also obtained from the Tshwane University of Technology ethical committee. None of the research participants were exposed to human practices. Furthermore, confidentiality was preserved by ensuring that no data was linked to any name via data coding. Lastly, consent forms were signed by participants and respondents.

Study limitations

Given the fact that loadshedding is a national issue, this study was limited to the electricity crisis or loadshedding in South Africa, focusing strictly on the effect of loadshedding on SMEs in the Collins Chabane Local Municipality. Data were collected through

mixed-methods research techniques to obtain the views of SME owners and managers and the relevant respondents within CCLM in the Limpopo Province of South Africa. Due to financial, transportation, and time constraints, the study sampled only 125 participants. The findings are not generalised to all municipalities in South Africa within the context of small business development. However, the findings can be transferred to other small businesses in municipalities that portray similar economic environments while facing similar loadshedding challenges, thereby contributing to the effectiveness of addressing this problem.

Qualitative results

The effects of loadshedding on small and medium-sized businesses

The empirical evidence reveals that loadshedding interrupts production machines, business plans, financial flows, communication, and information flows. Further, loadshedding has implications for business income, service delivery, personnel, and operating resources, including security systems and the use of technologies. The implications of these are further discussed below.

- Interruption of the production machines

Small and medium-sized businesses were asked whether loadshedding had an effect on their operations. Most small businesses in Collins Chabane Local Municipality run on electricity-powered machinery and technology. For example, brick yards use concrete block machines to make bricks; breadmaker machines are used by bakeries; granulator machines are used by mechanics for panelbeating; electricity-powered chargers and welding machines are used for cell phone repair, hairclippers and hair dryers are used in saloons; incubators are used for poultry businesses; and machines to cut meat and fridges to cool meat are used in butcheries, etc. Many of these businesses do not have backups, such as generators, due to a lack of financial resources. Because the equipment used requires an uninterrupted electricity supply for efficient production, this puts a halt to production and connectivity. As a result, the business is forced to close during loadshedding and reopens when it comes back. One respondent said:

> *It affects our daily operation. The stock gets rotten, fridges get damaged, and as I'm speaking, it has damaged the microwave and kettle. I have sent them to be fixed, which is an extra cost to the business is. When the electricity goes off while I'm done preparing potatoes to be fried, they end up getting rotten without being fried, so we had to throw them in a bin. It also results in pay cuts for employees since we are running at a loss. We don't have generators, and we were once using a gas stove, but we stopped using it since it is dangerous at this place. There are many schoolchildren who are passing by.*

Participants also emphasise the loss of profits and customers resulting from businesses closing due to loadshedding. Fast-food manufacturers or restaurants, for example, require electricity for every process of cooking meals. Because the processes demand an uninterrupted electrical supply for successful output, loadshedding causes poor output.

Another person said:

I have the electricity-powered chargers and the welding machine for cell phone repair. They shut off or cease to function during loadshedding. I can leave work during loadshedding without ever making a cent because the customer arrives and chooses to leave before the electricity is restored. I did not make any money that day, but I still have to pay rent, provide for my family, and pay the staff at the end of the month.

Another said:

I'm a motor mechanic who works to service motor vehicles, which includes overriding, changing of breaks, clutches, gearboxes, and diff, and I depend on electricity to do most of the things, like drilling and grinding. I have four employees. When there's no electricity, we sit and do nothing, which delays us from doing our job. Loadshedding always has the potential to tarnish our business because we don't deliver as promised. It has cost my company between R400 000 and R600 000 financially.

- Interrupted business plan

The results show that small businesses, such as fast-food restaurants, often follow a set schedule regarding delivery and preparation of food. The incidence of loadshedding, however, prevents perishable goods from being delivered and delays the delivery of food. This results in both suppliers and SMEs losing money. Another owner said:

Most of the time we are unable to serve our customers since when they go for lunch you will find that we are not yet done preparing food due to loadshedding, so they end up going to other shops like Shoprite, and in that way, we lose customers.

Plans for poultry company delivery were disrupted since some stocked chickens perished because of loadshedding, which resulted in the delivery of less than what was agreed upon to the customers. Additionally, businesses that provide goods and services face frequent interruptions, leading to missed deadlines.

- Interrupted financial, communication, and information flows

The results reveal that the machines that handle money or payments for small businesses, such as speed points, tills, and ATMs, require electricity for them to run. Therefore, if small businesses without backup electricity are unable to conduct online transactions due to loadshedding, the business has to send the customers back home without receiving any service. Other owners stated:

It has a financial impact on the business because we have to pay the rent at the end of the month and the landlord does not cut the price. Whether there is loadshedding or not, the costs remain the same.

Furthermore, loadshedding results in network issues, preventing businesses from accessing their emails and digital devices. In this way, their suppliers are unable to communicate or exchange information via email, cell phones, and other online platforms. As

a result, SMEs are affected by loadshedding since they cannot transact or send information on time.

- The following are the implications of loadshedding on business income, service delivery, personnel, and operating resources

In the event of loadshedding, financial performance declines because of a drop in customers. Businesses receive significantly less than they spend; they spend more money and get less profit. As a result of loadshedding, goods expire when they are not sold in time. Furthermore, food and stock rot when they are not kept chilled, and equipment is damaged and needs to be replaced. Other owners said:

> *I am running a fruit and vegetable business. Fruits do not last four to seven days unless they are refrigerated. So when there is loadshedding, fruits decay because we don't have a place to store them, and I have to throw them away because we can't sell a rotten stock, and if health officials discover that we are selling rotten stock, they can shut down our business. I used to have six employees, but I now only have four since it is tough to pay them.*

Furthermore, rental businesses are suffering because loadshedding causes sewage systems to become blocked, which necessitates the expenditure of extra funds to unblock them. This further causes customer inconvenience, leading rental businesses to lose customers.

- Interruption to security systems

Some small businesses use an alarm system to safeguard their assets. When there is loadshedding, many security systems are affected since they are powered by electricity. As a result, SMEs' security is jeopardised because their systems are not performing at their best. Therefore, loadshedding exposes SMEs to theft, poor stock management and other forms of criminal activity. Another owner said:

> *…When loadshedding occurs regularly, it can quickly deplete backup batteries in alarm systems and other devices, such as electronic gates. This poses risks to the business because the failure of security systems allows theft to occur. Also, loadshedding damages electronics when one forgets to turn it off because when the electricity comes back, it comes with power with such force, electronics can be irreparably damaged.*

- Interruption on the use of technologies

IT businesses are unable to provide online services, assist schoolchildren with research, print, scan, or perform any other internet-required activities. This is because the IT and technology infrastructure are heavily reliant on electricity. This discourages the use of technological devices in the Collins Chabane Local Municipality.

Quantitative results

The quantitative results demonstrate the level of dependence on electricity by small businesses and the impact the loadshedding has on small companies in the Collins Chabane Local Municipality.

Table 1 Whether the business depends on electricity

Does your business depend on electricity to operate?	Freq	Percent	Cum
Yes	100	100.00	100.00
Total	100	100.00	

Table 2 Whether loadshedding is experienced

Do you experience loadshedding	Freq	Percent	Cum
Yes	100	100.00	100.00
Total	100	100.00	

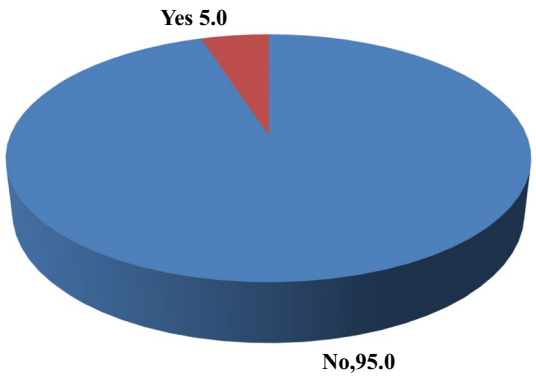

Fig. 3 Alternative source of power

- The question was posed to determine the level of dependence on electricity by small businesses in the Collins Chabane Local Municipality. The results in Table 1 show that 100% of the small businesses in the Collins Chabane Local Municipality rely on electricity to operate.
- The study also used a questionnaire to examine whether loadshedding has an impact on small businesses in the Collins Chabane Local Municipality. The results in Table 2 show that all participants (100%) experienced loadshedding in the Collins Chabane Local Municipality.

Further, the test of association was performed by Chi-square to determine whether the experience of loadshedding is influenced by gender, age group, race group, educational level, marital status, respondents' status, years in business, business area, type of business, employee numbers, working hours, additional income, the status of business premises, and the status of dependency on electricity. The findings demonstrate that loadshedding has been experienced uniformly by everyone, irrespective of their demographic and business demographic status. Therefore, none of the demographic factors mentioned had a significant influence on the experience of loadshedding.

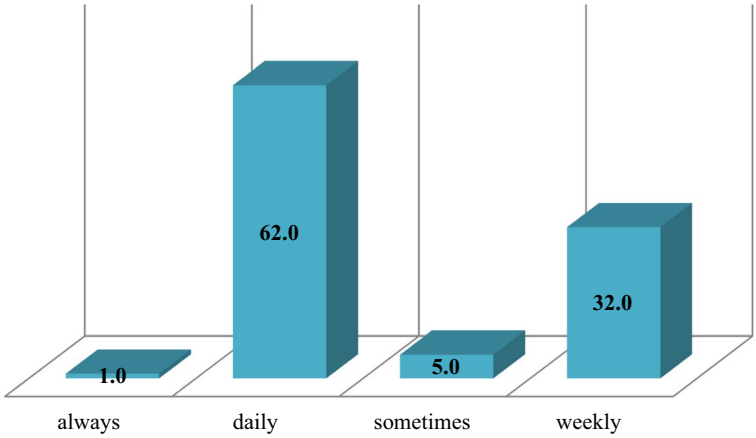

Fig. 4 How often loadshedding is experienced

Table 3 Descriptive statistics of averages

	N	Minimum	Maximum	Mean		Std deviation
	Stat	Stat	Stat	Stat	Std error	Statistic
Av. working hours in a day of loadshedding	100	0	11	4.62	0.253	2.526
Av turnover when there is no loadshedding	100	80.00%	100.00%	99%	0%	3%
Average turnover in a day with loadshedding	100	0.00%	100.00%	39%	2%	25%
Average estimated loss due to power outage	100	0.00%	100.00%	61%	2%	25%
Valid N (listwise)	100					

- The inquiry was made to see whether the small enterprises in the Collins Chabane Local Municipality had a backup power supply that they utilise when loadshedding occurs. Figure 3 shows that 95% of these businesses do not have an alternative source of power, whereas 5% of the businesses do.
- The Collins Chabane local municipality's small enterprises were also asked about how frequently loadshedding occurs.

The result in Fig. 4 shows that most of these businesses (62%) experience loadshedding daily, followed by those that experience it weekly, which constitutes 32%. The remaining 5% very occasionally experience it, whereas the lowest percentage (1%) always did. Based on these results, it is that loadshedding severely affects SMEs in the Collins Chabane Local Municipality because the majority experience it daily.

- The descriptive statistics were performed on the average working hours of loadshedding in a day, average turnover in a day with loadshedding, turnover when there is no loadshedding, and estimated loss due to a power outage to determine to what extent the small businesses in the Collins Chabane Local Municipality have been impacted by loadshedding. The results are shown in Table 3.

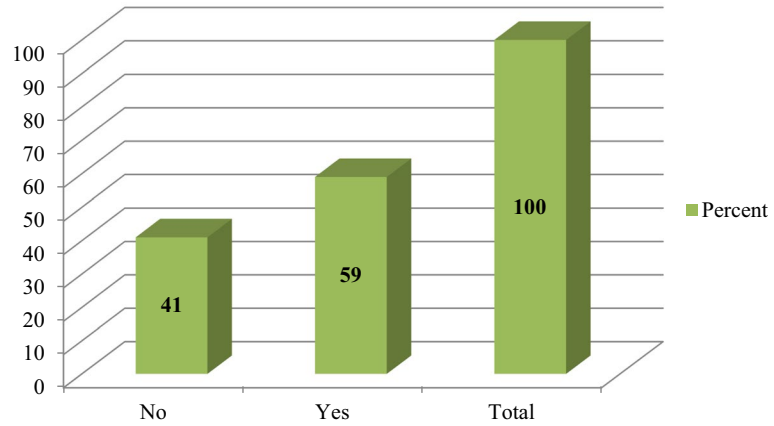

Fig. 5 Loss of employees due to loadshedding

Table 2 shows that on a day of loadshedding, the average working hours were five hours, the maximum number of hours was 11, and some did not work at all. The average turnover in a day with no loadshedding was 99%, the maximum was 100% and the minimum was 80%. On a day with loadshedding, the average turnover was 39%, but there was one with a maximum turnover of 100%, probably with an alternative source of power, and a minimum turnover of 0%, likely those without one. A power outage results in an average loss of 61%, which is significant because it is a large amount.

- It was also determined whether the business had lost employees due to loadshedding. Figure 5 shows that the majority (59%) of small businesses lost their employees due to loadshedding, compared to the 41% that did not lose their employees. Considering that the number of businesses that lost employees is high, it can be concluded that loadshedding results in employee layoffs in the Collins Chabane Local Municipality and that loadshedding has impacted employment growth in South Africa at large.

Discussion of the results

The qualitative evidence reveals that electricity is a critical input to the production process of small businesses in the CCLM. This is supported by quantitative results, which show that 100% of small businesses in the Collins Chabane Local Municipality rely on electricity to operate and produce. These results also confirm that electricity is a vital part of industrial operations in both small and large businesses (Baker & Phillips, 2019). Studies by Phiri (2017), Chishimba (2017) and Nyoni (2019) endorse the importance of electricity by revealing that it drives economic growth in developing countries and that modern society is largely reliant upon it for daily routine. The study conducted by Schoeman and Saunders (2018) on the impact of loadshedding on small businesses in the City of Johannesburg also discovered that the majority of SMEs (90.7%) rely on electricity for the operation of their businesses. Thus, it may be said that power is essential for small enterprises to succeed.

The small businesses in the Collins Chabane Local Municipality suffer from loadshedding. Quantitative results in Table 2 confirm that 100% of small businesses in the CCLM

experience loadshedding, with the majority experiencing it daily (62%). The findings also reveal that loadshedding interrupts production machines, business plans, financial flows, communication, and information flows. Further, loadshedding has implications for business income, service delivery, personnel, and operating resources, including security systems and the use of technology. As a result of the disruption to the production process, the majority (59%) of small businesses are forced to lay off their employees because they can no longer afford to pay them given that they were no longer making enough profit and operating costs had increased. This finding is shown in Fig. 5. Nyoni (2019) agrees that loadshedding contributes to small businesses' failure and closure because they cannot operate without stable internet (Nyoni, 2019). Zohuri and McDaniel (2019) and Politano (2019) endorse the fact that internet access is directly linked to having stable electricity. Emovon et al. (2018), Kumalo and Poll (2018), Sitharam and Hoque (2016), support the claim that SMEs suffered huge financial losses from the electricity crisis or loadshedding.

The quantity of the losses within small businesses in the Collins Chabane Local Municipality is revealed through descriptive statistics in Table 3, which shows the difference between average income on a day without loadshedding and on a day with loadshedding. The results reveal that on a day without loadshedding, the small business received 99% of its average income, whereas on a day where there is loadshedding, the average income is 39%, which means that there is an estimated loss of 61% of income on a day of loadshedding. Studies by Ayandibu and Houghton (2017); Bruwer and Van Den Berg (2017); Kumalo and Poll (2018); Masama and Bruwer (2018) reveal that SMEs in South Africa have one of the worst sustainability rates in the world since approximately 75% of small and medium enterprises fail within three years of entering the market due to challenges such as power shortages. It can be concluded that loadshedding has a negative impact on the growth of small businesses.

Conclusion and recommendations

This study aimed to explore the effects of loadshedding on small and medium enterprises in the Collins Chabane Local Municipality. A mixed method was used to accomplish the mentioned study objective. Complexity and resource-based theories were used to underpin the study. The results of this study concur with the complexity theory that small businesses operate within complex internal and external systems and that a decision made in one component of the system affects the whole system. This study agrees with the theory by pointing out that loadshedding as implemented by Eskom has made the whole system of small businesses dysfunctional. As a result of loadshedding, raw materials are not supplied on time by suppliers, which causes a delay in the small business production process, which leads to a lack of trust and a decline in customer loyalty, which results in a loss of finances. As a result, small businesses are no longer able to play an effective role in addressing socio-economic challenges such as unemployment, poverty eradication, and inequality, preventing government policies from achieving their goals of economic development. Further, the results of this study support the resource-based theory by asserting that businesses use unique resources to remain competitive. It was discovered that small businesses in CCLM use unique technology equipment for production and marketing

strategies, as well as human resources with varying skills and levels of innovative thinking, to be productive and remain competitive. Nevertheless, loadshedding has made it difficult for them to remain competitive because they have had to let go of some of their valuable resources. The results reveal that employees were retrenched due to failure to pay their salaries, and production machines were damaged. It can be concluded that loadshedding has a negative effect on SMEs' operations and their contribution to economic development. Further, the loss associated with the effects of loadshedding on SMEs' production is untenable. As a result, collaboration among SMEs, the government, and the electricity sector is critical to ensuring the provision of sustainable electricity in the country and mitigating the effects of loadshedding on SMEs.

The study provides the following recommendations to SMEs, the Department of Energy, and policymakers:

- An alternative source of power should be the requirement of small businesses in the Collins Chabane Municipality; therefore, the South African government should grant small businesses a subsidy for the purchase of alternatives such as strong generators and solar panels.
- The South African government should encourage and capacitate small businesses in the Collins Chabane Local Municipality to participate in producing and supplying renewable energy by funding them. Further, cooperation among small businesses and companies that are successful in the production of renewable energy should be fostered. This will assist in adding electricity generation capacity to the national grid and help eliminate electricity instability.
- The electricity provider should reduce electricity tariff rates for small businesses to make it affordable given that they are not compensated for their losses and that it is difficult to manage the increased operating costs of a business due to costs associated with replacing damaged products and equipment, loss of profit due to loadshedding, and expensive electricity at the same time.
- Small businesses in the Collins Chabane municipality, especially restaurants, should opt for equipment that uses gas, such as gas stoves and fridges.
- The government ought to give Collins Chabane Local Municipality the authority to generate its own electricity given that Eskom is the municipality's sole source of electricity.

Abbreviations

ATM	Automated teller machine
CCLM	Collins Chabane Local Municipality
ESKOM	Electricity Supply Commission
GDP	Gross Domestic Product
IT	Information and technology
LED	Local economic development
SMEs	Small and medium-sized enterprises
SPSS	Statistical Package for the Social Sciences

Acknowledgements
I acknowledge the TUT ethical committee and the Collins Chabane Local Municipality for granting me permission and ethical clearance to conduct this study. I acknowledge the Department of International Relations and Cooperation for funding my main research project.

Author contributions
MVM: conceptualisation, writing and editing. RMM and LRM: conceptualisation and supervision. All authors have agreed to the submission of this paper.

Funding
Not applicable.

Availability of data and materials
Not applicable.

Declarations

Competing interests
Not applicable.

Received: 14 November 2022 Accepted: 2 September 2023
Published online: 09 September 2023

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