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Article

Load Shedding and Its Crippling Effect on The South African Economy: An Entrepreneurial Perspective

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Abstract: The country has experienced industry shutdowns, decreased productivity, educational setbacks, increased unemployment rates, and negative healthcare outcomes. Load-shedding in South Africa is primarily caused by inadequate maintenance, internal mismanagement, corruption, and a lack of skills. This issue has had a significant impact on small businesses, as they often lack the necessary resources to handle power surges, equipment damage, and the costs associated with replacing stock. This paper explores how load-shedding has impacted the South African economy from an entrepreneurial perspective. The research is qualitative and exploratory in nature, and it was found that load-shedding has had a significant impact on businesses' finances, resources, and performance. Load-shedding in South Africa has had a severe impact on the daily lives of people, causing disruptions in businesses, households, and the overall economy. Eskom, the primary supplier of energy in South Africa, has been facing significant challenges in meeting the growing demand for electrical energy, leading to job losses, decreased productivity, and a loss of billions of rands. Small businesses have been particularly affected, with an estimated 75% of them failing after being operational for less than three years due to load-shedding. To ensure small businesses have electricity to operate during load-shedding it is recommended that small businesses adopt alternative energy sources like solar power to increase the businesses' independence and mitigate the effects of load-shedding. The South African government should also encourage and support small businesses to collaborate with successful renewable energy companies.

Keywords: Load-shedding; South Africa; economy; entrepreneurship small business

Introduction

The world has been faced with an exacerbating energy crisis, with several countries struggling to provide sufficient power to citizens, some recent events, such as Russia's restriction of gas supply to certain parts of Europe, have left countries like Germany preparing for potential power shortages, additionally parts of the United States, Australia, and various other nations may also encounter further power outages (Chepape, 2022). According to data provided by the World Bank, countries across the globe have been dealing with a median of 5.5 power cuts/outages per month, these outages include both planned load-shedding and emergency power outages which, on average last up to three hours (Thelwell, 2023). Similarly, South Africa has encountered many problems within its energy division over the last decade (Schoeman & Saunders, 2018).

According to Mabunda, et al. (2023) the causes of the worsening stages of load-shedding have been regularly exposed to discussion. Ateba, Prinsloo, and Gawlik (2019) argued that disparities are primarily caused by cable theft, electricity theft (through bridging), tariff cross-subsidization, and the breaking down of power stations. Phiri (2018) on the other hand, argued that the integration of technology within business

operations has resulted in an insignificant upsurge in the electricity demand. Botha (2019), and Jain and Jain (2017) divulged that the disparities are mostly because Eskom attempts to attend to social inequalities or injustices produced by the apartheid government, which included a conscious effort to hasten electricity provisions to most black nationals disadvantaged by apartheid.

With the above mentioned in mind, the purpose of this paper is to understand how load-shedding has affected the South African economy from an entrepreneurial point of view, with two research objectives in mind. The first is to determine the motives for and causes of load-shedding. The second is to determine how load-shedding has affected entrepreneurial enterprises/SMEs/SMMEs. By entrepreneurs becoming more aware of the effects of load-shedding on the economy business owners could gain a better understating of the potential risks or opportunities that could influence the business and thus plan, develop, and implement the necessary measures to ensure business continuity (Goldberg, 2015).This paper is divided into six parts. The third part of this paper will review the literature relevant to load-shedding and its effects on the South African economy, from an entrepreneurial point of view. The paper will then go on to provide the methodology used in recognizing, selecting, processing, and analyzing the gathered information. The fifth and sixth sections will present the study findings and discussion of the paper. Finally, recommendations will be provided, and a conclusion will be drawn to emphasize the paper's main points.

An approximated 95% of electricity in South Africa is produced by a publicly owned organization called, Eskom (Eskom, 2019). In 1948, Eskom purchased the Victoria Falls Power Company thus making Eskom South Africa's primary power producer, for several years, Eskom had been accountable for providing affordable and reliable electricity, that contributed to the country's economic stability and growth (Okharedia, 2019). The organization had been founded by the South African government, in the year 1992 owing to the implementation of the Electricity Act of 1922 and was originally named 'The Electricity Supply Commission' (Escom), but had its name changed to Eskom in 1987 (Botha, 2019). According to Nkosi (2020) Eskom has been and remains the monopoly within the electricity supply industry of South Africa, with the businesses' supply chain encompassing, electricity distribution, transmission, and generation. Despite government policy indicating that the supply of electricity should be made available to companies other than Eskom, no genuine rival energy provider has been permitted to emerge (Olajuyin and Mago, 2022). Despite the organization operating with excess capacity in previous years (Okharedia, 2019), since 2007, Eskom has been contending with the imbalances between the supply and demand of electricity which has compelled the organization to implement load-shedding for all consumers; however, load-shedding has become more severe over the years (Schoeman & Saunders, 2018; Walsh, Theron, & Reeders, 2021; Mabunda et al., 2023). Eskom experienced a decrease in electricity sales during 2022 when compared to the year 2008, and the factor of energy availability dropped from 85% to 62% for the duration of the same period (Daily Investor, 2023).

This paper aims to contribute to existing research on load-shedding and its impact on the South African economy from an entrepreneurial perspective by analyzing existing literature and providing an understanding of how load-shedding has affected the South African economy from an entrepreneurial point of view, with two research objectives in mind. The research objectives are twofold: first, to identify the causes and motives behind load-shedding, and second, to determine how it has affected entrepreneurial enterprises, SMEs, and SMMEs.

According to Naidoo (2023) load-shedding has had a detrimental impact on the South African economy, causing industry closures, reduced productivity, an education emergency, increased unemployment, and adverse health consequences. Mabunda et al. (2023) further stated that load-shedding disrupts production machinery, business strategies, financial transactions, communication, and information sharing. Additionally, load-shedding affects business revenue, service provision, staff, and operational resources such as security systems. Goldberg (2015) suggested that to gain a better understanding of how load-shedding impacts the South African economy, research could be extended beyond the retail sector. Research on the load shedding and its crippling effect on the South African economy from an entrepreneurial perspective is scarce. Therefore, this paper will provide an understanding of how load-shedding has affected the South African economy from an entrepreneurial point of view. By understanding the economic consequences of load-shedding, entrepreneurs can better assess the potential risks or opportunities that could impact their business and plan, accordingly, ensuring business continuity (Goldberg, 2015).

Literature Review

McCombes (2022) literature reviews entail analyzing articles about a particular topic, it presents a summary of existing knowledge surrounding the topic and allows individuals to recognize relevant methods, gaps, and theories in existing research. Furthermore, the literature review assists individuals with understanding the reasons for as to why a study is being or has been conducted. This literature review is split into four sections and will focus on the international setting of load-shedding, the concept of load-shedding, the motives for and causes of load-shedding, and the impact of load-shedding on entrepreneurial enterprises/SMEs/SMMEs.

1. The International Setting

Power outages, also known as power cuts or load-shedding (Mabuza & Maphosa, 2023), are a global phenomenon with the causes and effects of these power outages differing amongst the different countries (Schoeman & Saunders, 2018). Power cuts are a common occurrence in Pakistan due to distribution problems and electricity shortages which resulted in the large-scale installation of battery power backup solutions that had placed a burden on homes in terms of operational and installation costs (Naidoo, 2023). Khan and Begum (2020) in the paper on the "Social Impact of Energy Crisis on Small Scale Industrial Workers in District" indicated that load-shedding in Pakistan led to a reduction of working hours in the workforce within the industrial sector leading to industrial production rates deteriorating to the point where the industrial labour pool decreased dramatically.

Walsh et al. (2021) further stated that Pakistan's' electrical shortages negatively affected the industrial sector performance in the long-run and short-run. The national power utility of Zambia (ZESCO) also employed load-shedding that lasted up to 12 hours a day and resulted in the prices of food such as chicken, fish, milk, and beef being increased and businesses experienced a decrease in revenue (Umar & Kunda-Wamuwi, 2019). Nduhuura, Garschagen, and Zerga (2020) pointed out that Ghana has suffered from periods of load-shedding throughout recent years, from 2013 to 2016 outages possibly lasted up to 16 hours per day, with some neighborhoods being exposed to twice as much load-shedding than others (Nduhuura, Garschagen & Zerga, 2020). Likewise, Nepal has suffered from power deficiencies, with regions of the country being left without power for as long as 14 hours daily, affecting the country's GDP and decreasing industrial output (Naidoo, 2023). Mabunda et al. (2023) indicated that the hotel industry of Ghana, had experienced a decrease in hotel production rates and that power outages in Lebanon harmed the economy and the society at large.

2. The Concept of Load-Shedding

Before exploring the effects of loadshedding on the South African Economy it is necessary to understand what loadshedding is. Akpeji et al. (2019) stated that in South Africa load-shedding is also referred to as rolling blackouts. According to Schoeman and Saunders (2018) there are two types of power outages: unplanned and planned power outages, planned outages are power interruptions that occur when power has been switched off at an area on the local grid such as the substation so that emergency repairs or maintenance can take place. Unplanned power outages, on the other hand, involve periods when the supply of electricity to a specific area or building is disrupted and unplanned, such outages could occur due to weather conditions, cable theft, old infrastructure, illegal connections, even building developments or excavation.

Furthermore, unplanned power outages are short (habitually last three hours or less) and could occur in extremely carefully planned systems because unplanned outages infrequently take place, users do not foresee these outages and are not likely to invest in alternative energy supplies to alleviate the cost of theses disruptions (Minnaar & Crafford 2017; Walsh et al., 2021). According to Walsh et al. (2021) load-shedding is the implementation of deliberately planned, regular power outages that involve the shutting down of sections of the electricity distribution network to prevent the grid from being damaged or a national blackout. Goldberg (2015), Mbomvu et al. (2021), and Mabunda et al. (2023) stated that load-shedding refers to a measure that is implemented by a supplier of electricity (Eskom), to reduce the strain posited on an electricity grid through provisionally discontinuing electricity supply to limit the utilization of energy, as a result of an over-demand thereof. Therefore, load shedding could be ongoing due to increasing demand alongside insufficient supply (Mabuza & Maphosa, 2023). For this paper, load-shedding is a controlled, imposed, and planned reduction of power provision implemented to reduce the possibility of a total system breakdown and to make up for the

shortage in supply, leaving businesses and households in divided parts of a country with no electricity to complete daily endeavors, causing discomfort and inconvenience (Rakotonirainy, Durbach & Nyirenda, 2019; Mabuza & Maphosa, 2023).

3. The Motives for and Causes of Load-Shedding

According to Alhelou, Hamedani-Golshan, Njenda, and Siano (2019) the main reasons for global blackouts are human error and aging faulty equipment. In the case of South Africa, the major energy supplier of electricity (Eskom) implemented load shedding due to many factors including insufficient maintenance of electricity-supplying infrastructure (Ateba et al., 2019; Winkler et al., 2020; Mbomvu et al., 2021). Ateba et al. (2019) and Mbomvu et al. (2021) further stated that internal mismanagement, boiler leaks, corruption, lack of adequate emergency diesel, capital expenditure changes because of "State Capture", power station design flaws, the utilization of poor-quality coal, unplanned and planned maintenance, and lack of skills also contributed to the implementation of load-shedding. Similarly, Nowakowska and Tubis, (2015) and Mabuza and Maphosa (2023) stated that the motivations behind the implementation of load shedding in South Africa incorporate the following (Nowakowska & Tubis, 2015; Mabuza & Maphosa, 2023):

i. Inadequate electricity availability, required for meeting the demand of Eskom customers, resulting in the necessary interruption of electricity supply (load-shedding) in specific areas;
ii. A last option to stabilize electricity demand and supply that is frequently applied after other available options have been used;
iii. Refrainment from a national blackout or total grid collapse (total shutdown of the electrical energy supply grid), which could have devastating consequences. If power imbalances are not controlled, this could result in the collapse of the national grid therefore by the load being shed and rotated in a controlled and organized manner, the system stays stable;
iv. inadequately maintained infrastructure, insufficient workforce, and substantial loss of essential skills.

In other words, the primary reason for the South African national grid being under strain is because of the need for energy security, the most important resource for several different stakeholders, such as businesses, communities, and policymakers whose welfare is reliant on a continuous energy supply (Botha, 2019; Mabuza & Maphosa, 2023). These obstructions and additional factors including but not limited to the worsening of maintenance quality delayed essential maintenance efforts toward keeping electrical plants functioning, moreover, an estimated 64% of Eskom's existing established base-load capacity production plants had been exploited for beyond three-quarters of its life cycle, necessitating extended restoration times than planned and longer power outages (Mabuza & Maphosa, 2023). Deteriorating coal quality also affects plant performance, leading to additional maintenance, weather conditions, for instance, the extended duration of heavy rains or extreme heat waves, and disruptions to fuel supplies required for powering stations add to the amount of load shedding (Maringa, 2017; Kessides, 2020). Furthermore, policies and regulations put in place concerning carbon emissions could have added to the problem at hand (Mabuza & Maphosa, 2023).

4. The Impact of Load-Shedding on Entrepreneurial Enterprises/SMEs/SMMEs

Small businesses possess an essential role in developing economies with regard to national economic growth and are major tools for local economic growth especially when it comes to the welfare of rural residents (Walsh et al., 2021). An uninterrupted eccentricity supply is a significant element for production that is essential for any business to ensure quality services and products, bearing in mind that other factors remain normal (Mabunda et al., 2023). A restricted electricity supply, on the other hand, possesses the potential and could indirectly or directly affect the production rates, service delivery, and socio-economic progression of sectors that promote economic development (Mabunda et al., 2023). Direct costs correlated to power outages encompass opportunity expenses of resources such as staff or machinery that become inoperative and the halting of production, additionally, businesses could experience direct costs concerning the restarting and shutting down processes, spoilage or degeneration of stock, data loss, damage, equipment failure, etc. (Mbomvu et al., 2021).

According to a survey undertaken by Yoco (a technology firm), on the cost of load-shedding for small South African businesses revealed that 85% of entrepreneurs experienced a decrease in revenue due to load-shedding, 20% indicated that continuous load-shedding would result in these businesses needing to consider reducing staffing levels or shutting down the business; and 60%, stated that the expense of operating a business has increased, due to additional expenditure on UPS devices, switching to gas, and buying and operating generators for example, have become essential for "keeping the lights on" (BusinessTech, 2019). The dependence of South African SMMEs on electricity to conduct business is disconcerting when taking into consideration that load shedding directly halts business operations. (Phiri & Kabubi, 2018; Mbomvu et al., 2021). On the other hand, as the initial impacts of power outages filter through value chains, indirect costs such as delayed deliveries of services, products, or input materials (Akpeji et al., 2019; Mabunda et al., 2023). For example, the shutting down of Factory A could reduce the supplies to business B, which may in turn be compelled to reduce its production because of the inaccessibility of essential inputs (Akpeji et al., 2019). In other words, the energy shortage presents as a profound threat to the socio-economic growth of a country and jeopardizes job preservation and creation (PSA, 2023).

According to Mabuza and Maphosa (2023) small and medium-sized enterprises (SMEs) are the main contributors to the country's Gross Domestic Product (GDP), however, South Africa's falling economic growth and industrial decline are directly linked to the decreasing electricity sustainability, making it difficult for South African SMEs to grow economically and contribute to employment (Ateba et al., 2019). Leaving several individuals struggling to keep up with their families' expenses and daily activities, which in turn has an impact on their children's socialization and education opportunities (Khan and Begum, 2020), resulting in key business industries and businesses losing confidence (Ateba et al., 2019). In the long term, frequent power outages decrease investor, consumer, and business confidence, which could significantly restrain the national, and regional economy (Walsh et al., 2021; Nedbank, 2023). The Public Servants Association of South Africa (PSA) (2023) further stated that the lack of reliable electricity supply created added risk including increases in acts of crime, which also affects investor confidence. Additionally, an unstable electricity supply poses a significant obstacle for prospective investors as it would be unwise for any investor to commit resources to a country where the availability of uninterrupted power cannot be guaranteed. Business owners and industrialists strive to optimize their profits by maintaining continuous operations, necessitating a dependable power supply to prevent costly disruptions to production (PSA, 2023).

According to Mabunda et al. (2023) load-shedding causes small businesses to lose customers, decreases business income, causes low productivity, and makes it costly to operate the business given that backup systems should be obtained. The latter is due to business entities having to pay operational expenditures including but not limited to electricity and water, rent, wages, and salaries whilst being compelled to halt cash flow and income generation; install added security measures such as new policies and security guards to be protected from risks related to load-shedding, for instance, the loss of possible revenue and stealing of inventory; give up potential revenue for the acquirement and operation of alternative energy solutions for electricity such as inverters and generators to possess adequate power supply during the different stages of load-shedding, to continue operations that most of the time cannot be afforded; and pay for the replacing or repairing of electronic equipment as a result of electrical surges (Mbomvu et al., 2021).

Since most South African SMMEs are dependent on electricity to operate, it is not surprising that most South African SMMEs cannot operate when load-shedding occurs (Phiri & Kabubi, 2018). In Addition, load shedding negatively affects the sustainability of SMMEs in South Africa by disrupting financial performances (associated with efficiency and profitability) and/or financial situations (associated with financial stability and liquidity) (Phiri & Kabubi, 2018; Mbomvu et al., 2021). Naidoo (2023) similarly, stated that load-shedding hinders the movement toward a more prosperous and greener future. Mbomvu et al. (2021) pointed out that other limitations experienced by these commercial entities such as restricted market access and constrained access to capital, resulting in many of these entities not being able to obtain alternative power or energy sources and supplies such as generators and solar systems, thus businesses cannot operations during load-shedding, resulting in, load-shedding making it impossible for SMMEs in South Africa to optimally generate an income which would assist national governments with alleviating poverty, distributing wealth, and overall

boosting of national economies and adversely impact the business entities' liquidity, efficiency, and profitability.

Larger companies on the other hand possess financial resources and could have the opportunity to invest in alternative sources of energy SMEs are not able to accommodate such costs, leading to operations being halted and businesses having to wait for the electricity to return, resulting in sizeable income loss (PSA, 2023). These businesses labored to survive the loss however, many had to have downsized or closed entirely, this closure left many individuals that depended on these enterprises without employment (Nedbank, 2023). The businesses that invested in alternative sources of energy resulted in reduced profit margins and major resource consumption which could have been utilized for further job creation and growth (PSA, 2023). Similarly, Mabunda et al. (2023) stated that electricity significantly impacts the living circumstances of citizens, social life, the economy, sustainable development, poverty alleviation, and productivity.

Methodology

The paper used a secondary or desktop research method which encompassed an all-inclusive analysis of existing, obtainable sources of data and information concerning load shedding and its crippling effect on the South African economy from an entrepreneurial perspective. This all-inclusive analysis involved analyzing and examining existing studies that had been dependent on employing search engines that included the UKZN library, Google Scholar, and Google to retrieve online news articles, reports, books, surveys, websites, and online journals. A qualitative research design has been used, and the paper is descriptive and exploratory in nature. It comprises a literature review that uses a conceptual framework. The conceptual framework focused on empirical concepts and findings of the international setting of load-shedding, the concept of load-shedding, the motives for and causes of load-shedding and entrepreneurial enterprises/SMEs/SMMEs, and the impact of loadshedding. The words 'entrepreneurship', 'small business', 'impact', 'economy', and 'load-shedding' were used as keywords to search the UKZN library, Google Scholar, and Google and obtain relevant articles.

Finding and Discussion

The South African primary supplier of energy (Eskom) has been experiencing significant challenges in catering to the growing demand for electrical energy and was not sufficiently equipped with the necessary resources required to cater to significant upsurges in the demand for electrical energy (Mbomvu et al., 2021). This led to the implementation and worsening of load-shedding since 2007, as highlighted by Schoeman and Saunders (2018), Walsh et al. (2021), and Mabunda et al. (2023). The root cause of this issue could be attributed to a variety of factors, including but not limited to internal mismanagement, corruption, and inadequate maintenance of electrical supply infrastructure, etc. As a result, these challenges have created a significant impact on the daily lives of the people in South Africa, causing disruptions in businesses, households, and the overall economy., etc. (Ateba et al., 2019; Mbomvu et al., 2021).

It was found that during the year 2022 South Africa's gross domestic product increased by a mere 2%, and declined abruptly, in the fourth quarter by 1.3% as a result of intense and constant power outages toward the end of the year, costing the economy of South African an estimated 5% points in lost gross domestic product growth, it was further indicated that load-shedding threatens the survival of many small businesses, with several of those businesses experiencing decreased production levels throughout power outages, which eventually impact the businesses' bottom line (Nedbank, 2023). Furthermore, Mabunda et al. (2023) stated that load-shedding disrupts production for example small businesses might not have alternative energy and are therefore unable to use machinery such as electric beaters; business strategies; financial positions, additional operational costs such as those associated with operating diesel or petrol-powered generators; communication, and information sharing; business revenue and service provision, small businesses losing customers because these businesses are unable to accommodate customer needs and wants and inventory damage; staff, and operational resources such as security systems.

Load-shedding has undermined South Africa's economic growth, the economy shed a large number of jobs owing to low productivity in addition, the economy lost billions of rands (PSA, 2023). South African small, medium, and micro enterprises (SMMEs) principally support and encourage economic development by giving the national economy a boost, alleviating poverty, and creating jobs however, an estimated 75% of

these entities fail after being operational for less than three years because of load-shedding (Mbomvu et al., 2021; Mabunda et al., 2023). Whilst small businesses drive economic activity and create jobs in the surrounding communities, to stay operational, several small businesses should find alternate methods for continuing operations which encompasses investing in alternative energy sources and, thereby, incurring added operational costs, if small businesses are unable to do so, load-shedding compels such businesses to close for large portions of the day, resulting in reduced profits and revenues (Nedbank, 2023). In the case of small businesses in rural communities, it was indicated that 64% of small businesses do nothing, 17% improvise (which includes operating at a suboptimal level, doing other tasks, and finding new locations to do business) and 19% utilize alternative energy sources (involving the use of gas/paraffin, a generator, inverter or battery or solar power) (Nedbank, 2023).

It was found that 84% of businesses that do nothing, do nothing because it costs less to do nothing than when doing something. For example, running a generator is extremely extensive as fuel such as petrol or diesel is costly. Load-shedding had also impacted small business income, operating resources, including security systems and the use of technology and service delivery because of this disruption in the production processes, leading to the majority of small businesses (59%) being compelled to let go of employees as it was no longer affordable for these businesses to pay employees as there would be little to no profit and increased operating expenses (Mabunda et al., 2023). Leading to, small businesses becoming ineffective in addressing socio-economic challenges, thus hindering government policies from achieving set economic development goals.

Recommendations

The paper will now provide a few recommendations based on the study's findings:

i. It is also recommended that small businesses should use alternative energy sources such as solar panels, if possible, to increase their independence and mitigate the effects of load-shedding (Naidoo, 2023).
ii. The South African government should encourage and support cooperation among small businesses and successful renewable energy companies. This will help to increase the country's electricity generation capacity and eliminate instability in the national grid. Capacitating small businesses should be a priority to achieve this goal (Mabunda et al., 2023).
iii. The electricity provider (Eskom) should lessen the rates of electricity tariff to make it more affordable for small businesses especially since these businesses are not reimbursed for losses and that makes it difficult when manage increased operating costs (Mabunda et al., 2023).
iv. SMEs dealing with perishable goods should also use apps or online services (if available) to be informed or notified when and where load-shedding could occur, and thus make arrangements during those periods (Mabuza & Maphosa, 2023).
v. It was also recommended that that small business who can afford business interruption insurance, should get it, this would assist with gaining back some of the lost revenue or assist with combating added expenses (Mabuza & Maphosa, 2023).
vi. Small businesses should also not rely on one supplier, if the primary supplier or manufacturer of resources or products has to shut done/close/ lesson product output thus affecting the availability of resources or products, the amount of stock the small business has to sell

The paper will now provide a few recommendations for future research

i. The extent of the effects of load-shedding remains unknown and could be investigated in future studies (Mbomvu et al., 2021).
ii. The paper was unable to account for how sustainable alternative solutions are for small businesses therefore future studies could investigate sustainable energy solutions for small businesses.
iii. This paper utilized secondary data; therefore future studies could conduct field research when exploring the impact of load-shedding on the South African economy from an entrepreneurial perspective.

Conclusion

The study researched the impact of load shedding on the South African economy from an entrepreneurial

perspective. Power outages in South Africa are a regular occurrence and could last for long periods, which could considerably impact business finances, resources, performance, and more. This is mostly true for small businesses that do not have the resources needed to deal with the costs related to power surges resulting in equipment damage and/or stock replacement and more. For small businesses to develop and encourage the local, regional, and national economy through creating jobs, a steady and empowering environment is necessitated. Unfortunately, recurrent power outages in the country pose a grave threat to small businesses and could have a damaging effect on this sector's growth.

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