ASSESSING THE IMPACT OF LOAD SHEDDING AND COPING STRATEGIES ON BUSINESS OPERATIONS OF SMALL-SCALE ENTERPRISES: MASALA MARKET IN NDOLA, ZAMBIA

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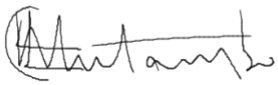
Signature:  **Date: 06.10.2023**

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ABSTRACT

Frequent prolonged load shedding continues to impact individuals and businesses. Small-Scale Enterprises have not been spared. This research sought to investigate the impact of electricity demand and load shedding on the operations of the small-scale enterprises in Zambia using the case study of the small-scale enterprises operating at the Ndola City Council's Masala Market. To achieve the main aim, the research sought to establish the frequency of load shedding that small-scale enterprises face during business hours from 0800 hours to 1700 hours, to investigate the ways in which electricity load shedding affects small-scale enterprises in Zambia. A further aim was to establish coping strategies of small-scale enterprises to remain operational during the periods of load shedding, and to recommend the best ways possible that small-scale enterprises can employ to overcome the effects of electricity load shedding.

The pragmatism research philosophy, the explanatory research design, survey research strategy and the mixed method approach were adopted. The concurrent mixed approach was adopted. The target population consisted of managers and/or business owners of small-scale enterprises at the Masala Market. Simple random sampling and purposive sampling were employed.

The study employed primary data collection methods namely survey questionnaire, in-depth interviews and observations whilst secondary data was collected using document review. Data were analysed using descriptive, Chi-square, correlation and content analyses. These results indicate that the small-scale enterprises at Masala Market frequently experienced load shedding during business hours (0800 hours-1700 hours) extending from 5 hours up to more than ten hours in a day. The results also showed that load shedding caused significant negative impacts on the operations of the small-scale enterprises at the Masala Market. The results showed that the majority of the small-scale enterprises (74.2%) had backup for load shedding. The results also showed that the mostly employed coping strategy by the small-scale enterprises at the Masala Market is change of working hours in relation to load shedding, followed by employment of part time employees and temporal relocation to unaffected areas.

However, the study established that for the majority of the small-scale enterprises (53.6%), most of the coping strategies employed were less effective. The main conclusion reached was that the frequent prolonged load shedding in Zambia significantly affects and disrupts business operations

particularly of small-scale enterprises. In addition, forming partnerships with neighbouring businesses that have access to reliable power supply can be beneficial to the small-scale enterprises. Sharing resources during load shedding periods can help mitigate the negative effects and ensure continuity of operations of the firms. The small-scale enterprises were recommended to consider investing in machines and equipment that use less energy or hybrid machines that are compatible with both electricity and solar. This study contributes to theory, policy and practice.

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It is possible that I would not have been able to write this dissertation if I had not had the support, patience, and direction of good people in my life. There are too many to list here, but a few deserve special mention. Dr. Charity Meki-Kombe, my co-supervisor, and Dr. Sidney Kawimbe, my principal supervisor, for taking on the role of my supervisor despite their numerous academic and professional commitments. I am grateful for their guidance and direction throughout my research, which helped me develop professionally and academically. I am extremely grateful to my friends, siblings, and family for providing me with the necessary support to complete the program, particularly, the dissertation.

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Above all, I would like to express my gratitude to the All-Powerful God for the numerous blessings he has bestowed upon me and continues to bestow upon me.

DEDICATION

I dedicate this work to God for the strength and health I needed to succeed in school. I also dedicate it to all of my family and siblings for their unwavering support and constant encouragement that I should be patient and persistent. They insisted that there were no elevators to success; one must accept staircases. I pray that all of you may receive numerous blessings from the All-Powerful God.

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ABBREVIATIONS

CGE	Computable General Equilibrium
CSO	Central Statistical Office
DAM	Direct Assessment Method
ERB	Energy Regulation Board
ESI	Electricity Supply Industry
GDP	Gross Domestic Product
GWh	Giga-Watt hour
HFO	Heavy Fuel Oil
IAPRI	Indaba Agriculture Policy Research Institute
IEA	International Energy Agency
IPP	Independent Power Project
ISI	International Standards Industrial Classification
KMO	Kaiser-Meyer-Olkin
Kwh	kilowatt-hours
MAN	Manufacturing Association of Nigeria
MCTI	Ministry of Commerce, Trade and Industry
MW	Mega Watts
NEP	National Energy Policy
OECD	Economic Co-operation and Development
PCT	Production Competence Theory
PPP	Private Public Partnerships
RDT	Resource Dependence Theory
REFiT	Renewable Energy Feed-in Tariff

SADC	Southern Africa Development Committee
SD	Standard Deviation
SDGs	Sustainable Development Goals
SMEs	Small and Medium Sized Enterprises
SPSS	Statistical Package for the Social Sciences
TDL	Transmission and Distribution Losses
TOC	Theory of Constraints
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
VoLL	Value of Lost Load
WTP	Willingness-to- Pay
ZCCI	Zambia Chamber of Commerce and Industry
ZESCO	Zambia Electricity Supply Corporation

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.0 Introduction

Load shedding, the deliberate shutdown of electricity supply for a certain period, has become a common phenomenon in many developing countries (Banda, Simukoko & Tailoka, 2021). Zambia has been one of the African developing countries that has been facing prolonged load shedding for the past few decades (Kalale, 2020; Siankwilimba, 2019). This load-shedding phenomenon has been having significant adverse effects to the operations of most businesses in Zambia where the small-scale business enterprises tend to be the most affected (Banda et al., 2021). Load shedding has therefore been considered one of the key factors affecting growth and sustainability of the small-scale enterprises, which are considered the engine for economic growth of Zambia (Banda et al., 2021; Fungwe & Kabubi, 2019). Small-scale businesses among the notable areas in Zambia that are mostly affected by load shedding are large markets (Banda *et al.*, 2020; Lombe & Tembo, 2023), one of which is Masala Market situated in Ndola on the Copperbelt Province. However, there is lack of empirical evidence regarding the impacts of load shedding on the operations of small-scale enterprises in Zambia specifically in Masala Market, Ndola.

Hence, the motivation behind this research study. The main purpose of the study is to assess the impact of electricity load shedding and coping strategies on the business operations of small-scale enterprises at the Masala Market in Ndola, Zambia. This chapter is therefore, the introductory chapter of the study. In this introduction, the background to the study is presented leading to the statement of the problem that the study aimed to address. It expresses the motive, general and specific objectives, as well as research questions that needed to be answered. The chapter additionally considers the rationale of the study, scope and operational definitions of terms and provides the summary of the chapter.

1.2 Background of the Study

Electricity load shedding is a global challenge, particularly in developing economies, and Zambia is no exception. The impact of load shedding on developing economies like Zambia is significant (Umar *et al.*, 2019). In the majority of cases, this has resulted in the occurrence of load shedding. Beginning in early 2015, Zambia encountered a substantial deficit in power supply amounting to

2,100 gigawatt-hours (GWh), which subsequently led to the implementation of load shedding measures across the whole nation (Banda, Simukoko & Tailoka, 2021; Kintu, 2022). This issue of load shedding has plagued the country for years, causing immense frustration and hindering economic growth (Banda *et al.*, 2021; Kintu, 2022). Industries suffer from reduced productivity due to interrupted operations and unreliable power supply. This hampers economic growth by affecting productivity of firms.

One of the sectors hardest hit by load shedding is the Small to Medium Enterprises (SME) sector. In Zambia, small-scale enterprises form the backbone of the economy. SMEs in Zambia play a significant role in the advancement of manufacturing, employment generation, and sales growth. According to the Ministry of Commerce, Trade and Industry (MCTI) (2020), these enterprises constitute 97% of all businesses within the nation, contribute 70% to the Gross Domestic Product (GDP), and employ 88% of the total workforce.

According to Muthuswamy (2022), SMEs are vital towards achieving Zambia's Vision 2030, as they drive economic growth through increased productivity and competition. They also contribute significantly towards poverty reduction by creating employment opportunities and empowering local communities. Thus, the Zambian government has placed emphasis on the advancement of small-scale enterprises throughout the nation, recognizing their role in stimulating sustainable economic development (Fungwe & Kabubi, 2019).

However, the major concern has been the increasing rate of failure of the SMEs as well as the declining contribution of the SMEs to the country's GDP (Banda *et al.*, 2021; Phiri, 2018). The major factors contributing to this poor performance of the SME sector has been attributed to the load shedding facing the country over the past decade (Banda *et al.*, 2021; Bwalya *et al.*, 2022; Phiri, 2018). Load shedding has been found to be the leading factor behind the high failure rate of small-scale enterprises in Zambia (Chewe, 2020; Mwewa, 2018). According to the statistics by the Zambia Chambers of Commerce and Industry (ZCCI) for 2021, the failure rate of small-scale enterprises in Zambia exceeds 70%. This high rate of failure raised significant concerns and prompted investigations into the various issues that impede the expansion of the small-scale enterprise in Zambia (Mwewa, 2018).

From the previous research studies, load shedding is among the external factors affecting the operations of the small-scale enterprises in Zambia leading to poor performance and ultimately high failure rate (Banda *et al.*, 2021; Bwalya *et al.*, 2022; Lombe & Tembo, 2023; Phiri, 2018). Load shedding has been an ongoing directive over the decade as the country's electricity demand exceeds supply. As cited by Banda *et al.* (2021), the peak national power demand exceeds 1,780 MW, while Zambia Electricity Supply Corporation (ZESCO) Limited, the power generation company, has a capacity of approximately 1,700 MW whilst there is a power imbalance of approximately 165 MW during peak hours, resulting in load shedding and protracted power cuts. Electricity disruptions have had adverse effects on trade and production particularly, the small-scale enterprises.

The history of load shedding in Zambia dates back to the early 1990s when the country experienced its first major power crisis (Bayliss & Pollen, 2021; Masule, 2022; Samboko *et al.*, 2016). However, the major power deficits in Zambia re-emerged in 2020 (Banda *et al.*, 2021). The commencement of electricity load shedding by ZESCO, which started in April 2015, was a direct result of a decrease in generation capacity and increase in electricy demand (ZESCO, 2023). The intensification of load-shedding occurred in June 2015, during which the majority of regions in Zambia saw a daily eight-hour load shedding as a means of addressing the deficit of 2,100 Megawatt-hours (Masule, 2022; ZESCO, 2023).

In order to effectively address the issue of load shedding, ZESCO devised a comprehensive plan for power outages in various places. ZESCO operates four divisions throughout the country, including the Copperbelt division, the Lusaka division, the Northern division, and the Southern division (ZESCO, 2023). Each of these divisions was subjected to a load shedding schedule that typically spanned eight hours, and was systematically rotated between the sub-areas within the divisions (Masule, 2022). Since then, load shedding has been the living style across the country. Due to the prevailing power shortfall, ZESCO further implemented an escalated load-shedding schedule over the period of 2019 to 2020, whereby the duration of power outages for the bulk of its residential, commercial, and industrial customers was extended to a minimum of fifteen (15) hours each day (Banda *et al.*, 2020).

This ongoing load shedding has been found to have significant impacts on the small-scale enterprieses due to their charcteristics (Banda *et al.*, 2021; Lubasi, 2020). To mitigate the adverse

impacts of load shedding, the small-scale enterprise in Zambia have been compelled to employ alternative coping strategies (Lombe & Tembo, 2023). However, besides the coping behaviour of the small-scale enterprises, the firms continue to face significant challenges in their business operations particularly in times of load shedding (Ngenda, 2020; Phiri, 2018).

This therefore motivated the researcher to assess the effects of load shedding as well as the effectiveness of the coping strategies of the small-scale enterprises. The motivation for this study stemmed from the researcher's observation that load shedding has been and is still posing a number of challenges to citizens of Zambia. Since 2015, Zambia has been experiencing the worst electricity crisis (Banda *et al.*, 2021). Zambia continues to face a significant issue in the form of a structural deficit in energy supply, leading to regular load shedding (Banda *et al.*, 2021). The ongoing load-shedding crisis has been found to be affecting small-scale enterprises, particularly those operating in large markets such as the Masala Market located in Ndola in the Copperbelt Province.

This vibrant Masala Market is a hub of activity and commerce (Muchindu, 2022; Simwaya, 2017). However, the constant power outages have cast a shadow over its otherwise lively atmosphere. The market used to house around 3,000 vendors, including fish, fruit and vegetable traders, restaurants, agro-product sellers, carpenters, and hardware suppliers (Ndola Chamber of Commerce, 2022). However, over the past years, the number of traders has significantly declined; load shedding has been one of the contributing factors to failure of most of the small-scale enterprises at the market (Chisanga, Musuka & Haambiya, 2015; Ndola Chamber of Commerce, 2022). The remaining operating small-scale enterprises are those that have managed to come up with coping mechanisms such as use of solar systems and back-up generators (Ndola Chamber of Commerce, 2022). However, little effort have been done yet to document the effects of load shedding and the coping strategies on the operations of the small-scale enterprises operating at the Masala Market in Ndola, Zambia. This is one of the notable gaps, which this study aimed to address.

In recent times, Zambia has experienced a significant surge in economic activities, resulting in a heightened need for energy. This increased demand for energy has surpassed the hydroelectric power generation capacity of the Zambia Electricity Supply Corporation (ZESCO). Consequently, ZESCO has been compelled to curtail the provision of power to different sectors of the economy. ZESCO (2023) has just made a public announcement on the augmentation of load shedding

periods, which have been extended from 6 hours per day to 12 hours per day. The recurrent occurrences of load shedding have had a notable adverse effect on small-scale enterprises that rely on power for their operational activities. The potential for future load shedding still persists due to the aging state of the nation's power generation infrastructure, which need either replacement or upgrading to accommodate the current surge in electricity demands (ZESCO, 2018).

In this particular scenario, it is vital to possess a comprehensive understanding of the ramifications that electricity load shedding imposes on operational activities. The examination of small-scale firms and their coping mechanisms holds significant importance for small-scale entrepreneurs in Zambia, which play a critical role in socio-economic development. This assertion holds particularly true for small-scale firms, as the impact of load shedding on consumers is characterized by a dynamic and multifaceted nature. The value generated by small-scale firms does not adhere to a linear production system like to a factory, where a power outage results in a foreseeable and quantifiable decline in productivity. The lack of comprehensive understanding of the effects of load shedding on small-scale firms is a notable issue, in that load shedding continues, despite its significant role within the Zambian economy. Small-scale enterprises have been acknowledged as a pivotal catalyst for the sustainable economic growth of Zambia.

The primary objective of the Vision 2030 Agenda is to promote the socioeconomic transformation of the nation, propelling it from a developing state to a middle-income economy by the year 2030. The achievement of Vision 2030 is based on three core pillars: the economic, social, and political dimensions. It is expected that the small-scale enterprise sector will play a crucial role in advancing the economic pillar. According to the Zambia Chamber of Commerce and Industries (ZCCI, 2018), the small-scale enterprises sector holds a prominent position within the Zambian economy, ranking among its largest industries.

Electricity consumption is a significant catalyst that exhibits notable linkages and spill over effects. The small-scale firm sector is characterized by intense competition in the product-market; where profit margins are extremely narrow (Umar et *al.*, 2019). It can be argued that the prosperity of small-scale firms in Zambia is contingent upon the integration of supply chain and logistics systems, which are fundamentally supported by a shared factor: a dependable energy supply. The challenges faced by ZESCO have the potential to jeopardize the survival of small-scale firms in Zambia and their capacity to offer affordable products (Banda *et al.*, 2021).

Zulu (2015) asserts that wood-fuel, encompassing firewood and charcoal, serves as the primary energy source in Zambia. This energy resource predominantly caters to households residing in both rural and urban regions. As per the findings of Mwila (2017), hydro generation holds a dominant position in the Electricity Supply Industry (ESI) of Zambia. In the study conducted by Zulu (2015), it was found that the majority of the national installed capacity, specifically 96%, was attributed to hydro generation. A smaller portion, around 2.1%, was derived from alternative sources such as Diesel and Heavy Fuel Oil (HFO). Additionally, renewable energy sources, including solar and small hydro systems, accounted for approximately 1.7% of the total installed capacity.

According to Mwila's (2017) research, Zambia has encountered a decline in its electricity provision. This can be attributed to the diminished generation capacity of the Zambia Electricity Supply Corporation (ZESCO), primarily resulting from depleted water levels in the reservoirs due to inadequate rainfall.

ZESCO was established as a corporate entity in the year 1970, with its principal office located in Lusaka, Zambia. ZESCO is a government-owned electricity utility business operating in the Republic of Zambia. Zambia's major power utility is responsible for the generation of around 80% of the electricity consumed within the nation. The following power stations fall under the jurisdiction of ZESCO: According to ZESCO (2023), the Kafue Gorge Upper hydroelectric power plant has a capacity of 990 MW. Similarly, the Kariba North Bank power plant generates 720 MW, while its extension facility contributes an additional 360 MW. The Victoria Falls power plant has a capacity of 108 MW, while the Itezhi-Tezhi Dam generates 120 MW of electricity.

The power deficit seen during 2015 has varied between 560 and 1000 MW. Since 2015, the nation has faced a power shortfall, leading ZESCO to escalate the duration of load shedding for the majority of its residential, commercial, and industrial customers to a range of eight (8) to twelve (12) hours per day (ZESCO, 2023). Phiri (2017) asserts that the phenomenon of load shedding exerts a detrimental impact on both business growth and entrepreneurship. The majority of instances involving load shedding have a detrimental impact on the operational aspects and financial sustainability of businesses, with small-scale organizations being particularly susceptible to poor consequences. Considering the significant role of electricity in Zambia, particularly for

small-scale enterprises, it is imperative to conduct a comprehensive analysis of the effects of load shedding on the operational aspects of these enterprises.

As of 2006, ZESCO's installed capacity stood at approximately 1631 MW, while the overall demand amounted to 1200 MW. According to Chisala (2015), the company obtained a surplus capacity of 431 MW, a portion of which was subsequently exported within the region. Nevertheless, in the beginning of 2007, ZESCO saw a decline in its generation capacity to 1000MW, accompanied by a simultaneous increase in demand to 1300MW, leading to a deficit of 300MW (Engineering Institution of Zambia, 2015). In Ndola, the urban center in which Masala Market is situated, the predominant source of electricity is hydroelectric power, which is also the primary energy supply for manufacturing firms, small-scale industries, and homes across the country (Banda *et al.*, 2021).

If ZESCO is unable to generate and distribute sufficient electricity, but resorts to power rationing measures, this might result in disruptions to the normal functioning of enterprises, particularly those that do not have access to alternate sources of electricity, as mentioned by Bagher *et al.* (2015) and Chirwa and Sinyangwe (2008). This implies that enterprises are likely to have a failure in generating the necessary production for economic growth, leading to shifting of the costs of this failure onto consumers. This could result in a phenomenon akin to Cost-push inflation, where the prices of consumer goods go up in response to supply-chain disruptions.

As stated by Chola (2015), Zambia is currently facing a severe electricity crisis, characterized by a shortage of 560 MW. This predicament is expected to exacerbate due to an annual increase in electricity consumption by 200 MW. The government has made significant progress in tackling this issue by overseeing the commissioning of the 120 MW Itezhi-tezi power station, with plans for the subsequent establishment of the 150 MW Maamba Coal-Powered Station (Engineering Institution of Zambia, 2015).

There exist numerous conjectures pertaining to the phenomenon of load shedding in Zambia. There are differing perspectives regarding the causes of this phenomenon. Certain individuals attribute it to the inadequate planning abilities of policy makers, while others argue that it is a natural occurrence that may be resolved if the country receives ample rainfall to replenish its dams and lakes during a specific timeframe (Bagher *et al.*, 2015).The insufficiency and untimeliness of

rainfall in Zambia has led to a deficiency in water flow necessary for the generation of electricity at the country's largest hydroelectric power unit, known as Kariba Dam.

Electricity is often regarded as a fundamental aspect of contemporary existence. It serves as a crucial factor in the generation of goods and services, as well as the enhancement of overall quality of life. However, it is important to acknowledge that the current situation in Africa regarding access to electricity is concerning. According to the International Energy Agency (IEA) in 2015, over 600 million individuals in Africa do not have access to electricity. Furthermore, even for those who are connected to the grid, the reliability and consistency of the electrical supply can be unreliable. Electricity outages have been a prevalent characteristic in numerous African nations (Andersen & Dalgaard, 2013).

Bilgili and Ozturk (2015) assert that electricity has a crucial role in fostering economic growth by enhancing worker productivity and stimulating entrepreneurial endeavours. According to Todaro (2011), the provision of electricity is commonly associated with the stimulation of economic growth and development. According to the Southern Africa Development Committee (SADC) Report (2018), there exists a positive correlation between electricity consumption and the real per capita Gross Domestic Product (GDP) in the majority of countries. According to Tembo (2013), the presence of electricity is commonly acknowledged as a significant catalyst for economic activities and industrial development.

According to the Energy Sector Report (2015), there was a positive correlation seen between electricity consumption and the gross domestic product (GDP) of Zambia over the period 2004 to 2005. Specifically, it was noted that while electricity consumption saw a growth rate of 1.21%, the GDP of Zambia exhibited an average annual growth rate of 5.5% (Banda *et al.*, 2021). This observation suggests a favourable association between power use and GDP growth. Hence, the significance of electricity inside an economy is of utmost importance, and should not be underestimated. This is due to the fact that several sectors, including health, construction, manufacturing, entertainment, education, and communications, heavily rely on the generation of energy to carry out their operations (Mwansa, 2014).

In the year 2000, the power sector made a contribution of 6.21% to Zambia's industrial GDP, as reported by ZESCO in 2023. According to Mwansa (2014), a decline in economic growth has been

typically observed in instances of electricity production failure. The lack of access to power by customers, and the adverse impact on key economic stakeholders such as private firms, contribute to this phenomenon. An increase in production costs has been observed due to the growing reliance on generators for electricity generation, as reported by ZESCO in 2023. Since 2015, Zambia has encountered a power deficit because of less rainfall during the rainy season of 2014/2015. According to Banda *et al.* (2021), the shortfall in June 2015 was recorded at 560MW, and it subsequently increased to around 1,000MW by November 2015.

The primary reason for this phenomenon can be attributed to Zambia's reliance on hydroelectric power generation, which accounts for nearly 96% of its total energy production. This significant proportion is predominantly derived from reservoirs associated with the three main hydropower facilities located in the southern region of the nation. As a result of the deficit, ZESCO implemented a rigorous load-shedding regimen to conserve water in the dams and prevent a total shutdown of the power generation facilities. In response to the decrease in power generation, ZESCO implemented a range of steps aimed at mitigating the impact. These efforts encompassed short-term, medium-term, and long-term strategies, one of which was the importation of emergency electricity.

According to the Engineering Institute of Zambia (EIZ) report of 2015, one of the major contributors to the current electricity crises in Zambia is the fact that the Kariba North bank power stations has not adjusted to the current pattern of rainfall. The power station still operates on the old pattern from the time it was designed in the early 1970s, failing to take into account the recent year's droughts. Power outages in Zambia, particularly beginning in 2008 have also been attributed to acts of vandalism, targeting the 120 Megawatts (MW) Zambia Democratic Republic of Congo inter-connector. This inter-connector served as the sole source of imported power for a period of 52 years, with the consequences primarily impacting domestic power supply (Banda *et al.*, 2021). However, power shortages experienced in 1992, 2000, 2006-2009, and 2015 can chiefly be attributed to the impact of climate change-induced droughts. These droughts have revealed the danger of excessive reliance on hydroelectric power, which had a generation capacity of less than 2000 MW throughout those periods. This capacity proved to be inadequate in mitigating the negative consequences of the droughts. According to ZESCO Limited, the 2015 power crisis can

be attributed to the insufficient water levels in the Kariba dam as a result of inadequate rainfall during the 2014/15 season (Mwale, 2015; ZESCO, 2015).

Although the aforementioned rationales hold merit, it is imperative to assert that the primary cause behind the prevailing and historical power crises may be attributed to the deferred investments in significant capacity expansions, owing to the substantial surge in demand for consumption, coupled with the failure to diversify the generation portfolio.

According to World Bank (2008) and Kapika and Eberhard (2013), the demand for power has continued to exceed the supply all the way through to 2022, despite the installation of a generation capacity of 3,456.8 MW and a surplus of 1,156 MW. This imbalance was mostly caused by the rapid development in demand from industry, families, and mines, as well as population expansion. Moreover, it appears that the issue has been exacerbated by the failure to expand the range of energy generation sources in response to the challenges posed by climate change. This can be attributed, in part, to the regulatory authority's limited autonomy resulting from political interference, as well as inefficiencies within ZESCO's operational practices (IPA 2007).

In April 2015, ZESCO Limited initiated the implementation of energy supply rationing due to a decline in generation capacity. The occurrence of this phenomenon became more pronounced in June 2015, as a result of which the majority of regions experienced a daily load shedding period of eight hours in order to address the power deficit of 2,100 gigawatt-hours (GWh) (Banda *et al.*, 2021). According to Kapika and Eberhard (2013), ZESCO Limited has stated that in the absence of power rationing, the electricity supply from Zambia's primary hydroelectric power plants, namely the Kariba North Bank and Kafue Gorge power stations, would only be sustainable for a period of two months. These power stations have capacities of 720 MW and 990 MW, respectively. ZESCO's implementation of power rationing involved the utilization of a load-shedding schedule to allocate electricity supply among several sites. The schedules are divided among eight provincial zones in the country, specifically Copperbelt, Central, Eastern, Lusaka, Northern, Southern, Livingstone, and Western divisions (ZESCO, 2023). ZESCO's prescribed duration for load shedding typically amounted to eight hours and was systematically distributed across the various sub-areas within the divisions. The occurrence of load shedding shows variation among different divisions. In the Lusaka division October load-shedding schedule, it was observed that

the industrial area, which houses a majority of agro-processing companies, experienced power disconnection from 4:00 am. Similarly, the central business district faced power disconnection from midnight to 08:00 am, while certain commercial farms encountered load shedding from 06:00 am to 12:30 pm (ZESCO, 2023). This implies that certain commercial farms possessed the capability to get power for the purpose of irrigation specifically during the most favorable irrigation periods, which typically occurred in the late afternoon.

During this particular period, the procurement of emergency power imports from Aggreko had significant financial implications for both ZESCO Limited and the Government of the Republic of Zambia (ZESCO, 2023). Aggreko specialises in proving power and temperature control to customers who need them, either very quickly or perhaps for a short period of time, or, in some cases just for as long as they are needed. Between September 2015 and December 2015, an amount of forty million, one hundred and twenty-two thousand, eight hundred and forty-seven United States Dollars and twenty cents (US$40,122,847.20) was allocated for the procurement of 148 megawatts (MW) of power through imports. The purchasing price of power from Aggreko by ZESCO exceeded the selling price at which ZESCO subsequently provided the same power to its customers. The price per kilowatt-hour of electricity was 18.43 US cents, whereas ZESCO, in contrast, was selling the electricity at an average rate of 5 US cents per kilowatt-hour (ZESCO, 2023). According to the Government Gazette (2018), a substantial deficit was incurred consequently.

In late 2015, due to the high cost of importing power from Aggreko, the country transitioned to Electricidade de Mozambique (EDM of Mozambique). In early 2016, Zambia incurred a debt of 70 million US Dollars to EDM for the power supplied (ZESCO, 2023). The government subsequently decided to abandon the proposal of importing electricity from the Electricidade de Moçambique (EDM) due to its high cost. In the beginning of 2016, Zambia sought assistance from Turkish power producers, Karadeniz, to obtain 100 MW of electricity, in order to address the challenges faced by its struggling power industry (ZESCO, 2023). At that time, the aforementioned corporation held a unique position as the sole global entity possessing a fleet of large maritime vessels capable of generating power. Subsequently, upon docking, the company would connect this power to electricity grids.

These power stations, also referred to as power badges, primarily operate on fuel oil but may also utilize natural gas as an alternative fuel source (ZESCO, 2023). One of the vessels owned by the corporation was stationed at the port of Nacala in Mozambique, where electricity was generated and subsequently transported to Zambia through a grid system. Zambia has emulated the approach taken by Ghana and Cameroon, both of which have been reaping the advantages of a 225 MW plant since 2014. Zambia, being in Southern Africa has not been spared from this disparity, and small-scale operations have been particularly vulnerable. The operations of small-scale enterprises in Zambia is heavily dependent on electric power if they are to operate effectively and efficiently (Banda *et al.*, 2021).

However, to the best knowledge of the researcher, there is little empirical research done yet, to determine the effects of load shedding on the business operations of the small-scale enterprises in developing economies, given their significant contributions to economic development. Precisely, no research has been done yet in the context of small-scale enterprises operating at the Masala Market in Ndola, Zambia. Against this backdrop, the study aims to fill the gaps in knowledge by assessing the impact of electricity load shedding on the business operations of small-scale enterprises, and coping strategies at Masala Market.

1.2 Problem Statement

It is essential for a business to operate in a favourable environment in order to grow. This also applies to the quality of the inputs, including electricity, which is crucial because the majority of business operations operate on electricity. According to Banda, *et al.* (2020), electricity plays a crucial role in the expansion and development of small businesses. Thus, the operations and performance of Small and Medium Enterprises (SMEs), have been impeded by energy load shedding due to their small size. When small businesses and industries have an uninterrupted supply of electricity, they produce more, creating and maintaining jobs to accommodate the increased workload. According to Banda *et al.* (2020), this increased productivity results in increased profits to support infrastructure enhancements. The prevalent load shedding in Zambia also poses significant challenges to the operations of businesses particularly SMEs.

The Zambia Chamber of Commerce and Industry (ZCCI) (2020) asserts that Zambia has experienced a power crisis in recent times, resulting in the implementation of load management, commonly referred to as load shedding, across the nation. This has had detrimental effects on

businesses. Business owners often have challenges in accessing a sufficient and reliable supply of electricity necessary for the efficient operation of their company (Kintu, 2022). Consequently, in the event of electrical outages, business owners are compelled to seek alternative sources of power, such as employing generators, or face operational inactivity (Umar & Kunda-Wamuwi, 2019).

By the end of 2022, the electricity supply deficit increased to a level where the Minister of Energy Mr. Peter Kapala gave a ministerial statement in Parliament announcing the increased hours of load shedding the initial six (6) hours, to twelve (12) per day, throughout the country (ZESCO, 2023). The impetus for this study arises from the researcher's observation that the occurrence of load shedding in Zambia has presented, and continues to present various difficulties for its residents.

According to ZCCI (2020), the load shedding of electricity affects businesses and their owners in several publicly known but undocumented ways. Therefore, there is need to gain deeper understanding of the impacts load shedding has on the operations of the small-scale enterprises in Zambia, and document findings in a systematic manner through empirical studies. This justifies the need for this current study. Small-scale businesses among the notable areas in Zambia that are mostly affected by load shedding are large markets (Banda *et al.*, 2020; Lombe & Tembo, 2023), one of which is Masala Market, situated in Ndola on the Copperbelt Province. Masala Market is the second largest market in the province, with a huge collection of small-scale enterprises in one area (Simwaya, 2017). The reduction in the population of traders at Masala Market from 3,000 to less than 2,000 by end 2015 can be attributed to load shedding. (Ndola Chamber of Commerce, 2022).

According to the Ndola Chamber of Commerce (2022), most of the entrepreneurs have shunned the market due to the load-shedding situation, which was heavily impacting their operations. The Masala Market under Group B has been facing load shedding on a daily basis - that is, between 0600 hours to 1800 hours, or 1200 hours to 0000 hours, depending on the schedule for the day. Either way, business hours of 0800 hours to 1700 hours are affected (ZESCO, 2023). This is an indication that the operations of the small-scale enterprises at the Masala Market were being disrupted by load shedding. Precisely, the study by Chisanga et al. (2015) reported that the frequent power cuts by ZESCO affected fish traders at the Masala Market as ice production was impacted,

ultimately affecting storage of fresh fish. This resulted in some fish traders at the market shunning the fish trading business (Chisanga et al., 2015).

According to the ZCCI (2021), over 70% of the small-scale enterprises in Zambia including informal traders at the Masala Market fail to survive, and load shedding has been identified to be among the contributing factors. The Zambia Chamber of Small and Medium Business Associations (2021) reported that due to load shedding, in total the small-scale enterprises lose approximately US$15 million annually. This has been a concern to the Zambian government as this has also resulted in the decline in the contribution of the small-scale enterprises to GDP from 70% to around 50% (Zambia Chamber of Small and Medium Business Associations, 2021). The remaining operating small-scale enterprises are those that have managed to come up with coping mechanisms such as use of solar systems and back-up generators (Ndola Chamber of Commerce, 2022). Besides, the researcher also observed that the small-scale enterprises at the Masala Market were being impacted by the load shedding such that a few had resorted to coping strategies such as use of solar panels and generators.

The aforementioned facts led to the need for this research, as well as existing empirical gaps in literature. Several studies have been conducted to examine the effect of load shedding to consumers in general. The few studies such as those done by Alban and Moshi (2014), Alo and Adeyemo (2021), Banda *et al.* (2020), Cissokho and Seck (2013), Lombe and Tembo (2023) and Kintu (2022), have examined the effects of load shedding on SMEs in the context of developing economies including Zambia. However, the majority of previous studies were done outside Zambia. In addition, prior studies done in Zambia focused on small-scale enterprises in other geographical settings such as Kitwe (e.g. Banda *et al.*, 2020; Bwalya *et al.*, 2023) and Lusaka (e.g. Lombe & Tembo, 2023, Kintu, 2022 and Umar & Kunda-Wamuwi, 2019). Ndola's Masala Market has yet, not been the focus of any detailed study.

In separate investigations conducted by Ngenda (2020) and Sichone *et al.* (2016), the impacts of load shedding on larger corporations within the Zambian manufacturing sector were examined, with small-scale enterprises being excluded from the analyses. More so, Siankwilimba (2019) only studied the effects of electricity load shedding on Zambian small-scale agricultural enterprises, focusing on five Southern Province districts namely Namwala, Mazabuka, Choma, Monze and

Kalomo districts. Other studies such as Samboko *et al.* (2016) have also focused on the agriculture sector of Zambia.

Looking at all the studies highlighted above, it can be seen that there has never been any study that has critically dedicated its investigation to assessing the impact of electricity load shedding on the operations of small-scale enterprises specifically at Masala Market, Ndola. Hence, the study in question addresses notable gap in its examination of the impact of power load shedding on operations of small-scale firms at Masala Market in Ndola, Zambia. Therefore, the identified gap sought to be filled, focusing on small-scale enterprises at Ndola's Masala Market. This aspect has not been sufficiently explored by previous studies.

1.3 General Objective of the Study

The general objective of this study was to assess the impact of electricity load shedding and coping strategies on the business operations of small-scale enterprises at Masala Market in Ndola, Zambia.

1.4 Specific Objectives of the Study

The specific objectives of the study were:

i. To investigate the ways in which electricity load shedding affects business operations of small-scale enterprises at Masala Market in Ndola, Zambia;

ii. To establish coping strategies and their effectiveness on business operations of small-scale enterprises at Masala Market in Ndola, Zambia;

iii. To develop and propose a framework for small-scale enterprises at Masala Market in Ndola, Zambia to cope with electricity load shedding.

1.5 Research Questions

Therefore, this study aimed to answer the following questions:

i. In what ways does electricity load shedding affect business operations of small-scale enterprises at Masala Market in Ndola, Zambia?

ii. What coping strategies are being implemented by small-scale enterprises at Masala Market in Ndola, Zambia and how effective are they on business operations of small-scale enterprises at Masala Market in Ndola, Zambia?

iii. What framework can be employed by small-scale enterprises at Masala Market in Ndola, Zambia to cope with electricity load shedding?

1.6 Research Hypothesis

Basing on the Resource Dependency Theory, the Economics of Power System Reliability and Planning Theory and the principles of the coping theories, namely the Cybernetic Theory and Stress Theory, the following hypotheses were derived:

$H_{1a:}$ Load shedding has significant impacts on the business operations of small-scale enterprises at Ndola's Masala Market.

$H_{1b:}$ Load shedding has no significant impacts on the business operations of small-scale enterprises at Ndola's Masala Market.

$H_{2a:}$ Coping strategies effectively influence the business operations of small-scale enterprises at Ndola's Masala Market.

$H_{2b:}$ Coping strategies do not effectively influence the business operations of small-scale enterprises at Ndola's Masala Market.

1.7 Rationale of the Study

There are several motivations behind the need to examine the effects of load shedding and coping strategies on the business operations of the small-scale enterprises at the Masala Market. The main motivation for this study stemmed from the researcher's observations as well as previous research findings that load shedding has been, and is still posing a number of challenges to small-scale enterprise of Zambia, given the nature and importance of the sector. The rationale behind conducting this research therefore, lies in the need to understand the extent and nature of the impact that load shedding has on small-scale enterprises at the Masala Market. These enterprises play a crucial role in the economic development of Zambia, as they contribute significantly to employment generation and poverty reduction. The other motivation is the lack of empirical

literature on the context. Precisely, no such research has been done focusing on the small-scale enterprises at the Masala Market of Zambia, as previous studies have focused either on other markets or other sectors in Zambia.

By assessing the impact of load shedding on these small enterprises, policymakers can develop effective strategies and policies to mitigate its adverse effects. However, despite coping behaviour of the small-scale enterprises, the firms continue to face significant challenges in their business operations particularly in times of load shedding (Ngenda, 2020; Phiri, 2018). This therefore motivated the researcher to assess the effects of load shedding as well as the effectiveness of the coping strategies of the small-scale enterprises. Moreover, understanding how these businesses cope with such disruptions can provide valuable insights into their resilience and adaptability of the small-scale enterprises, leading to their sustainability.

In conclusion, assessing the impacts of load shedding on small-scale enterprises is essential for gaining insights into this critical issue. Findings from this research can inform policymakers about necessary interventions that can support these small-scale enterprises during load shedding, to ensure their sustainability and growth.

1.8 Delimitations of the Study

According to Creswell (2012), the delimitations of a study are the components and aspects of the inquiry that will not be taken into consideration. To put it another way, these are the limits that the researcher places on the scope of the study in terms of its length, population size, and the kinds of participants (Kothari & Garg, 2020). The delimitations serve to specify the investigation's overall parameters. Researchers are able to draw conclusions about the reliability or external validity of an experiment or study based on the scope that is provided by delimitations (Patton, 2017).

This study does not cover all the small-scale enterprises in markets in Ndola, but focuses on Small-scale enterprises operating at Masala Market only. The reasons for choosing a convenient sampling technique is due to availability of limited resources, local circumstances such as practical access, ethical and permit considerations, in addition to time constraints. This study was also limited to the variables selected, which is electricity load shedding as independent variable, and Small-Enterprises economic performance as an independent variable.

This exploration was directed at Masala Market, Ndola of the Copperbelt Province of Zambia. The choice of the Masala Market for this study was influenced by the presence on the location of a variety of small-scale businesses, and information was readily available. A large portion of the business visionaries who run organizations at Masala Market are individuals who were once Street Vendors, who however, have formalized their organizations into limited scope ventures including retail shops, eateries and metal fabrication workshops. The study was confined to the period 2018 to 2022, which saw increased episodes of load shedding, and possibly related failure of SMEs in Zambia.

1.9 Assumptions of the Study

An assumption is a realistic expectation, which is something that we believe in to be true but has no empirical evidence to support it (Creswell, 2012). Several assumptions underpinned this study. Firstly, the researcher assumed that the participants that were to be investigated would be a representative sample of small-scale enterprises in Ndola, and Masala Market in particular. Secondly, it was assumed that electricity was a business enabler for small-scale enterprises. Thirdly, the load shedding challenges facing the operations of small-scale enterprises at Masala Market had a similar effect or occurrence, as the load-shedding schedule was common to all small-enterprises. Fourthly, it was assumed that the participants would be willing to participate in the study, and provide honest assessment of their experiences. Lastly, it was assumed that the self-reported demography (ethnicity, gender, and grade level) was sufficiently free of error in cases where the questionnaire was given to respondents, in order to eliminate any form of ambiguity.

1.10 Operational Definitions

Load Shedding - this is defined as a method of reducing demand (or load) on the energy generation system by temporarily switching off distribution of energy to different areas of energy utilities. (Raghu & Manjunatha, 2017).

Business Operations - refer to the activities, processes, and functions that a company undertakes to produce and deliver goods and services to its customers (Mkala, Wanjau & Kyalo, 2018).

Small Scale Enterprise - the definition of a small-scale enterprise is one that owns assets, employs staff, or earns income below a certain threshold. According to Chigunta (2012), a small-scale enterprise is a business undertaking whose objective is to make profit with potential for growth,

employs staff or believes in self-employment. Chigunta (2012) added on by defining a small-scale enterprise as the establishment and operations of an enterprise for the sole purpose of growing the business. However, Chigunta (2012) contends that entrepreneurs and business managers could not all be recognized as micro entrepreneurs. In Zambia, these are businesses whose annual turnover does not exceed K800, 000.00 per annum; it also includes businesses employing up to 30 persons (The Small Enterprises Development Act of 1996).

Going Concern - this refers to the fundamental assumption that a company will not enter liquidation and will continue to operate for at least one (1) year (Manni & Faccia, 2020).

Coping Strategies - in this research, it refers to an action, a series of actions, or a thought process used in meeting a stressful or unpleasant situation, or in modifying one's reaction to such a situation.

Operations - an act of functioning, or the fact of being active or in effect, such as the management of business enterprises.

Brown Out- this is an intentional or unintentional drop in the voltage supply on the electrical power supply side. Intentional brown outs are a strategic method used for load reduction in an emergency.

Black Out- also known as, power outage, power cut, or load shedding, is the loss of electricity supply on the end user's side.

1.11 Outline of the Dissertation

To achieve the stated objectives, this research was carried out where it comprised of six main chapters arranged in chronological order from Chapter 1 to this final chapter that is Chapter 6. Chapter 1, the introductory chapter of this study presented the background of the research leading to the research problem and research objectives. The research questions and statements of hypotheses were presented as well as the significance and justification of the research. In addition, the chapter presented the scope of the study, limitations of the study, assumptions of the research, and operational definitions of key terms, and lastly outline of the research.

Chapter 2 provided the full literature review of load shedding and its impacts on businesses according to different scholars and authors. This chapter provided an introduction to load shedding,

definitions of load shedding, small-scale enterprises and business operations as well as the global context of the background and contribution of small-scale enterprises. Chapter Two further presented the critical review of available literature on the role and importance of electricity to businesses, including SMEs. Also, the impact of load shedding on operations of small-scale enterprises, and their coping strategies to load shedding. Overall, the literature showed how operations of SMEs are impacted by load shedding. The research gaps that the study sought to fill were outlined in this chapter.

Additionally, Chapter 2 covered the theoretical and conceptual frameworks for the study. The theoretical framework on which the study was anchored was presented, where the main theories presented and discussed include the Resource Dependence Theory (RDT), the Economics of Power System Reliability and Planning theory, Cybernetics Theory of Organisational Stress, Theory of Constraints (TOC), Production Competence Theory and the Transformation Theory of Production.

Chapter 3 covered the Methodology employed in this study. This chapter provided a description of the Research Methodology, which is the design of how the study and research was conducted. The chapter provided an overview of the research techniques employed to collect and analyse the empirical data utilised in this study, as well as a description of the research design, research philosophy and research approach. This chapter provided a description of the sampling method utilised, encompassing the sampling frame and the size of the sample. In addition, the chapter discussed the data collection methods. The chapter additionally delineated the analysis conducted, the methodologies employed in the data analysis, and the manner in which the data were presented in the study. Precisely, the Pragmatism Research Philosophy was adopted, as well as the Cross-sectional Descriptive Research Design, Survey Research Strategy and the Mixed Method Approach. The Concurrent Mixed Approach was used in this study.

In this research, the researcher used both Probability and Non-Probability sampling methods, namely Simple Random Sampling and Purposive Sampling respectively. The study employed primary data collection methods namely Survey Questionnaire, In-depth Interviews and Observations, whilst secondary data were collected using Document Review. Data were analysed using Descriptive, Chi-square, Correlation and Content Analyses.

Chapter 4 presented results and the analysis. The chapter focused on research findings that were discovered using questionnaire surveys, observations, document reviews, and in-person interviews. This section of the study presents the research's findings and includes data analysis and justifications for the significance of the data collection's findings, in order to reach a conclusion. This chapter focused on providing comprehensive data analysis and outcomes presentation. Since the study employed a mixed research design for data gathering, both qualitative and quantitative data are analyzed in Chapter 4.This chapter presented the findings from the data collected as well as the discussions of the research findings.

Chapter 5 focused on the discussion of the findings. The results were discussed in line with theoretical and empirical literature reviewed in Chapter 2 and Chapter 3. The last and final chapter which is Chapter 6, presented the Conclusions and Recommendations. The study summary, summary of results, and policy recommendations are the main topics of the sixth chapter. The chapter also makes recommendations for areas for further research, while disclosing the knowledge contributions of the study in connection to business policies, practises, and theory.

1.12 Chapter Summary

The study's brief background and issue, as well as the gap in existing research on the topic of the impact of electricity load shedding on the operations of small businesses at Masala Market, are discussed in Chapter 1. The significance of comprehending the effects of load shedding on the economic performance of small-scale enterprises at Masala Market in Ndola, Zambia, in light of their significant roles in the Zambian economy was emphasized in the study's introduction and background. In addition, the research questions, objectives, and approaches taken to address them were outlined. Further, the avocation was given regarding the significance of the review. Before providing an overview of the remainder of the study, the chapter provided additional details about the study's scope. The next chapter provides a comprehensive theoretical overview of the effects of load shedding on small-scale enterprises' operation performance and survival strategies at the Masala Market in Ndola, Zambia.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The preceding chapter provided the background of the study. This chapter presents the review of relevant empirical and theoretical literature to the study. According to Dunne (2011), before initiating a fresh inquiry on a particular subject, it is essential to first carry out a literature review. This allows the researcher to gain familiarity with, and grasp of the most recent research in the field being investigated. In this chapter, relevant literature is presented and discussed, followed by the review of empirical studies. Literature gaps identified from the literature review are also presented in this chapter. The primary aim of performing a literature review in this study is to examine the existing body of research pertaining to the impact of load shedding on business operations. The literature review plays a crucial role in research by offering a theoretical foundation for the inquiry. Tichapondwa (2013) defines a literature review as "a comprehensive analysis of scholarly and research publications pertaining to a specific subject".

This chapter provides a comprehensive assessment of the existing literature pertaining to load shedding and its impacts on business operations. The initial section of the chapter examines various possible definitions of small-scale enterprises, load shedding and business operations. Additionally, this chapter explores the role of SMEs across the globe. It then delves into the literature on the role and importance of electricity in business, as well as causes of load shedding. Additionally, this chapter examines empirical research conducted globally on the subject of load shedding and its impacts and coping strategies. The chapter concludes by presenting the research gaps which the present study aims to fill. The following section provides a brief background of the literature review presented in this chapter.

A broad literature research necessitated the creation of theoretical and conceptual frameworks to guide this study. This is consistent with Varpio *et al.* (2020), who states that conceptual and theoretical frameworks are derived through an examination of the literature. This chapter synthesises a review of the literature into a conceptual framework that will guide the current investigation. This study's conceptual framework is given diagrammatically to demonstrate the links between electricity load shedding and operations of small-scale enterprises.

2.2 Background of Literature Review

This chapter reviewed research and other writings on load shedding on the operations of small-scale businesses that had been published by other scholars and authors, so that the subject could be understood clearly. The components included an examination of the significance of electricity and the effects of load shedding on the operations of small businesses, as well as an understanding of the factors that led to electricity load shedding. Before focusing on a global, continental, and Zambian perspective of electricity load shedding, the chapter fundamentally presented an understanding of the concept of electricity load shedding. It also identified some of the causes of electricity load shedding, discussed the potential for electricity generation, and factors that determined the effect of electricity load shedding on the operations of small businesses.

A summary of the available literature regarding the power outages in Zambia formed the core of the discussion, despite the fact that the review focused on global and continental trends in order to provide a broader perspective. After this analysis, research gaps that the study sought to fill were identified. This led to the establishment of the conceptual framework that emerged from the discussion. Therefore, the primary goal of this study's literature review was to examine what different analysts had found concerning the impact of electricity load shedding to the operations of small-scale enterprises and survival techniques utilized to relieve the impacts. Because it provided the theoretical foundation for the study, the literature review was an essential research tool. A literature review, as defined by Tichapondwa (2013), was an account of what other accredited scholars and researchers have published on a subject.

2.3 Conceptualisation of Small-Scale Businesses

According to Organisation for Economic Co-operation and Development (OECD) (2020), there is no definition of a SME that is universally accepted, and it is impossible to find two countries or organisations that have the same definition for the firms. Small businesses can be defined in a variety of ways, depending on factors such as the total number of employees, the turnover levels, the total net assets, the capital base, the legal structure, and the degree of formalisation (Tsuruta, 2020). These definitions vary by country according to Mazikana (2019). For instance, in the United States of America, SMEs are classified as having less than 20 employees (Dallasega *et al.*, 2019). The definition of an SME in the European context is based on employment, yearly turnover, or the annual balance sheet total as put forward by Juergensen, Guimón and Narula (2020). According

to the European definition, a company was considered small if it had ten workers or fewer (Juergensen *et al.*, 2020). The characteristics that define SMEs in Europe are outlined in Table 2.1:

Table 2.1: Definition on SMEs with the European Union

Enterprise category	Headcount: Annual Work Unit (AWU)	Annual turnover		Annual balance sheet total
Medium-sized	< 250	≤€50 million	or	≤€50 million
Small	< 50	≤€10 million	or	≤€10 million
Micro	< 10	≤€2 million	or	≤€2 million

Source: European Commission (2019)

On the other hand, the World Bank (2020) utilises three quantitative criteria in order to define what constitutes SMEs. It takes into account either the overall number of employees or assets, or the total annual sales (World Bank, 2020). According to Table 2.2, in order for a company to be classified as either small, micro, or medium, the number of employees at the company must first meet the criteria, and then the company must meet at least one of the financial criteria.

Table 2.2: Definition of SMEs by World Bank Standards

Type of Enterprise	Number of Employees	Extent of Total Assets	Annual Turnover
Micro enterprises	1-10 people	Less than USD1,00,000	Less than USD1,00,000
Small enterprises	11-50 people	Between US$1,00,000 to US$3 million	Between US$1,00,000 to US$3 million
Medium enterprises	51-300 people	Between US$3 million to US$15 million	Between US$3 million to US$15 million

Source: World Bank (2020)

One common criterion among several countries is the quantitative criterion of number of employees. This is because, due to inflationary pressure and macroeconomic instability, it has been a challenge to define an SME in terms of turnover and asset value, or any other monetary criteria in most countries (Nyoni & Bonga, 2018). The definitions of small-scale businesses based on number of employees in several nations are presented in Table 2.3.

Table 2.3: Definitions of SMEs by Number of Employees in Different Nations

Country/Region	Micro Enterprise	Small Enterprise	Medium Enterprise
European Union	1-9	10-49	50-249
Norway and Switzerland	1-9	10-49	50-249
Canada	1-9	10-49	50-499
Australia	1-9	10-49	50-199
Japan	4-9	10-49	50-249
United States	1-9	10-99	100-499
Turkey	1-19	20-49	50-249
New Zealand	1-9	10-49	50-99
Mexico	1-10	11-50	51-250
Korea	5-9	10-49	51-199
China	1-19	20-299	≥300
Jordan	1-9	10-30	31-100
Malaysia	<5	5-29	30-75

Source: OECD (2022)

As shown in Table 2.3, there are varying definitions of small-scale enterprises by number of employees across nations from the developed world. However, there seems to be some convergence that small-scale enterprises in most countries employ not more than 250 employees. According to Pinkovetskaia and Lebedev (2019), micro firms in Russia have between one and fifteen full-time employees, whereas small enterprises have between fifteen and one hundred full-time employees, total assets between one hundred thousand and three million dollars, and yearly revenues between one hundred thousand and three million dollars. It is abundantly obvious that many nations make use of various indicators in order to identify SMEs since most of these definitions are different from country to country, and since each nation or region has a definition

that is tailored to its specific requirements, conditions, and expectations. It is therefore not a simple undertaking to provide an all-encompassing definition of SMEs.

Narrowing down to the African developing economies, there are also significant differences in SME classifications. In Egypt, small-scale enterprises are classified as firms with not more than 10 permanent employees, with the medium-sized firms being those with 10 to 50 permanent employees whilst in Kenya, small-scale enterprises employ not more than 100 employees (Dlamini & Schutte, 2020). More so, in Ghana, firms with fewer than ten employees are classified as small-scale enterprises, while those with more than ten but less than 100 employees are classified as medium sized enterprises (Amoah & Amoah, 2018).

In Zimbabwe, according to Dlamini and Schutte (2020), a company is considered a small enterprise if it employs not more than 100 employees. In South Africa, the Department of Trade and Industry define small-scale corporations as entities that employ a maximum of 100 workers and 200 employees in industrial and manufacturing industries respectively (Makgopa & Mpetsheni, 2022).

On the other hand, the definition of small and medium-sized enterprises (SMEs) in Zambia is based on certain features such as fixed total investments, sales turnover, worker count, and the legal status of the organization (Muthuswamy, 2022). Small-scale businesses in Zambia typically have less than one hundred workers on staff. Small-scale enterprises or SMEs in Zambia shall be any business enterprise registered with the Patents and Companies Registration Agency (PACRA) (Kawimbe, 2023) and possessing the criteria summarized in Table 2.4. This is in accordance with Zambia's Micro, Small, and Medium Enterprises (MSME) Development Policy.

Table 2.4: Characteristics of SMEs in Zambia

Category	**Micro Enterprise**	**Small Enterprise**	**Medium Enterprise**
Total investment (assets)	K1-K80,000	K80,000-K200,000	K200,000-K500,000
Annual sales turnover	K1-K150,000	K150,000-K300,000	K300,000-K800,000
Employees	1-10 employees	11-50 employees	51-100 employees

Source: Kawimbe (2023)

2.4 Small-Scale Enterprises in the Global Context

Small-scale enterprises play a significant role in the global context. Limited resources and a small number of employees typically characterize these enterprises, notwithstanding the fact that they contribute significantly to economic development, job creation, and entrepreneurship (OECD, 2020; World Bank, 2022). According to the United Nations Economic Commission for Africa (UNECA) (2022), small-scale businesses in developing countries, rising economies, and developed economies all play an important part in industrialization, economic growth, contributing to GDP, and the provision of jobs. According to the World Bank (2022), SMEs encourage innovation, an entrepreneurial spirit, as well as the identification and development of local and worldwide markets.

According to UNECA (2022), the promotion of competition among businesses is one of the most significant roles that SMEs play in the process of transforming an economy into a market economy. Certain businesses are allowed to have monopolies in certain economies, which lowers the bar for both the level of service they provide to customers and the quality of the goods they sell (OECD, 2020; UNECA, 2022). Research has shown that the presence of small and medium-sized businesses helps to minimize the inefficiencies of monopolistic systems (Abdulsalam & Zainal, 2022). The ability of SMEs to be adaptable and sensitive to changes in the global macroeconomic and sociopolitical environment is another reason for the importance of SMEs (Bomani, 2015; Sari & Vitalli, 2023). The private sector is dominated by SMEs, which account for more than 90 percent of all businesses registered around the world, and provide around 60 percent of the employment opportunities in the private sector (World Bank, 2022). According to the research conducted by Bomani (2015), the contribution of SMEs to the global economy accounts for more than half of the GDP that is generated by the private sector. Therefore, the significance of small businesses to the economy of any given country cannot be emphasized enough.

Mohammed (2017) posits that small and medium-sized enterprises (SMEs) play a crucial role in driving economic development and facilitating the transition towards industrialization. The pivotal significance of small and medium-sized enterprises in the context of emerging nations is widely acknowledged, as they serve as catalysts for attaining the growth targets of these countries (Amoah et al., 2022; Mohammed, 2017). A key attribute of a thriving and expanding economy is the presence of a dynamic and burgeoning small and medium-sized enterprise sector (Qamruzzaman

& Kler, 2023). Small and Medium Enterprises play a crucial and influential role in the socio-economic development of a nation (Dunya, Chen & Appiah, 2019). They make significant contributions to socio-economic development through multiple means, specifically by generating employment opportunities for both the expanding rural and urban labor force, and by fostering desirable sustainability and innovation within the economy (Dunya *et al.*, 2019).

The failure rate, extent of government support, and obstacles faced by small and medium-sized enterprises (SMEs) in industrialized economies are likely to differ from those in emerging economies and developing countries (Bomani, 2015; Pandya, 2012). While it is true that small and medium-sized enterprises (SMEs) experience failures in developed countries, the magnitude of such failures is relatively small due to the presence of extensive policies and strategies that have been devised and put into practice (Qamruzzaman & Kler, 2023; OECD, 2020).

According to Zafar and Mustafa (2017), in developed countries, more than 90% of enterprises are classified as small and medium-sized enterprises (SMEs), which contribute to over 60% of the overall employment. Small and medium-sized enterprises (SMEs) have exerted a significant impact on the advancement of contemporary economies by fostering the creation of new ideas, facilitating the introduction of novel solutions, and cultivating an entrepreneurial mindset (Zafar & Mustafa, 2017). The research by the European Union Commission (2019) highlights the substantial economic impact of small and medium-sized enterprises (SMEs) in Europe. It reveals that SMEs constitute 99% of all registered businesses inside the European Union, and play a crucial role in the private sector, employing over 80% of the workforce.

According to Dallasega *et al.* (2019), small and medium-sized enterprises (SMEs) make up 95% of the total number of businesses in the United States. Furthermore, these SMEs are responsible for generating over 90% of the country's employment. Additionally, it is noted that SMEs account for 97% of all exporters in the United States. According to Beland, Fakorede, and Mikola (2020), small and medium-sized enterprises (SMEs) constitute over 99% of the commercial entities in Canada. Furthermore, these enterprises are responsible for employing approximately 54% of the Canadian labor force. In terms of economic impact, SMEs contribute 45% to the country's gross domestic product (GDP) and account for 20% of its total exports.

Small and medium-sized enterprises (SMEs) play a significant role in employment generation within OECD countries, accounting for approximately 60-70% of jobs (Bomani, 2015; OECD, 2020). Small and Medium-sized Enterprises (SMEs) are of significant importance in the Chinese economy due to their contributions to income growth, employment expansion, and export augmentation (Wang *et al.*, 2023). According to Wang *et al.* (2023), Chinese small and medium-sized enterprises (SMEs) contribute 45% of the total employment, 60% of the gross domestic product (GDP), and 68% of the manufactured exports in China.

Moreover, small-scale firms play a crucial role in fostering economic development in emerging economies. According to the United Nations Economic Commission for Africa (UNECA, 2022), small and medium-sized companies (SMEs) constitute a significant part of business establishments in developing nations. According to the World Bank (2022), small and medium-sized enterprises (SMEs) play a significant role in emerging economies by representing up to 85% of newly generated job opportunities and contributing around 40% to 50% of the gross domestic product (GDP) of each respective nation. The impact of small and medium-sized enterprises (SMEs) in emerging nations exhibits considerable variation among different countries. SMEs in Brazil play a substantial role in the country's labor market, employing over 70% of the workforce and making a considerable contribution to the alleviation of unemployment rates. Moreover, these enterprises contribute approximately 20% to both the Gross Domestic Product (GDP) and the export sector of Brazil (Oliveira *et al.*, 2022).

According to Rodríguez-Espíndola *et al.* (2022), small and medium-sized firms (SMEs) constitute 90% of the business entities in Mexico, employing over 70% of the labor force and contributing to approximately 50% of the country's gross domestic product (GDP). According to Toke and Kalpande (2020), the small and medium-sized enterprise (SME) sector in India comprises over 26 million enterprises. These enterprises play a significant role in the country's industrial production, contributing 45% to it. Moreover, they are responsible for employing around 73 million individuals and generating 1.3 million employment opportunities annually. Additionally, the SME sector accounts for approximately 35%-40% of India's gross domestic product (GDP) and contributes to 40% of the country's total exports. According to the findings of Perdana *et al.* (2022), small and medium-sized enterprises (SMEs) constitute around 90% of the total business entities operating in Singapore.

Small-scale firms in Africa play a pivotal role in facilitating economic growth by exerting a substantial influence on the creation of employment opportunities, decrease of poverty levels, and promotion of sustainable development. Bomani (2015) asserts that small and medium-sized enterprises (SMEs) play a significant role in generating export earnings for developing countries in Africa. In Ghana, small and medium-sized enterprises (SMEs) play a significant role in the country's export revenue, accounting for 70% of the total. Additionally, they constitute 92% of all firms and contribute to more than 80% of employment opportunities (Amoah & Amoah, 2018; Owusu *et al.*, 2022). According to Ogujiuba *et al.* (2020), small and medium enterprises (SMEs) make up 95% of the total number of enterprises in South Africa. These SMEs also contribute 57% to the country's gross domestic product (GDP) and account for 60% of employment. According to the United Nations Economic Commission for Africa (UNECA) in 2022, small and medium-sized enterprises (SMEs) play a significant role in the economy of Malawi, employing over 38% of the country's labor force and contributing 15.6% to its gross domestic product (GDP).

Similarly, in Ivory Coast, SMEs are responsible for approximately 78% of employment within the manufacturing sector. Furthermore, it is worth noting that Moroccan small and medium-sized enterprises (SMEs) constitute a significant proportion, approximately 98%, of the total number of firms in the country. These enterprises also play a substantial role in the economy, contributing around 40% to the gross domestic product (GDP). In terms of employment, they provide jobs for approximately 40% of the population. Additionally, Moroccan SMEs contribute to the country's export sector, accounting for approximately 30% of total exports (Chawki & Lemqeddem, 2021). According to the World Bank Group (WBG, 2004a), the majority of the workforce in Mozambique, amounting to 90%, is engaged in employment within small and medium-sized enterprises (SMEs).

Furthermore, it has been reported that approximately 77% of the businesses officially registered in the country fall under the category of small businesses, employing less than 10 individuals. According to Day, Sanders, and Fields (2019), small and medium-sized enterprises (SMEs) in Mozambique provide a significant contribution of 16% to the country's Gross Domestic Product (GDP). Among these SMEs, the majority, accounting for 68%, are engaged in commerce, while 13.1% operate in the manufacturing sector and 8.7% in the services sector. Moreover, it is worth noting that small and medium-sized enterprises (SMEs) in Kenya play a significant role in the

country's economic landscape. These enterprises include around 80-85% of all firms, contribute around 30% to the Gross Domestic Product (GDP), and are responsible for employing approximately 85% of the entire workforce (Alumasa & Muathe, 2021; UNECA, 2022).

In Zambia, small-scale enterprises contribute significantly to employment generation, poverty reduction, and overall economic diversification. Firstly, small-scale enterprises in Zambia are major contributors to employment generation. With a high unemployment rate in the country, SMEs provide a lifeline for many individuals and households (Lombe & Tembo, 2023). They create employment opportunities for the local population, especially in rural areas where formal employment is limited (Choonog *et al.*, 2016). Moreover, SMEs tend to employ people with low levels of education and provide on-the-job training, thereby enhancing skills and employability (Mwika *et al.*, 2018). Secondly, small-scale enterprises contribute to poverty reduction in Zambia. By providing job opportunities, particularly to those living in rural areas and informal settlements, SMEs help to alleviate poverty. Small businesses enable individuals to earn income, support their families, and improve their standard of living (Choongo *et al.*, 2016). Additionally, SMEs enhance financial inclusion by providing access to credit and banking services, thus reducing poverty at both the individual and community levels.

Furthermore, small-scale enterprises play a pivotal role in economic diversification. Zambia's economy is heavily dependent on copper mining, leaving it vulnerable to external shocks and price fluctuations (Mwika *et al.* 2018). SMEs help diversify the economy by engaging in various sectors such as agriculture, manufacturing, tourism, and services. This diversification reduces dependency on a single industry, fostering stability and resilience in the face of economic uncertainties. In addition to their contributions to employment and poverty reduction, small-scale enterprises foster entrepreneurship and innovation in Zambia (Mwewa, 2020). SMEs often arise from the entrepreneurial spirit of individuals who identify gaps in the market and seek to fulfill them. These enterprises birth ideas, attract investment, and introduce new products or services (Choongo, 2016; Mwika *et al.*, 2018). This entrepreneurial culture stimulates competition, resulting in improved quality, increased market efficiency, and consumer satisfaction according to Chewe (2020).

In summary, small-scale firms play a crucial role in the economic landscape of Zambia. The establishment of these entities generates job prospects for a significant number of individuals, concurrently promoting the cultivation of innovative practices and fostering a climate of

competitiveness. Furthermore, these entities contribute to the diversification of the nation's economy by providing various sources of income that extend beyond conventional industries such as mining.

2.5 Conceptualisation of Business Operations of Small-scale Enterprises

Business operations refer to the activities, processes, and functions that a company undertakes to produce and deliver goods and services to its customers (Mkala, Wanjau & Kyalo, 2018). It encompasses various aspects such as inventory management, supply chain management, procurement, production, and distribution (Mbolonzi, 2016). Effective business operations are crucial for a company's success as they directly affect its ability to meet customer demands, maintain competitiveness, and achieve profitability. One fundamental aspect of business operations is “Production” (Mkala *et al.*, 2018). The production process is a central component of business operations where inputs are transformed into final goods or services. It involves various activities such as planning, scheduling, and control to ensure efficient and effective production according to Mbolonzi (2016). Business operations management is an essential discipline that ensures the smooth functioning of an organization's day-to-day activities. It involves the coordination and oversight of various processes and resources to achieve organizational goals efficiently and effectively.

According to Slack *et al.* (2010), the term "operations management" refers to the management of activities that take place within an organization in order to develop products and services. According to Amadi-Echendu (2013), operations management involves the process of transforming a variety of inputs into outputs for the institution. According to Amadi-Echendu (2013) and Pycraft *et al.* (2010), operations management outlines five fundamental performance objectives, which include quality, speed, dependability, flexibility, and cost. These objectives, when managed properly, have the potential to streamline operations inside a company unit. Mkala *et al.* (2018) state that "operations management" encompasses both "production operations" and "service operations," both of which, when combined, result in "desired outputs."

2.6 Conceptualisation of Electricity Load Shedding

Load shedding is a term used to describe the intentional cessation of electricity provision by power utility companies, typically because of insufficient power producing capacity. The aforementioned

phenomenon has become prevalent in numerous nations, resulting in substantial disruptions to commercial firms, particularly those classified as small and medium-sized enterprises. Load shedding occurs when there is an insufficient supply of electricity to meet the demands of all consumers, leading an electricity provider to selectively interrupt the provision of energy to specific regions (Raghu & Manjunatha, 2017). According to Dugan (2000), resorting to balancing electricity supply and demand is considered a final measure. Many firms implement load-shedding programs in order to enhance their consumers' preparedness for cyclic load shedding (Bambaravanage, Kumarawadu & Rodrigo, 2016). Rotational load shedding is a prevailing phenomenon observed predominantly in developing nations, primarily attributed to inadequate funding, obsolete energy grid systems, and suboptimal infrastructure management (Bambaravanage *et al.*, 2016).

According to the definition provided by Karthik *et al.* (2019), electricity load shedding pertains to the intentional cessation of electricity distribution to specific geographical areas or districts because of an incongruity between the supply and demand of electrical energy. Makgopa and Mpetsheni (2022) posit that load shedding is implemented as a final measure when the demand for electricity surpasses the available supply. Conversely, Rankumise (2017) provides a definition of load shedding as an electrical power reduction due to an increase in demand that surpasses the available supply. Botha (2019) offered a comparable interpretation of 'load-shedding' as the deliberate implementation of power cuts in a rotational manner, with the aim of reducing the strain on the power supply system during periods when the electricity supplier is unable to meet the substantial demand for electricity.

According to Altman *et al.* (2010), load shedding refers to a situation in which there is an insufficiency of electricity, resulting from a scenario where the aggregate demand for electricity from users surpasses the available supply at a specific moment. The provided definition of load shedding bears a resemblance to the definition put out by Tapula (2013), which posits that load shedding is a strategy implemented to avert a complete loss of energy supply on a national or regional scale. This strategy is employed when the existing capacity of the power networks is insufficient to meet the prevailing demand for electricity. According to Tapula (2013), load shedding is a deliberate intervention that is implemented to impact a certain group of consumers within a given timeframe.

Banderker (2022) posits that load shedding is enacted in situations where there is an inadequate supply of electricity to fulfill the requirements of all consumers. Consequently, public electricity companies resort to interrupting the provision of energy in some regions. According to Banderker (2022), alternative definitions characterize it as the final recourse employed to achieve equilibrium between the supply and demand of electricity. Load shedding is a crucial mechanism employed by power utilities to prevent a complete collapse of the electrical grid during periods of high demand (Banderker, 2022). This strategy, although necessary, cause significant inconveniences for individuals, businesses, and public services.

Fiawoo (2016) defines load shedding as the intentional cessation of energy supply in specific areas of an electricity distribution system, with the aim of averting a complete breakdown of the entire power system due to an imbalance between demand and supply. According to Bevrani and Hiyama (2010), load shedding is a critical measure implemented to maintain system stability by reducing the load on the system. The objective of load shedding is to safeguard the system from excessive voltage or frequency drop through the management of actual and reactive power demand and supply (Bevrani & Hiyama, 2010; Fiawoo, 2016). Load shedding is a strategy implemented to alleviate the stress imposed on an electricity grid by temporarily reducing the supply of electricity, intentionally limiting the consumption of energy due to excessive demand (Goldberg, 2015; Mbobvu *et al.*, 2021). According to Growitsch *et al.* (2013), load shedding or power, outage can be defined as the cessation of energy power delivery, leading to a complete absence of power supply.

Load shedding in electrical supply networks is a deliberate and regulated procedure employed by utility companies to manage the demand and supply equilibrium by selectively reducing the load (Kaseke & Hosking, 2012). This practice is commonly employed in instances where the system experiences an excessive workload. Standby generators necessitate the disconnection or shedding of some circuits in order to mitigate the risk of an overload situation (Kaseke & Hosking, 2012). The purpose of load shedding is to distribute the available power among consumers by selectively deactivating electricity supply in certain areas while maintaining it in others, with the aim of ensuring service provision to all customers (Osen, 2012).

There exist two overarching categories of load shedding, specifically referred to as blackouts and brownouts. A brownout refers to a deliberate or accidental reduction in the voltage supplied by the

electrical power system (Arritt & Dugan, 2015). Intentional brownouts serve as a deliberate and purposeful approach to mitigate excessive load during emergencies, with the duration of the decrease varying from minutes to hours depending on the specific conditions (Raghu & Manjunatha, 2017). The term "brown out" is derived from the phenomenon of reduced brightness observed in incandescent lighting when there is a decrease or fluctuation in voltage (Arritt & Dugan, 2015; Burgos, 2010).

The occurrence of voltage drop can be attributed to disturbances or disruptions in the electrical system, or it may occasionally be intentional as a means to mitigate load and avoid power outages, commonly referred to as blackouts (Burgos, 2010). Alternatively, blackout, often referred to as power outage, power cut, or load shedding, denotes the cessation of electricity provision to the consumer's premises (Dugan, 2000). Power failure in an electrical power network can be attributed to various factors, including failures occurring at the power station, damage inflicted upon the electrical transmission lines, substation malfunctions, or other issues affecting the distribution systems (Raghu & Manjunatha, 2017).

More so, load shedding is classified as planned and unplanned load shedding (Botha, 2019; Schoeman & Saunders, 2018). Planned electricity load shedding refers to the intentional and temporary reduction of electricity supply to certain areas or regions to prevent a complete blackout during times of high demand or insufficient generation capacity (Raghu & Manjunatha, 2017). As per Botha's (2019, p. 7) research, the concept of planned load shedding can be defined as the deliberate implementation of power outages at predetermined times, when energy supply is intentionally discontinued at certain substations or localized areas within the electrical grid. Scheduled power outages, also known as planned load shedding, are typically implemented for reasons such as maintenance activities, emergency repairs, or to alleviate the strain on suppliers caused by high customer demand (Botha, 2019; Schoeman & Saunders, 2018).

According to Scott *et al.* (2014), a scheduled power outage may also be required when there is insufficient power generation to meet the complete demand of the end users. Scheduled power outages are deliberate interruptions of electricity supply that are planned and often follow defined time intervals. Notices often follow these outages from the power providers, as highlighted by Njiraini (2021). In conclusion, while planned electricity load shedding may cause temporary inconveniences for individuals and businesses alike, it serves as an effective strategy to maintain

grid stability by balancing supply and demand, facilitating infrastructure maintenance, and promoting energy conservation (Schoeman & Saunders, 2018).

On the other hand, unplanned electricity load shedding refers to the sudden and unexpected interruption of power supply, resulting in inconvenience and disruption for individuals, businesses, and communities (Goldberg, 2015). According to Botha (2019, p. 7), unexpected load shedding can be described as instances of power outages that occur without prior scheduling, resulting in the interruption of electricity supplies to a specific region. Frequent causes of this issue include cable theft, adverse weather conditions, unauthorized electrical connections, aging infrastructure, excavation or construction activities, and unlawful electricity connections (Njiraini, 2021; Schoeman & Saunders, 2018). According to Botha (2019), the problem of unplanned load shedding also arises due to various reasons such as inadequate infrastructure, lack of maintenance, or an imbalance between electricity demand and supply.

Electric power interruptions are defined by dynamics, which may include elements such as the time of occurrence of the outage, the length or duration of the outage, the frequency of the outage, the source of the outage, the perceived reliability level of the power supply, and notification of the outage (Njiraini, 2021). According to Njiraini (2021), "the number of power blackouts over a specific time period, either per day, week, or on monthly basis" is what is meant by "power outage frequency" or "number of occurrences." According to Moyo (2012) and Schoeman and Saunders (2018), power outages can also be characterized based on fluctuations for electricity that is supplied in a certain area. The frequency of power outages refers to the rate at which service is disrupted. It is undesirable for there to be any frequency of power outages; nevertheless, having a larger frequency of the outages increases the unreliability of the electricity and may have a substantial impact on the operations of a business (Njiraini, 2021).

On the other hand, the length of a power outage is measured in terms of the period of time that individual customers are without a full supply of energy (Fisher-Vanden, Mansur & Wang, 2015). The length of an electrical power failure is measured in terms of the amount of time it lasts. The length of the power outage can be used to calculate the losses incurred by businesses because of the disruption (Njiraini, 2021). Power outage frequencies and the length are characteristics that are known to activate strains for certain businesses, particularly those that rely on electricity as a key input resource (Fisher-Vanden *et al.*, 2015; Frederick & Selase, 2014). These qualities are known

to trigger strains because they are characteristics that are known to trigger strains for certain sectors.

In addition to this, there is something called power outage notice, which is an advanced communication that is given to end consumers of electric power within a fair amount of time before the power loss (Njiraini, 2021). According to Frederick and Selase (2014), the amount of damage caused by an interruption can be mitigated by providing advance warning of the disruption. Outage notification, as stated by Fisher-Vanden *et al.* (2015), mitigates the negative impact of a power outage on businesses. This is because businesses are given the opportunity to switch to alternative power sources, such as generators, or safely discontinue operations (Fisher-Vanden *et al.*, 2015). This results in a reduction or elimination of damage to semi-finished goods and a reduction for time that is wasted. On the other hand, unmitigated loss because of a lack of notice may create a variety of damages, some of which may have an effect on product quality and cause a large increase in operational expenses (Frederick & Selase, 2014).

In conclusion, one aspect of the dynamics of an electric power outage is the length of time that the electricity is off. This viewpoint is concerned with the timing of the blackout itself, regardless of whether it was intentional or not (Frederick & Selase, 2014). The incident might take place in the middle of the day, in the evening, or in the middle of the night. In addition, it is possible for it to take place throughout the week, Monday through Friday, or it may take place over the weekend, on either Saturday or Sunday (Njiraini, 2021). According to Frederick and Selase (2014), the timing of power outages can have a variety of effects, including on the number of customers that are impacted and the associated expenses. Because of the higher volume of activity that occurs at that time of the day, for instance, it is reasonable to anticipate that commercial firms will suffer more severe consequences than home consumers of electricity in the event that a power outage takes place during the day.

In the research conducted by Schoeman and Saunders (2018), for instance, it was shown that businesses in Ireland participating in industrial operations lost more of the value of lost load in the course of the week between the hours of 8:00 am and 8:00 pm in the evenings compared to home users of electric power. This was found to be the case in Ireland. From literature, load shedding can be assessed and measured by examining the frequency and duration of load shedding (Scott *et al.*, 2014; Forkuoh & Li, 2015).

2.7 Role and Importance of Electricity to Small-Scale Enterprises

Electricity is an essential resource that plays a vital role in the operations of modern business enterprises (Owusu, Agyemang & Agyeman, 2022). It is a crucial input factor for many manufacturing operations and is also the predominant source of power for businesses (Cissokho & Seck, 2013; Njiraini, 2021). (Cissokho & Seck, 2013; Njiraini, 2021). From powering machinery and equipment to enabling efficient communication and conducting research, electricity is crucial for the success and growth of these enterprises (Nyanzu & Adarkwah, 2016). Primarily, electricity provides the necessary power to run machinery and equipment in business enterprises (Alo & Adeyemo, 2021). According to Doe and Asamoah (2014), electricity is the backbone of manufacturing industries as it fuels machines and equipment used in production lines, allowing businesses to increase productivity and expand their operations. Without a reliable source of electricity, large-scale manufacturing would become practically impossible, resulting in a significant setback for economic growth and development (Owusu *et al.*, 2022). Whether it is manufacturing plants, construction sites, or office premises, almost all modern operations heavily rely on electricity to function effectively (Alcott *et al.*, 2016; Fisher-Vanden *et al.*, 2015). According to Braimah and Amponsah (2012), businesses rely on electricity for their fundamental or primary activities, making this resource indispensable to the enterprises' daily operations.

The significance of electricity supply for the functioning of small and medium-scale businesses and firms has been well acknowledged in numerous previous studies (Cheruto & Munene, 2019). Ahadu (2019 stated that electricity has a crucial role in enhancing the performance of micro and small firms by transforming them from poor value, low productivity, and low-income activities. According to several scholars, without electricity, production processes would come to a halt, resulting in significant losses for the enterprises and potential setbacks in meeting customer demands (Bose *et al.*, 2006; Chakraborty *et al.*, 2014). Scott *et al.* (2014) cited that majority of small and medium-sized organisations and firms are usually believed to depend on having access to a consistent electrical supply in order to operate.

According to Goldberg (2015), who shares this perspective, having a steady supply of energy is widely regarded as absolutely necessary for the running of enterprises. According to Ateba, Prinsloo, and Gawlik (2019), the rate of industrialization and economic growth in all economies that are still in the process of growing is highly dependent on the amount of power that is supplied

as well as the availability of dependable sources of energy. According to Isaksson (2016), which was quoted in Ateba *et al.* (2019), the most direct role that electrical energy plays is that it acts as the primary input to industrial output.

Additionally, electricity is crucial for providing lighting in business premises (Aziz *et al.*, 2010). According to Husain and Lean (2015), adequate lighting is necessary not only to create a comfortable working environment for employees but also to ensure the safety and productivity of the workforce. Furthermore, electricity ensures uninterrupted access to the internet, enabling businesses to conduct research, gather data, and stay connected in an increasingly interconnected marketplace (Siddiqui *et al.*, 2011). It enables employees to perform their tasks efficiently by reducing eyestrain and fatigue, resulting in improved productivity and quality of work (Siddiqui *et al.*, 2011). Furthermore, electricity plays a pivotal role in enabling effective communication in business enterprises as put forward by Bernstein and Madler (2015). Attigah, Rammelt and Mayer-Tasch (2015) asserted that the most dominant use of electricity among SMEs is for lighting and communication purposes. Modern communication systems such as telephones, fax machines, computers, and email all heavily rely on electricity to operate (Tang & Shabaz, 2013). These communication tools are vital for conducting daily business activities, collaborating with clients and colleagues, and ensuring smooth coordination within the organization (Attigah *et al.*, 2015; Owusu *et al.*, 2022).

Moreover, electricity enables businesses to create an attractive and convenient shopping experience for customers (Tang & Shabaz, 2013). In retail stores, electricity powers lighting, air conditioning, and point-of-sale systems, providing a comfortable and efficient environment for customers (Mensah, 2018; Rentschler & Kornejew, 2017). These amenities not only enhance the overall customer experience but also contribute towards increased sales and customer loyalty. Additionally, Ahmed and Mudassar (2012) stated that electricity is vital for businesses that rely on e-commerce and online platforms to reach customers. Websites, online marketplaces, and social media platforms all require electricity to operate seamlessly (Sun & Anwar, 2015).

In this sense, without electricity, businesses would be unable to leverage the vast potential of the digital marketplace, resulting in missed opportunities for growth and expansion (Owusu *et al.*, 2022; Sun & Anwar, 2015). The primary use of electricity within manufacturing firms is to power machines that are usually critical to their respective production process (Nyanzu & Adarkwah,

2016). Researchers have shown that there is symbiotic relationship between electricity and business (Doe & Asamoah, 2014; Nyanzu & Adarkwah, 2016).

In addition, electrification, much like the majority of other technological shocks, paves the way for the establishment of new firms and brings about structural change (Fried & Lagakos, 2017). According to the findings of Vernet *et al.*'s (2019) research, having access to electricity enhances the number of options for engaging in entrepreneurial activities and developing new businesses. Access to electricity can encourage the development of new jobs because it encourages would-be entrepreneurs to take advantage of the enabling conditions that the provision of infrastructure affords (Alcott *et al.*, 2016; Owusu *et al.*, 2022). This research was published in Alcott *et al.*, 2016 and Owusu *et al.*, 2022. For instance, in many developing economies where the informal sector is the most prevalent, having access to electricity might enable households to set up small businesses that manufacture intermediate or final items (and services) for the market (Fried & Lagakos, 2017). In conclusion, electricity is of utmost importance to business enterprises (Ajibola *et al.*, 2021). It powers machinery, provides lighting, facilitates effective communication, enables uninterrupted production, ensures a comfortable working environment and enhances the shopping experience for customers.

In the context of small-scale enterprises, electricity has been found to have great importance. Sabo and Lekan (2019) documented that availability of a dependable electricity supply is universally acknowledged as crucial and essential for the functioning of the majority of small and medium enterprises. In the same vein, Adanlawo and Vezi-Magigaba (2021) stated that the provision of uninterrupted electricity facilitates the efficient operation and performance of small and medium-sized enterprises. According to Ef li (2021), electricity is a vital resource that plays a crucial role in the growth and development of small-scale enterprises as it provides power for various operations, increases productivity, and enhances overall business efficiency.

Olatunji and Umukoro (2018) stated that electricity is indispensable in powering machinery and equipment used by small-scale enterprises. These scholars argued that without electricity, these machines would be rendered useless, leading to a halt in operations and significant losses (Olatunji & Umukoro, 2018). By ensuring a steady supply of electricity, small-scale enterprises can operate smoothly, meet production deadlines, and provide goods and services to their customers in a timely manner (Olatunji & Umukoro, 2018).

On the other hand, electricity enables small-scale enterprises to adopt modern technologies and practices (Attigah, Rammelt & Mayer-Tasch, 2015). With electeicity, small-scale businesses can use computer systems, automate processes, and implement advanced manufacturing techniques (Mohammed, 2017). These innovations not only enhance productivity but also improve quality and precision, allowing small-scale enterprises to produce goods and services that meet international standards (Ef li, 2021). Moreover, the use of electricity also facilitates communication and online transactions, empowering small-scale enterprises to reach a wider customer base and expand their market reach. According to Adanlawo and Vezi-Magigaba (2021), it is said that small and medium-sized enterprises necessitate a consistent and uninterrupted source of electricity in order to facilitate their production processes and the provision of goods and necessary services.

Furthermore, electricity is essential for refrigeration and storage purposes, which are crucial for businesses that deal with perishable goods (Siankwilimba, 2019). By providing cooling systems, small-scale enterprises can store their products for longer durations, reducing the risk of spoilage (Sabo & Lekan, 2019). Electricity ensures proper storage, increases the value of the products, and extends their shelf life, ultimately benefiting both the small-scale businesses and the consumers (Siankwilimba, 2019).

In addition, electricity is vital for lighting and security purposes, especially in small-scale enterprises located in remote or underdeveloped areas. By providing lighting, electricity enables businesses to operate during nighttime hours, significantly increasing their productive time (Arthur & Locher, 2022). Moreover, well-lit premises contribute to a safer working environment and reduce the risk of accidents. Additionally, electricity powers security systems such as surveillance cameras and alarms, protecting small-scale enterprises from theft, vandalism, and other criminal activities, thus ensuring the safety of assets and personnel (Sabo & Lekan, 2019).

Moreover, electricity also creates employment opportunities and contributes to poverty alleviation. Small-scale enterprises that have access to a reliable power supply can expand their operations, resulting in increased production and the need for additional manpower (Arthur & Locher, 2022). This, in turn, leads to job creation and economic growth, lifting people out of poverty and improving their livelihoods (Umar & Kunda-Wamuwi, 2019). As electricity supports the growth

of small-scale enterprises, it becomes a catalyst for economic development, leading to increased incomes, improved living standards, and reduced inequality (Farawoo, 2016; Forkuoh & Li, 2015).

Furthermore, access to electricity enables small-scale enterprises to leverage information and communication technologies (ICTs) (Braimah & Amponsah, 2012). ICTs have revolutionized the way businesses operate, enabling them to streamline processes, improve customer service, and gain a competitive edge (Farawoo, 2016; Forkuoh & Li, 2015). By connecting to the internet, small-scale enterprises can access information, market their products globally, and compete with larger corporations (Arthur & Locher, 2022). The ability to utilize ICTs through electricity empowers small-scale enterprises to overcome geographic barriers, access new markets, and increase their market share (Braimah & Amponsah, 2012). In their study, Duru and Yusuf (2017) reached the conclusion that the provision of electricity access has a significant role in facilitating the transformation of rural small and medium enterprises from traditional to modernized forms. The authors believe that a consistent and uninterrupted supply of power plays a crucial role in fostering the growth and establishment of novel firms (Duru & Yusuf, 2017). Therefore, the consistent availability of energy is crucial for the efficient functioning and long-term viability of small and medium-sized enterprises. In conclusion, electricity is of paramount importance to small-scale enterprises.

2.8 Main Causes of Electricity Load Shedding

In order to come up with best possible ways for small-scale enterprises to survive the effects of load shedding, it is worth to understand the causes of load shedding across the globe. Power outages are a prevalent occurrence on a global scale, with varying reasons observed across different nations. Existing literature has documented several causes of electricity load shedding. For instance, the research by Neelsen and Peters, (2013) established a number of factors that cause load shedding. These factors include in**e**fficiency and lack of maintenance of generating and distribution systems, technical faults, permanent fault, equipment failure, increase in population, lack of planning and natural disasters.

Simonoff *et al.* (2005) cited in Ahadu (2019) differentiate between the following categories as causes of load shedding: (i) criminal activity (ii) malfunction of equipment (iii) the occurrence of fire, (iv) instances of human error, (v) occurrences of operational error, (vi) natural disasters, (vii)

adverse weather conditions, (viii) involvement of third parties, (ix) unidentified factors, and (x) insufficiency in capacity. According to Ahadu (2019), power outages are commonly attributed to a confluence of multiple flaws rather than a singular occurrence. The following sub-sections presents and discusses some of the main causes of load shedding as documented in existing literature.

2.8.1 Increased Population Growth and Electricity Demand

The rise in population within a nation, along with the migration of individuals from rural regions to urban areas, leads to a significant surge in the demand for energy. Consequently, electricity generating utilities are compelled to augment their supply in order to fulfil this escalating need (Ngenda, 2020). In the majority of instances within emerging nations, there is a failure to effectively augment their power supply, resulting in a situation where demand surpasses supply. Consequently, this imbalance leads to disruptions in the power supply, commonly manifested as load shedding (Ngenda, 2020).

As cited by Neelsen and Peters (2013), the increase in population in a country and urbanization of people from the rural areas to the urban areas, as a result, the demand for electricity increases rapidly and the generating utilities must increase their supply to meet the demand. In most cases, developing countries fail to increase their supply that causes the demand to exceed the supply hence, causes instabilities in the power supply and usually results into load shedding.

The exponential increase in population puts tremendous pressure on resources, one of which is electricity (Goldberg, 2015). As the population grows, the demand for electricity intensifies. More people means more households, businesses, and industries, all requiring electric power to function (Hameed & Khan, 2016). This surge in demand can quickly overwhelm the electricity supply, leading to frequent power cuts and load shedding (Njiraini, 2021). Goldberg (2015) posits that load shedding is mostly attributed to the expansion of the economy, population growth, and increasing investments, all of which contribute to a heightened demand for power that surpasses the existing capacity.

In their study on the relationship between electricity consumption and population growth in South Africa, Hlongwane and Daw (2022) found negative significant relationships between population growth and electricity consumption leading to load shedding. In Nepal, Nepal and Paija (2020)

found that electricity insecurity in the country has been caused by increased population growth leading to increased electricity demand.

2.8.2 Inadequate and Deteriorating Power Infrastructure

The role of inadequate and deteriorating power infrastructure on load shedding cannot be underestimated as several studies have documented it as the main factor contributing to load shedding in most developing economies. Cole *et al.* (2018) conducted a study on the impact of load shedding on business performance in Sub-Saharan Africa. Their findings indicate that the inadequate state of electrification networks in Africa, relative to global standards, significantly disrupts the power supply in many major cities across the region. According to the findings of Kavishe's (2015) study, the presence of inadequate and deteriorating power infrastructure in Tanzania is a contributing factor to the occurrence of electricity disruptions. Frequent interruptions in energy supply are observed because of inadequate and outdated infrastructure for electrical distribution (Degani, 2016). The breakdown encompasses the collapse of electricity poles and electric cables, as well as the inadequacy of transmission cables to bear sufficient load, resulting in the ineffective operation of the power system (Kavishe, 2015).

According to Schoeman and Saunders (2018), the primary factors contributing to the occurrence of daily power outages in South Africa include the ageing electricity infrastructure and insufficient maintenance. The security of power supply is impacted by postponed infrastructure investments (Bailey, 2022; Reichl, Schmidthaler & Schneider, 2013). According to Goldberg (2015), the lack of energy supply in sub-Saharan Africa is predominantly characterized by unplanned outages resulting from unforeseen disruptions caused by defects in the inadequately maintained electrical infrastructure. Fabiyi, Abdulmalik, and Tiamiu (2016) assert that in Nigeria, the inadequate provision of infrastructure, such as limited power generation capacity, stagnant investment in expansion projects, and the operation of hydro and thermal plants beyond their intended lifespan, contribute to the substandard quality of electricity supply and prolonged periods of power outages.

2.8.3 Theft and Vandalism of Electricity Equipment and Infrastructure

One of the other elements that contribute to energy load shedding in many nations is the occurrence of theft and vandalism targeting electricity equipment and infrastructure (Dzansi, Rambe & Mathe,

2014). Degani (2016) asserts that the pilferage of electrical equipment and cables significantly contributes to the occurrence of energy load shedding. According to Schoeman and Saunders (2018), the primary factors contributing to the occurrence of daily power outages in South Africa include cable theft. More so, vandalism of power infrastructure can cause extensive damage that takes time and resources to repair as these repairs take time, during which load shedding becomes even more frequent (Degani, 2016). The study by Dzansi *et al.* (2014) found that the phenomenon of cable theft and vandalism in South Africa has witnessed a significant increase in power outages. In conclusion, theft and vandalism worsen the already challenging issue of load shedding by reducing available power supply and causing extensive damage that takes time to repair.

2.8.4 Voltage Fluctuations

The occurrence of voltage fluctuation has been identified as a contributing factor to the occurrence of disruptions in the provision of power in developing countries (Kavishe, 2015; Salm *et al.*, 2012). According to Salm *et al.* (2012), the occurrence of power outages in nations such as Tanzania can be attributed to voltage fluctuations. According to Schoeman and Saunders (2018), the primary factors contributing to the occurrence of daily power outages in South Africa include voltage fluctuations. Voltage fluctuations are a common occurrence in electrical power systems, and they can have significant effects on load shedding (Jianjun *et al.*, 2018).

One of the primary effects of voltage fluctuations on load shedding is the increased risk of equipment failure (Kavishe, 2015; Salm *et al.*, 2012). Electrical devices are designed to operate within specific voltage ranges, and when these ranges are exceeded due to fluctuations, it can lead to overheating, insulation breakdown, or even complete failure leading to unplanned outages (Jianjun *et al.*, 2018).

2.8.5 Regulatory Framework

According to Reichl *et al.*'s (2013) research, the presence of state monopolies in the energy supply sector leads to inefficiencies and has a negative impact on the quality and dependability of the electricity provided. Moreover, the potential disruptions caused by regulatory changes, the expanding renewable electricity industry, and the increasing electricity demand in developed nations can have adverse effects on electricity supply. To ensure the uninterrupted provision of

dependable electricity, it is imperative to implement capacity enhancement measures and develop innovative solutions (Bailey, 2022; Reichl *et al.*, 2013). The provision of subsidized power in Pakistan has resulted in a significant accumulation of debt among suppliers. Consequently, suppliers have resorted to freezing the delivery of electricity, so exacerbating the issue of load shedding (Grainger & Zhang, 2019; Makhdoom *et al.*, 2017).

2.8.6 External Environmental Circumstances

Unplanned load shedding can also be attributed to external environmental circumstances (Bailey, 2022). The occurrence of blackouts in the United States of America can be attributed to the detrimental impact of severe weather on the electrical infrastructure (Mukherjee, Nateghi, & Hastak, 2018). Furthermore, Wethal (2023) has examined the impact of heavy snowfall and severe storms on the dependability of the Norwegian electrical supply. This research has shed light on the susceptibility of the electrical infrastructure, particularly in cases when trees are in close proximity to grid lines.

The Republic of Zambia has experienced a decline in precipitation, resulting in the implementation of energy load shedding. This is mostly due to the diminished reliability of their hydroelectric power infrastructure, which is no longer capable of meeting the increasing electricity demand (Bwalya *et al.*, 2022). The occurrence of load shedding in Lebanon can be attributed to a combination of factors, including the consequences of a civil war and political instability (Abi Ghanem, 2018).

2.8.7 Technical Faults

The occurrence of technical and non-technical breakdowns contributes to power outages in many developing economies, as observed in the case of Tanzania (Kavishe, 2015). Ngenda (2020) suggests that load shedding can occur due to technical failures that may happen during the transmission of power to the end consumer. The occurrence of an electrical fault may arise either during the transmission phase, specifically along the transmission lines or transformers, or during the distribution phase (Ngenda, 2020).

Technical faults can originate from different sources, including equipment malfunction, power plant failures, transmission line faults, or substation breakdowns. These faults can disrupt the

smooth flow of electricity, leading to unforeseen power outages (Kavishe, 2015). One of the effects of technical faults on electricity shedding is an increased duration of power outages (Wethal, 2023). When technical faults occur, utility companies may need longer periods to address and rectify the issue before normal power supply can be resumed (Goldbeg, 2015).

In conclusion, globally, the provision of electricity has encountered challenges stemming from various factors, including insufficient investment in electrical infrastructure, the unsustainability of subsidising electricity supply, escalating demand, alterations in regulatory frameworks, particularly pertaining to renewable energy sources, theft or vandalism, or the absence of adequate regulations, adverse weather conditions, and instances of conflict such as civil wars.

2.9 Impact of Electricity Load Shedding on Operations of Small-Scale Enterprises

The effects of load shedding for the functioning of small and medium-scale businesses and firms have been well acknowledged in numerous previous studies. Despite the fact that small and medium-sized enterprises remain the most rapidly expanding sector in the economy of emerging nations, their operations have been significantly hindered by insufficient and unpredictable power supplies (Nyanzu & Adarkwah, 2016). As a result, many SMEs are experiencing reduced productivity and inefficiency. Most small and medium-sized enterprises are usually believed to depend on having access to a steady supply of power to operate (Scott *et al.*, 2014). Hence, the impacts of electricity load shedding on the operations of small-scale enterprises cannot be overstated.

Numerous prior studies have examined the influence of electrical load shedding on business operations. Researchers investigated the relationship between power load shedding and business operations at both the macroeconomic and corporate levels. A significant number of research studies has revealed that electricity shedding has significant impacts on businesses. Literature has shown that the practise of load shedding compels certain small enterprises to suspend operations for a significant duration, resulting in detrimental effects on their operations and financial performance, namely in terms of revenue generation and profitability (Banda *et al.*, 2020; Scott *et al.*, 2014; Trung & Kajozi, 2017).

Most of the previous research studies have reported that load shedding disrupts production schedules and hampers productivity of firms. As reported by Banda, Simukoko and Tailoka

(2020), many SMEs are forced to close during load shedding hours, resulting in a drop in sales, reduced turnover, and an inability to meet operating costs. The statistical analysis by Scott *et al.* (2014) found that electricity lead shedding negatively affects labor and total factor productivity of manufacturing SMEs.

In a study conducted by Trung and Kaijozi (2017), the researchers examined the effects of insufficient power supply on the operational efficiencies of enterprises in Vietnam. The research was centered on manufacturing enterprises. The study's results indicated that a lack of power was having a negative impact on the productivity of enterprises (Trung & Kajozi, 2017). In a study conducted by Abotsi (2016), an examination was undertaken to assess the influence of power outages on the production efficiency of businesses in Africa. The findings revealed that the occurrence of frequent electric outages had a detrimental effect on the production proficiency of small-scale enterprises located in Africa (Abotsi, 2016).

Electricity load shedding disrupts production processes (Nyanzu & Adarkwah, 2016). As cited in Walsh, Theron and Reeders (2021), many businesses rely heavily on electricity for their operations, such as manufacturing plants and service providers. When power is suddenly cut off, it leads to downtime and delays in production, resulting in decreased output and potential financial losses (Walsh *et al.*, 2021). More so, load shedding affects communication systems of business entities. In today's digital age, businesses heavily rely on technology for communication purposes. Power outages can disrupt internet connectivity and telephone lines, making it difficult for businesses to communicate with clients and customers (Owusu *et al.*, 2022). This can lead to missed opportunities and damage business relationships (Fiawoo, 2016).

The inadequate provision of power resulting from the practice of load shedding has the potential to raise the expenses incurred by industrial enterprises. Consequently, this circumstance may influence their decisions on technological options, leading them to choose less energy-intensive alternatives. As a result, the overall cost of production is likely to escalate (Fiawoo, 2016). This phenomenon has a consequential impact on the competitiveness of enterprises as it compels them to employ alternative approaches, resulting in diminished product quality, production interruptions, and order delivery delays (Abeberes, 2012). In the same view, Scott *et al.* (2014) reported that electricity load shedding in many developing countries is perceived by small-scale

enterprises to negatively impact operations by halting production, damaging equipment and affecting product or service quality.

A significant number of prior studies has investigated the effects of load shedding on the business operations of small-scale enterprises. The following sections presents some of the empirical studies done across selected developing countries across the globe:

2.9.1 Load Shedding and Business Operations of Small-Scale Enterprises in Pakistan

In Pakistan, load shedding has become a chronic issue that has severely affected the business operations of small-scale enterprises in the country. Over the past few decades since 2007, Pakistan experienced a severe power crisis characterised by a significant decline in production, resulting in a reduction of 6000 Megawatts and widespread shutdowns (Kazmi *et al.*, 2019). Since then, Pakistan has been confronted with a significant energy crisis that has had profound repercussions across all sectors, including academia and industries (Kazmi *et al.*, 2019). Numerous studies have been conducted on the impact of power load shedding on small and medium enterprises in Pakistan, yielding consistent findings.

For instance, Makhdoom, Nawaz and Narejo (2017) studied the impacts of load shedding on retail SMEs in Pakistan. This study was based on the quantitative survey where data was gathered using structured questionnaires over a random sample of 262 business owners. Data was using multiple regression and descriptive statistics. The findings revealed that 65% of the respondents stated they faced load shedding for 6 to 8 hours where 55.3% used Uninterruptible Power Supply (UPS) systems and generator. The study found that load shedding significantly impacted business operations resulting in problems in dealing with customers, decreased sales, product damage and increases costs.

The research conducted by Kaufmann, Kraay, and Mastruzzi (2018) provided empirical evidence supporting the notion that power interruptions in Pakistan exert a substantial negative influence on businesses. Significantly, according to Kaufmann *et al.* (2018), enterprises stated that the overall duration of annual blackouts resulted in an estimated increase in sales losses of 0.29 percentage points for every 100 hours of blackout.

2.9.2 Load Shedding and Business Operations of Small-Scale Enterprises in Bangladesh

In Bangladesh, load shedding has become a common phenomenon, severely affecting the business operations of small-scale enterprises (Shah *et al.*, 2021). Bose, Uddin and Mondal (2013), are also of the view that, electricity load shedding in Bangladesh has contributed to the rise in operational costs of small-scale enterprises leading to suspension or discontinuation of some operations. As found by Rahman, Nesa and Ghose (2018), the persistent and recurrent power outages in Bangladesh are adversely impacting the financial gains of small firms precisely those outside the export processing zones (EPZs). According to Rahman *et al.* (2018), these enterprises have been compelled to resort to expensive diesel fuel in order to sustain their operations, hence leading to an escalation in production costs. In the same vein, Shah *et al.* (2021) reported that the current scheduled load shedding in Bangladesh has had a significant impact on the small and medium firms located outside the export processing zones.

2.9.3 Load Shedding and Business Operations of Small Scale Enterprises in India

Load shedding is also crisis in India that has been prevalent over the past decade where the crisis heightened in 2012. Approximately nine percent of the world's population was without electricity when India was hit by the worst blackout in the history of the globe in the month of July 2012 (Alam, 2013). The breakdown in infrastructure is unfortunately representative of the energy issues that the country is currently facing. Lack of investment in infrastructure and excess demand brought on by price distortion across consumer categories are two key factors contributing to the instability of electricity supply in India. Both of these factors play a role in the country's energy crisis. The crisis has significant negative effects on businesses particularly small firms.

According to a survey conducted by the World Bank in 2015, 35.2% of Indian businesses cite the lack of access to electricity as the single most significant barrier to doing business. These same businesses also report that power interruptions result in losses that are equivalent to 6.6% of annual sales Alama, 2013). According to the findings by Alam (2013), the effect of power outages differs greatly depending on the sector of business where only certain industries that rely heavily on electricity will see their output and profitability decline as a result of a rise in the number of power interruptions.

2.9.4 Load Shedding and Business Operations of Small-Scale Enterprises in Cameroon

Load shedding, the deliberate shutdown of power supply to certain areas for a specific period, has become a common phenomenon in Cameroon where this practice has had detrimental effects on small-scale enterprises in the country (Aboubakar, Li & Oumarou, 2022; Diboma & Tatietse, 2013). In Cameroon, Ef Ii (2021) studied the impacts of electricity insecurity on performance of small-scale enterprises. The research utilized time series data for the period 1980 to 2018. The time series data using multiple linear regression analysis. The study also utilized a survey research to gather field data. The survey findings from this study indicated that small and medium-scale enterprises in Cameroon hold the perception that the energy company's electricity supply is inadequate, hence impeding their business operations. Findings from the same study showed that high fluctuations in electricity supply negatively impacted profitability of SMEs. In conclusion, load shedding has severe consequences on small-scale enterprises in Cameroon as it disrupts production processes, increases operational costs and affects customer satisfaction. Ef li (2021) concluded that small and medium-sized firms that face inadequate electrical supplies encounter regular disruptions in their production operations. In the same view, the study Diboma and Tatietse (2013) which focused on the estimation of power interruptions on industries in Cameroon concluded that power interruptions had significant negative effects on small-scale industries in Cameroon.

2.9.5 Load Shedding and Business Operations of Small Scale Enterprises in Nigeria

In recent times, the Nigerian economy has seen a significant problem within the energy sector because of unsuccessful privatization initiatives, corruption, inadequate governance, and inconsistency in government policies resulting in epileptic electricity supply (Alo & Adeyemo, 202; Chukwulobe *et al.*, 2022, Nurudeen, Nafiu & Jibo, 2018). The inconsistent provision of electricity, characterized by frequent disruptions, is a significant determinant of the financial viability and overall welfare of commercial small-scale firms in present-day Nigeria (Alo & Adeyemo, 2021).

The slow rate of development of small and medium-sized enterprises in Nigeira has been attributed to epileptic electricity supply in the country. According to Alo and Adeyemo (2021), an unreliable power supply negatively affects the efficiency of production channels, leading to additional costs

for firms. This is due to the need to rely on alternative energy sources, increased pressure to meet deadlines in anticipation of power outages, potential damage to inventories, malfunctioning machinery, and overall uncertainty (Alo & Adeyemo, 2021).

In a separate investigation conducted by Moyo (2012), the consequences of power interruptions on both major and minor manufacturing enterprises in Nigeria were analysed. The findings of this study revealed that power outages had a detrimental and statistically significant impact on several aspects of operations, production, and productivity. Furthermore, it is worth noting that electrical disruptions, particularly those resulting from load shedding, have a far more pronounced effect on small enterprises with limited ability to adapt (Moyo, 2012). This, in turn, hampers their capacity for entrepreneurship, innovation, and competitiveness (Ajibola *et al.*, 2021; Moyo, 2012).) The study conducted by Nurudeen *et al.* (2018) also examined the correlation between fluctuations in electricity power and the operational efficiency of small and medium enterprises in Nigeria.

The primary aim of this research was to investigate the impacts of inconsistent electricity provision on the economic contribution and performance of small and medium-sized enterprises in Nigeria. The research study utilised a survey research strategy, and the results of the study indicated that the presence of an unstable electrical supply has led to an escalation in operational expenses and, ultimately, the closure of several small and medium-sized enterprises.

According to Ajibola *et al.* (2021), the presence of a reliable power supply is of great importance as it offers cost-effective advantages. This, in turn, contributes to the optimization of SMEs' operations, leading to increased profitability and overall growth. Bassey and Imoh (2021) also examined the effects of electricity supply on performance of SMEs in Nigeria. These researchers conducted a comparative analysis to examine the impacts of electricity supply on performance SMEs in Calabar South in Nigeria and Calabar Municipality in Nigeria. The participants to this research were owners of SMEs and staff members from power utilities. The study employed a survey research approach and utilised a structured questionnaire. The sample size of 248 was used basing the simple random sampling technique.

The study findings indicate a notable impact of power provision on the operational efficiency of SMEs. The findings additionally demonstrated that the inadequate provision of electricity has a substantial negative impact on operational efficiency of SMEs. The study revealed that SMEs were

facing significant operational challenges because of insufficient and irregular electricity supply including failure to meet daily targets and increased costs of operating.

Empirical research by Akuru and Okoro (2014) on the effect of electricity load shedding on the growth and survival of firms in Nigeria, established that, between 2000 and 2008 around 820 manufacturing firms discontinued operations. This figure went up to 834 in the following year, all because of poor electricity power supply and high cost of the alternative energy supply. More so, Adanlawo and Vezi-Magigaba (2021) examined the effects of electricity outages on the operations of small-scale enterprises in Nigeria. The descriptive survey design was employed to administer structured questionnaires to SMEs operators in Lagos state, Nigeria. Data were analysed using descriptive statistics whilst the Chi-square method was employed to test the formulated hypothesis that electricity outages have significant effects on operations of SMEs. The findings revealed that electricity outages have significant negative effects on operations of SMEs in Nigeria.

The study conducted by Ajibola *et al.* (2021) investigated the influence of electricity supply on the operational effectiveness of small and medium-sized enterprises (SMEs) located in the Ogun State of Nigeria. The descriptive research design was employed and questionnaires were distributed to the participants through the utilization of purposive sampling methodology. The data underwent analysis utilizing the Statistical Package for Social Science (SPSS), employing techniques such as variance analysis (ANOVA) and correlations, as well as linear regression. A total of 120 questionnaires were distributed, out of which 90 were collected and subsequently subjected to analysis. The results of the study indicated a notable positive influence of electricity provision on the operational effectiveness of small and medium-sized enterprises located in the Ogun State of Nigeria. The results imply that unreliable electricity supply that is load shedding pose negative effects on operational effectiveness of SMEs. Additionally, the utilization of alternative power sources has a substantial influence on the operational efficiency of small and medium-sized enterprises in Nigeria.

Similar research was carried out by Fashanu (2021) who investigated the impacts of electricity outages on SMEs' operations in Nigeria. The secondary objective was to ascertain the impacts of power outages on production efficiency of the SMEs. Primary data was collected through questionnaires and the cross-sectional survey design was employed. Data was analysed using regression and correlation analyses. The results revealed that power outages had significant

negative impacts on performance, production efficiency, competitiveness, customer satisfaction and profitability of SMEs. These findings by Fashanu (2021) were in line with those by Abbas and Jibrilla (2016) which examined the impacts of electricity supply on performance of SMEs in Nigeria using descriptive, correlation and regression analyses and found that electricity supply and performance of SMEs are positively correlated.

Olatunji and Umukoro (2018) carried out another study in the context of Nigeria. These researchers examined the impact of electricity power insecurity on the operational efficiency and productivity of small-scale enterprises in the Ondo State of Nigeria. The study employed a descriptive survey research design. The multiple regression technique was employed to ascertain the relationship between electricity insecurity and operational efficiency of SMEs. The findings derived from the analysis indicated that there exists a statistically significant negative correlation between the performance of small enterprises and electricity supply insecurity. Nevertheless, the findings of the research were unable to establish a definitive correlation between the cost and quality of energy supply and the performance of small firms. The research findings indicated that a consistent and reliable electrical supply is of utmost importance in fostering the development and expansion of small enterprises within Nigeria.

According to Azubuike (2013), unreliable power supply in Nigeria negatively affects the efficiency of production channels, leading to additional costs for small-scale firms. This is due to the need to rely on alternative energy sources, increased pressure to meet deadlines due to anticipated blackouts, potential damage to inventories, malfunctioning machinery, and overall uncertainty.

2.9.6 Load Shedding and Business Operations of Small-Scale Enterprises in Ghana

Literature provides evidence that power load shedding in Ghana has indirect negative impacts on small-scale enterprises, including production losses, revenue losses, wastage, personnel losses resulting from downsizing, and challenges in sustaining operations due to high production costs (Doe & Asamoah, 2016; Owusu *et al.*, 2022). Furthermore, Owusu *et al.* (2022) claim that the recurrence of power rationing in Ghana ultimately results in a decrease in productivity. As a result, the company's sales volume does not meet the expected targets. In the concluding remarks, Doe and Asamoah (2014) asserted that the energy challenges in Ghana have not shown signs of

improvement and have exacerbated, resulting in adverse impacts on company operations. More so, Nyanzu and Adarkwah (2016) found that insufficient and unreliable power supplies, rendering the majority of them unproductive and inefficient, have hampered activities and operations of SMEs in Ghana.

According to Doe and Asamoah (2014), the occurrence of electricity load shedding in Ghana leads to interruptions in business operations, resulting in various negative consequences. These consequences include damage to semi-finished goods or materials, delays or cancellations of orders, increased production costs, loss of reputation and competitiveness, decreased sales and customer base, as well as diminished product or service quality. Forkuoh and Li (2015) assert that the occurrence of electrical outages in Ghana has a detrimental impact on the operations and profitability of SMEs. This is primarily attributed to the escalation of production costs, the imposition of exorbitant expenses for alternative power sources, and the consequential impairment of assets, all of which culminate in a decline in sales for these enterprises. Because of escalating operational expenses, businesses allocate their revenue towards the payment of electricity and alternative power bills, rather than reinvesting it, so significantly compromising their performance and impeding their growth (Farawoo, 2016; Forkuoh & Li, 2015). Likewise, a qualitative study by Braimah and Amponsah (2012) revealed that monthly blackouts lasting for about 10.3 hours in a day resulted in increased costs of production of SMEs leading to firms failing to meet contract deadlines.

The study by Doe and Asamoah (2014) examined the effects of electricity power fluctuations on competitiveness and profitability of SMEs in Ghana. The research focused on SMEs located within the Accra business district of Ghana. The researchers employed a cross-sectional survey design and utilised a mixed-method technique. A systematic sampling strategy was employed to choose a sample of 70 SMEs in Ghana. The selection of SMEs was based on utilisation of electricity as a primary component of their major business operations. The data was gathered using a structured questionnaire. The study specifically examined the impact of power fluctuations on the operations of SMEs, with a particular emphasis on profitability and its subsequent influence on the competitiveness of the organisations. The data was analysed using the single-factor analysis. The research revealed that in the absence of dependable energy supplies, SMEs in Ghana faced

challenges in enhancing their production capacity and maintaining high product or service quality, resulting in diminished sales and consequently reduced profitability.

The study further revealed significant negative effects of electricity fluctuations on Return on Investment and Return on Assets. Doe and Asamoah (2014) also found that electricity outages/irregular electricity supply significantly affect SMEs' operations leading to closure of many businesses. However, the present study was not able to collect quantitative data on Return on Investment and Return on Assets because most of the small-scale enterprises in Zambia lack financial recording skills.

Another study in the context of Ghana by Fiawoo (2016) assessed the effects of load shedding on SMEs as well as the coping strategies. Exploratory research methods were utilised to collect quantitative and qualitative information from 31 SMEs in Madina using a purposive, non-probabilistic sampling. Interviews and questionnaires were used to gather data. The data were analysed using descriptive and content analysis. Results showed that the operations and expansion of SMEs are negatively impacted by power load shedding. The adverse outcomes included an increase in operating costs, reduction in labour force, lost production time, lost revenue, and decreased productivity, damage to plant equipment, higher spending, and midnight work.

The objective of the study conducted by Frederick and Selase (2014) was to examine the impact of fluctuations in electric power supply on the profitability and competitiveness of SMEs in Ghana. The nation had successfully attained a middle-income classification and was required to maintain this state. The research report employed a case study methodology, focusing mostly on SMEs operating within the Accra commercial centre in Ghana. The research employed a cross-sectional survey design and utilised a systematic sampling technique to determine a sample size of 70 SMEs in Ghana. The selection of a SME firm was based on two primary criteria: geographical location and reliance on electricity as a critical input for business operations.

Data pertaining to power fluctuations, firm profitability, and firm competitiveness was collected through the utilisation of structured questionnaires. The research findings indicated that an inconsistent power supply had a detrimental impact on the firm's capacity to enhance both the quantity and quality of its products, ultimately resulting in diminished sales and profitability. The objective of this study was to assess the impact of power outages on the operations of SMEs in

Ghana. It is imperative to conduct an analysis in order to ascertain whether comparable outcomes may be attained within the context of small-scale firms in Zambia.

Another study in the context of SMEs in Ghana done by Dunya *et al.* (2019) investigated the impact of electricity load management on the functioning of small-scale firms, while also evaluating the efficacy of the coping strategies employed by these enterprises. The study employed a cross-sectional survey design in conjunction with a mixed-methods research design. A sample size of 152 small-scale traders was selected from Madina in the La-Nkwantanang Municipality, located in the Greater Accra Region, Ghana. The research illustrated that the current implementation of load management measures negatively affected the profitability of numerous small and medium-sized enterprises in Ghana. The study also found that the enterprises had resorted to various coping strategies, including employee layoffs, night shifts, salary reductions, and the use of generators, in order to mitigate the effects of frequent load management. However, these measures were proven less effective in addressing the challenges posed by load management to the operations of the SMEs. The study further identified that over 50% of the SMEs used generators during times of power cuts.

2.9.7 Load Shedding and Business Operations of Small-Scale Enterprises in Senegal

Small-scale enterprises have a significant role in the overall economic landscape of Senegal, as highlighted by Cissokho (2019). Since the onset of the 21st century, small and medium-sized enterprises have been functioning within a context marked by instances of electrical power interruptions. In fact, a significant proportion of these enterprises, specifically 57%, have identified energy as a prominent issue of concern.

According to Cissokho (2019) and Cissokho & Seck (2014), small and medium-sized enterprises experienced an average of 26 disruptions per month, with each outage lasting approximately two hours. Cissokho and Seck (2014) unveiled that the occurrence of load shedding in Senegal prompted enterprises to develop effective methods aimed at enhancing management practices in response to unforeseen power outages.

The study by Cissokho (2019) examined the impact of power outages on the productivity of small-scale enterprises in the manufacturing sector in Senegal. The analysis was conducted utilising panel data from manufacturing small-scale firms. Productivity was quantified through the

utilisation of stochastic frontier models, whereas power outages were assessed based on either their frequency or length. Cissokho (2019) incorporated controls for firms that possess a generator in the study. The results revealed that power disruptions have a significant detrimental impact on the productivity of small and medium-sized enterprises in Senegal. Moreover, the study found that the small-scale firms equipped with a generator have proven to be effective in mitigating the detrimental impact of power outages on productivity.

However, Cissokho and Seck (2014) present an alternative perspective based on their comprehensive analysis of the study's findings where the authors unveiled that power outages may occasionally yield favorable outcomes for the organizations.

2.9.8 Load Shedding and Business Operations of Small-Scale Enterprises in Ethiopia

Similar to other African nations, Ethiopia is presently experiencing an energy crisis. Abdisa (2018) asserts that the inconsistent provision of electricity is a significant hindrance to conducting economic operations in Ethiopia. One of the primary challenges faced by small-scale firms in the country is the insufficiency of electrical supplies, coupled with an uncertain security environment (Ahadu, 2019; Hassen & Degu, 2019). According to Ahadu's (2019) report, the country has seen a frequent recurrence of power outages over an extended period. There are also studies that have studied the impact of load shedding on the operations of small-scale enterprises in the context of Ethiopia. The previous studies have found similar results.

For instance, Ahadu (2019) investigated the impact of power outages on the functioning and efficiency of a small-scale manufacturing businesses Ethiopia. The study found that small businesses in Ethiopia often encounter frequent and unanticipated power outages. This regular occurrence of unexpected power outages was found to significantly hamper the capacity of small businesses to adhere to contractual obligations within specified timeframes. The study also found financial implications of a power outage beyond a duration of three hours were greater compared to a power outage of less than three hours. The study also found that blackouts significantly affected the overall activity of small firms, as well as the work motivation and productivity of their staff.

Similarly, Hassen and Degu (2019) studied the effects of power outages on small-scale enterprises' productivity using evidence from Ethiopia. In this study, a cross-sectional survey was undertaken

to examine the impacts of power outages on the total factor productivity, labour productivity, and revenue of small-scale firms in ten prominent urban regions of Ethiopia. The findings of the study indicated that a marginal increase of one percent in the average duration of power outage is linked to a corresponding drop of 0.54% in total factor productivity, 0.17% in labour productivity, and 0.19% in revenue. The authors proposed that power outages have a detrimental impact on the productivity and profitability of small businesses, as they impose limitations on the production process. Additionally, it is suggested that placing significant emphasis on the provision of sustainable and dependable power is crucial for enhancing the overall efficiency of micro, small, and medium firms.

2.9.9 Load Shedding and Business Operations of Small-Scale Enterprises in Sub-Sahara Africa

Loading shedding is a crisis in Sub-Saharan Africa that has plagued the region for decades and the consequences of loading shedding are far-reaching. According to Mensah (2016), power cuts have developed into a distinguishing feature of a number of economies located in Sub-Saharan Africa. According to research conducted by the World Bank (2020), the region has approximately 102 power outages on a yearly basis, on average. The major reason is that power generation capacity in the sub-Saharan Africa region is comparatively smaller than that of any other region globally, and the growth of this capacity has experienced a state of stagnation (Abotsi, 2016). According to the World Bank Enterprise 2015Survey, the monthly average number of outages in sub-Saharan Africa is 8.5 (4.8 hours), while it is 3.5 (2.5 hours) in East Asia and Pacific, 17.6 (6.5 hours) in the Middle East and North Africa, 25.4 (3.1 hours) in South Asia, and 2.8 (1.5 hours) in South America and the Caribbean (Mensah, 2016). This is in comparison to the number of outages that occur in East Asia and Pacific, which are significantly lower.

As also cited by Maende and Alwanga (2020), one contributing factor to the insufficient power supply in Sub-Saharan Africa (SSA), is the limited capacity for power generation and inefficiencies within the electricity institutions. In their study, Cole *et al.* (2018) examined the impact of power outages on the performance of firms in Sub-Saharan Africa and noted significant power outages in several countries in the region. According to the findings of Cole *et al.* (2018),

frequent and unplanned power outages impose a considerable hardship on enterprises in the region particularly small firms with lower total sales in comparison to medium-sized firms.

According to their findings, if the average duration of power outages is lowered, small-scale enterprises that do not possess generators might potentially experience a significant gain in sales, amounting to 83 percent (Cole *et al.*, 2018). Further, Cole *et al.* (2018) found that small businesses in the formal sector of Sub-Saharan African countries had losses amounting to approximately 6% of their turnover because of power outages whilst firms in the informal sector, which lack alternative power sources, incurred losses of up to 16% of their revenue.

Mensah (2016) also made an effort to assess the impact of power outages at the firm level by using panel data on firms from 15 different Sub-Saharan African countries. Mensha (2016) used a quasi-experimental methodology to analyse the influence that electricity self-generation has on the firm's performance in terms of mitigating the negative consequences that power interruptions have. The findings of the investigation showed that shortages of power have considerable adverse effects on the productivity of businesses, as well as their sizes and levels of employment. In conclusion, contrary to the assumption that self-generation, the evidence presented by Mensah (2016) suggested that dependence on self-generation is associated with decreased productivity despite short-term increases in revenue. These findings contradict the notion that self-generation may be advantageous for businesses during outage periods.

2.9.10 Load Shedding and Business Operations of Small-Scale Enterprises in Kenya

Electricity supply in Kenya is widely recognised for its lack of stability and the significant costs associated with disruptions, which have a negative impact on production efficiency and competitiveness (Cheruto & Munene, 2019; Njiraini, 2021). According to Cheruto and Munene (2019), the presence of an unreliable power supply can result in several negative consequences within a production setting, including disruptions in the manufacturing process, the potential loss of perishable commodities, potential damage to sensitive equipment, and the potential loss of orders.

Maende and Alwanga (2020) stated that the occurrence of power outages in Kenya could be attributed, in part, to inadequate infrastructural facilities as well as instances of fraud and vandalism targeting critical assets like transformers and electricity lines. According to Maende and

Alwanga (2020), in the context of Kenya's enterprises, there exists a notable and adverse correlation between a scarcity of power and the financial performance of small firms.

2.9.11 Load Shedding and Business Operations of Small-Scale Enterprises in Tanzania

Small-scale enterprises play a crucial role in Tanzania's economy, contributing to employment generation and poverty reduction. However, load shedding impacts the operations of these enterprises (Ngowi, Bångens & Ahlgren, 2019). According to the study conducted by Mchopa *et al.* (2014), companies in Tanzania experience prolonged periods without access to electricity due to the frequent occurrence of power outages. The aforementioned circumstance had a direct impact on the efficiency of small enterprises, resulting in escalated production costs due to the supplementary financial resources allocated towards fuel consumption for generator operation. Mchopa *et al.* (2014) also noted that small and medium-sized enterprises encountered significant challenges due to power rationing. These challenges manifested in several ways, including reduced production levels, inadequate service supply, inability to meet desired output or sales targets, and diminished revenue levels.

Consequently, the aforementioned circumstances resulted in a decline in profits and a negative impact on the overall financial and nonfinancial performance of these small and medium-sized enterprises (Mchopa *et al.*, 2014). The findings of the study indicated that the implementation of power rationing led to the cessation of production machinery, hence exerting a detrimental impact on productivity (Mchopa *et al.*, 2014). In their survey research, Mchopa, Kazungu and Moshi (2014) discovered that power rationing reduced SME productivity in Tanzania. Furthermore, a drop in productivity was observed to have a positive link with loss of income for SMEs because of power rationing (Mchopa *et al.*, 2014).

2.9.12 Load Shedding and Business Operations of Small-Scale Enterprises in South Africa

Load shedding has been occurring in South Africa since 2007, and throughout the course of the last 15 years, the energy crisis has exhibited increased persistence and duration due to a widening gap between supply and demand (Tembe & Hlengwa, 2022). This situation poses a significant risk to the stability of the national grid. Load shedding in South Africa has also significant effects on small-scale enterprises in the country.

According to a previous study conducted by Mbobvu *et al.* (2021), it has been indicated that the sustainability of small and medium-sized enterprises (SMEs) in South Africa is adversely affected by load shedding. This is mostly because to the disruption it causes in the financial performance of these enterprises, affecting factors such as solvency, efficiency, profitability, and liquidity. The study conducted by Botha (2019) presents empirical evidence on the detrimental effects of an unreliable electricity supply in South Africa on company operations and total factor productivity.

Makgopa and Mpetsheni (2022) explored the impacts of load shedding on SMMEs in South Africa focusing on SMMEs in Nelson Mandela Bay Municipality. The qualitative research approach was adopted to gain in-depth understanding of the impacts of load shedding on the SMMEs in Nelson Mandela Bay. Qualitative data was collected using in-depth interviews conducted with SMMEs' managers and was analysed using content analysis. Makgopa and Mpetsheni (2022) revealed that load shedding results in business interruptions and security risks to the SMMEs.

Olajuyin and Mago (2022) which examined the effects of load shedding on performance of SMEs in the South Africa's food industry did a similar study to that of Makgopa and Mpetsheni (2022). The study was explorative and adopted the qualitative research design. The purposive sampling method was employed to select participants. Data was collected using in-depth interviews. The research revealed that load shedding adversely affect performance of SMEs by undermining the capacity of the SMEs to provide quality services and products to customers leading loss of customers and reputation. The study further revealed that to mitigate effects of power outages, SMEs in the food industry embrace alternative energy power sources such as backup generators as well as adjusting operations.

More so, the findings by Makgopa and Mpetsheni (2022), Olajuyin, and Mago (2022) corroborated the findings by the earlier study of Mohammed (2012). The study by Mohammed (2012) focused on the impacts of load shedding on SMEs Johannesburg, South Africa. The secondary objective was to investigate the extent to which particular industries were affected by the load-shedding problem. Data for the study was gathered using structured questionnaires and analysed using the student's t-test and analysis of variance (ANOVA). The evidence showed that small enterprises were more impacted compared to medium-sized enterprises. The study found that load shedding negatively affected the SMEs by reducing operating profits, affecting service delivery, reducing

competitiveness and sales turnover. However, the study findings were confined to the SMEs in Johannesburg in South Africa.

Schoeman and Saunders (2018) which aimed to examine the effects and financial implications of power outages on small enterprises situated in South Africa's City of Johannesburg did a similar South African-based research. The study followed the quantitative research approach where data was collected using questionnaires and interviews. A majority of the surveyed firms, comprising over two thirds, reported an average occurrence of one to three power outages each month. In contrast, 18.5 percent of the businesses indicated experiencing between four and seven power outages during the same period. Business enterprises reported a decrease in client base and a decline in revenue on days when they experienced power outages. In order to mitigate the effects of power outages, many of the SMEs employed backup power systems such as backup generators and solar systems.

Similarly, Mohammed (2017) evaluated the impacts of load shedding on SMEs in Johannesburg, South Africa. The study followed the quantitative research approach. Data was collected using survey questionnaires. Load shedding was measured using frequency and duration of load shedding. The descriptive survey research design was employed. Stratified random and purposive sampling techniques were employed. Data gathered were analysed using cross-tabulations and frequency distributions. The study found that SMEs were negatively impacted in terms of operating profits, service delivery, sales turnover and competitiveness.

2.9.13 Load Shedding and Business Operations of Small-Scale Enterprises in Zambia

Load shedding has also found to be one of the external factors impacting small-scale enterprises in Zambia. According to the research conducted by Mwila (2017), it was found that load shedding has a significant impact on the operational efficiency and financial sustainability of various businesses. The research was carried out in Zambia with the objective of examining the effects of load shedding on small-scale industries. The study's findings indicate that small firms saw the greatest impact, mostly because of their limited resilience and constrained ability to invest in alternative energy sources. Many small businesses opted to decrease their production outputs, leading to a decrease in revenue, while also incurring additional expenses such as idle labour and overtime.

Phiri's (2017) study also demonstrated that power restriction and energy load shedding have adverse effects on the productivity and profitability of business organizations. This study was conducted in Solwezi on the North-Western part of Zambia while the current study focuses on Masala Market in Ndola District, Copperbelt Province. Sichone *et al.* (2016) also found that, at the subsector level, SMEs involved in the food and metal fabrication processes in Zambia experienced sales declines of between 1.4% and 1.9% due to load shedding.

In another local-based research, Banda *et al.* (2020) aimed to determine the effect of load shedding on small-scale entrepreneurs in Zambia using the mixed research approach. The sample for the study consisted of 200 small-scale entrepreneurs selected using simple random sampling. Data were collected through survey questionnaires and interviews and analysed using Analysis of Covariance. The findings revealed that load shedding had negative effects on small-scale entrepreneurs in Zambia. The study was conducted in in Kitwe District, Copperbelt Province whilst the present study focuses on SMEs in Ndola, Copperbelt Province.

Phiri (2018) examined load shedding and electricity demand and its impacts on Zambian businesses. The study's overarching goal was to look into the effects of load shedding and electricity consumption on Zambian small enterprises and entrepreneurs. The study's particular goals were: (a) to determine the productivity and financial impacts of load shedding on Zambian businesses, (b) to determine the impact of load shedding on revenue and output and (c) find out alternatives for reducing the consequences of load shedding. Purposive sampling was used to select a sample of 100 from various sub-sectors. Data was collected using self-administered questionnaires containing closed and open-ended questions and personal observations. The analysis showed that ZESCO's efforts to manage the power shortfall through load shedding and power rationing had a detrimental effect on the productivity and profitability of the small-scale enterprises. The survey also showed that very few enterprises turned to alternate energy sources and took steps to lessen the effects of load shedding.

However, the study found that the coping strategies implemented to lessen load shedding had not improved profitability and productivity. Additionally, it was determined that load shedding has a detrimental effect on business development and entrepreneurship due to the absence of accessible and trustworthy energy supplies. However, the findings may not be transferable to the situation of small-scale enterprises at Masala Market.

Furthermore, a recent study conducted by Lombe and Tembo (2023) investigated the impact of load shedding on small and medium-sized enterprises, specifically focusing on female entrepreneurs in Lusaka Kabwata Market. The primary objectives of this study were to determine the effects of load shedding on output, profit, and workers within the context of businesses. Additionally, the study aimed to analyze the influence of load shedding on the socioeconomic circumstances of female owners of small and medium-sized enterprises, as well as the effectiveness of the coping techniques employed by these organizations.

The research was grounded in the principles of the Cybernetic theory and the Stress theory. The research employed a descriptive design to gather qualitative and quantitative data, using a random selection of 100 respondents and interviews with key informants. The data collection process involved the utilization of a questionnaire as well as conducting in-depth interviews with key informants. The statistical analysis employed descriptive techniques to analyze the quantitative data, while theme analysis was applied to examine the qualitative data.

Based on the findings of the study, it has been shown that load shedding exerts a negative influence on the workforce, socioeconomic aspects, productivity, and financial gains of small and medium-sized enterprises. A variety of coping tactics were identified, one of which was working during nighttime hours. However, in comparison to utilizing electricity as a power source, the effectiveness of the bulk of these coping approaches employed by small and medium-sized enterprise owners was shown to be somewhat lower. The study reached the conclusion that load shedding had notably more adverse effects on small businesses operated by women.

More so, the study by Kintu (2022) examined key factors that affect the operational elements of Zambia's SMEs affected by load shedding, including the financial implications of material losses, labor costs, and the preservation of business operations. The study also examined the impacts of load shedding on turnover rates, as well as the various coping mechanisms implemented in response to load shedding. The specific aims of the study were to determine effects of load shedding on viability of SMEs and to identify strategies of the SMEs to mitigate the impacts of load shedding. The research strategy employed was non-experimental. The study employed a quantitative research approach employing a semi-structured questionnaire. Kintu (2022) conducted a univariate analysis and chi-square test to determine statistical association between

variables. The study revealed that occurrence of load shedding resulted in detrimental disruptions to the operations of a majority of SMEs.

In another study, Siankwilimba (2019) examined the impacts of electricity power load shedding, caused by climate change on the agricultural productivity and production of smallholder farmers in the districts of Mazabuka, Monze, Choma, Kalomo, and Namwala in the Southern Province of Zambia. In order to acquire the necessary data for comprehending the impacts and scope of load shedding, as well as assessing potential variations in outcomes across different enterprises, a total of 149 carefully designed sets of questionnaires were distributed at the enterprise level. In addition, in order to enhance and expand the comprehension of the impacts and scope of load shedding on small-scale farmers, a series of 17 focus group discussions were carried out. The analysis indicated that certain firms within the sample area either lacked awareness of the scheduled power cuts or experienced deviations from ZESCO's programmed load shedding timetable. The results indicated numerous firms encountered a decline in the projected mean level of production amidst the occurrence of load shedding. The production level experienced a decrease of 26.6%. The study further found that majority of smallholder farmers (85.26%) opted to rent alternative tools/equipment as a means of coping with load shedding and purchasing alternative tools/equipment to ensure continuous power supply.

Based on the aforementioned empirical literature assessment, an agreement among scholars and researchers emerges; indicating that load shedding has a detrimental effect on small-scale firms. However, Scott *et al.* (2014) argue that electricity load shedding has a considerable impact on the productivity of industrial SMEs. However, it is important to note that these effects are often statistically insignificant and, in some cases, even positive. Although the prevailing consensus suggests that load shedding has predominantly negative consequences, Cissokho and Seck (2014) present an alternative perspective based on their comprehensive analysis of the study's findings. The study unveiled that power outages may occasionally yield favorable outcomes for the organizations.

The findings of the study indicated that in Senegal, the occurrence of load shedding prompted enterprises to develop effective methods aimed at enhancing management practices in response to unforeseen power outages (Cissokho & Seckm, 2014). Furthermore, alongside the development of effective management methods, proficient companies strategically seized the opportunity to

acquire the market share that was formerly held by less efficient enterprises. In accordance with the research conducted by Cissokho and Seck (2013), Bose, Uddin and Mondal (2013) established that electricity outages do not have a substantial influence on operations of small and medium-sized enterprises.

From the reviewed empirical literature, several studies have been carried out to determine the effects of load shedding on operations of businesses particularly. Although, most of the prior studies have proved that load shedding has significant negative effects on operations of SMEs, several theoretical, methodological and empirical gaps. Table 2.5 provides the summary of the operational effects of load shedding from the existing literature.

Table 2.5: Summary of Operational Effects of Load Shedding on Small-Scale Enterprises

Operational effects of load shedding	**References**
Reduced profitability	Banda *et al.*, 2020; Doe & Asamoah, 2014; Dunya et al., 2019; Ef li, 2021; Fashanu, 2021; Frederick & Selase, 2014; Mbobvu et al., 2021; Scott *et al.*, 2014; Trung & Kajozi, 2017
Reduced productivity	Ahadu, 2019; Cissokho, 2019; Moyo, 2012; Fiawoo, 2016; Mchopa et al., 20145; Scott *et al.*, 2014; Trung & Kajozi, 2017; Lombe & Tembo, 2023
Disruptions of production processes and reduced production efficiency	Abeberes, 2012; Abotsi, 2016; Fashanu, 2021; Fiawoo, 2016; Nyanzu & Adarkwah, 2016; Moyo; 2012; Phiri, 2017; Siankwilimba, 2019
Communication disruptions	Fiawoo, 2016; Owusu et al., 2022;
Decreased sales	Alam, 2013; Doe & Asamoah, 2014; Forkuoh & Li, 2015; Frederick & Selase, 2014; Kaufmann et al., 2018; Makhdoom et al., 2017; Sichone et al., 2016

Temporal closure of business or suspension of operations	Bose et al., 2013; Doe & Asamoah, 2014; Nurudeen *et al.,* 2018,
Increased production costs	Ajibola *et al.,* 2018; Doe & Asamoah, 2014; Forkuoh & Li, 2015; Rahman et al., 2018;
Poor product or service quality	Ajibola *et al.,* 2018; Doe & Asamoah, 2014; Mohammed, 2012; Olajuyin & Mago, 2022
Loss of customers and reputation	Doe & Asamoah, 2014; Schoeman & Saunders, 2018
Failure to meet targets and deadlines	Braimah & Amponsah, 2012; Mchopa et al., 2014; Olajuyin & Mago, 2022

Source: Researcher's constructions

2.10 Coping Strategies of Small-Scale Enterprises to Electricity Load Shedding

Generally, Lazarus and Folkman (1984, p.147) cited in Van Zyl and Du Plessis (2012) define coping as the "thoughts and behaviours that people use to manage the internal and external demands of situations that are appraised as stressful". Coping is s a distinct field of psychology that emerged between 1970 and 1980 (Van Zyl & Du Plessis, 2012). It is a fundamental aspect of nature that enables individuals to effectively manage challenges, stress, and adversity. According to Drnovšek, Örtqvist and Wincent (2010), coping is the process of utilizing various strategies and mechanisms to deal with difficult and stressful situations. The ability to cope effectively not only enhances well-being but also promotes resilience and adaptability. Drnovšek, Örtqvist and Wincent (2010) argue that coping refers to the cognitive and behavioral strategies employed by individuals to effectively navigate and address challenging circumstances. It involves the allocation of personal resources and efforts towards problem solving, as well as the pursuit of mastery, minimization, reduction, or tolerance of stress resulting from unpleasant and stressful events (Uy, Foo & Song, 2013).

Coping can be categorized into two overarching strategies - one that motivates individuals to actively address the problem, and another that focuses on managing the emotional responses that

arise from the given challenge (Beukes *et al.*, 2018). The existing body of literature commonly distinguishes between two overarching coping methods, as outlined in the review conducted by Lazarus and Folkman in 1984. Problem-based coping is a cognitive response behavior that encompasses actions aimed at mitigating stressful circumstances (Drnovšek *et al.*, 2010). This coping approach encompasses the process of identifying and defining the problem at hand, producing a range of different solutions, evaluating the costs and benefits associated with each solution, and subsequently implementing activities to effectively address and resolve the problem (Drnovšek *et al.*, 2010).

Furthermore, emotion-based coping strategies encompass behavioral reactions aimed at regulating the affective outcomes of stressful situations (Rosman *et al.*, 2020). These strategies may comprise avoidance, minimization, and removing oneself from the problem (Drnovšek *et al.*, 2010). While the former approach exhibits proactivity and a focus on taking action, the latter approach is characterized by passivity and a tendency to suppress rather than actively participate (Drnovšek *et al.*, 2010). However, Drnovšek, Örtqvist and Wincent (2010), concluded that small firms and entrepreneurs mostly employ problem-focused coping strategies to deal with stressful environments.

Being centered on the stressful environments brought about by the load shedding to the small-scale enterprises, this study was anchored on the coping theories namely Cybernetic theory of organisational stress proposed by Edwards in 1992 and Theory of stress or Transactional model of stress and coping propounded by Lazarus and Folkman in 1984. The theory of stress hypothesises positive relationships between coping strategies and individual or entrepreneurial well-being (Drnovšek *et al.*, 2010). This theory proposes that stress is not solely determined by external events but is rather a result of the individual's appraisal of those events.

According to the Theory of Stress, stress occurs when an individual perceives a situation as threatening or demanding, exceeding their resources to cope effectively (Biggs, Brough & Drummond, 2017). The theory also distinguishes between two types of coping strategies: problem-focused coping and emotion-focused coping (Lazarus, 2020). Problem-focused coping involves taking actions to directly address the stressor, such as seeking information or actively problem-solving. Emotion-focused coping, on the other hand, involves regulating emotions through strategies (Biggs *et al.*, 2017). In the regard, the constructs of coping strategies according to the

Theory of Stress are problem-focused and emotion-focused coping strategies. Problem-focused coping is defined as the attempts to manage or alter the situation whilst emotion-focused coping as the attempts to manage or reduce emotional distress caused by stressful events (Guo, Gan & Tong, 2013). These constructs are shaped by various factors such as personal experiences, cultural background, and individual personality traits (Landy et al., 2022). These coping styles are often measured using items adapted from the theory of stress' coping scale which indicates that problem-focused coping construct include measuring statements such as "I come up with several alternative solutions to the problem", "I try to work more efficiently" and "I make a plan and follow it" (Boyd, Lewin & Sager, 2009; Lyngdoh, Liu & Sridhar, 2018).

On the other hand, emotion-focused coping is measured by items such as "I refuse to believe it has happened" and "I have fantasies about how things will work out" basing on Likert scales (1 = almost never to 5 = almost always) (Boyd et al., 2009). These constructs have been widely measured using the Ways of Coping Questionnaire (WCQ) developed by Lazarus and Folkman (1984) in their theory of organisational stress. The WCQ is a widely used tool in research that aims to measure the various strategies individuals employ to cope with stress and adversity and consists of 66 items that assess coping mechanisms across eight different dimensions namely confrontive coping, distancing, seeking social support, self-control, accepting responsibility, planful problem solving, escape-avoidance and positive reappraisal (Abdullah et al., 2010; Kato, 2015).

Furthermore, the theory emphasizes that the selection and impact of coping methods are contingent upon the interplay between individuals' reported stress levels and their perceived level of control over stress (Lazarus, 2020, Lin, Li & Han, 2018). Similarly, the cybernetic theory of stress is a classic framework that seeks to explain how individuals perceive and respond to stressful situations (Biggs *et al.*, 2017). Furthermore, the utilisation of coping strategies aligns with the resilience theory, which emphasises the significance of recognising stressors such as load shedding, implementing protective factors, and facilitating the reestablishment of business operations to achieve a state of equilibrium, or potentially surpass the initial level (Tembe & Hlengwa, 2022). The resilience theory originated from the examination of adversity and its effects on individuals, as explored by Tembe and Hlengwa (2022). Load shedding is considered a significant challenge due to its propensity to create vulnerability, therefore rendering it an adversity.

The resilience theory argues that individuals can learn and grow from adversity, rather than being permanently damaged by it. According to Van Breda (2018), an essential element of resilience theory is the development of effective coping mechanisms and problem-solving skills. From the theory, resilient individuals are able to assess a challenging situation objectively, find viable solutions, and implement them in a practical manner (Van Breda, 2018), like in this case of load shedding. They possess the ability to adapt their plans and strategies as circumstances change, enabling them to move forward and overcome obstacles (Van Breda, 2018). In line with the resilience theory is the survival-based theory, often known as survival theory or the survivalist perspective, which explores the fundamental human inclination to survive and adapt in challenging circumstances (Jafar *et al.*, 2010).

Globally, there are a number of coping strategies that small-scale enterprises have been putting in place in order to mitigate the effects of load shedding. There are of actual and aspirational coping strategies that have been in use in order to mitigate against electricity load shedding so that businesses can continue operating. In China, Fisher-Vanden *et al.* (2012) discovered that load shedding forced small-scale enterprises to use backup systems, typically diesel generators as a way of ensuring that there are minimum disruptions to the business operations.

Zachariadis and Poullikkas (2012) suggested that most small-scale enterprises in Cyprus that cannot operate without electricity have resorted to using generators, solar powered electricity generating equipment and invertors. Attigah, Rammelt, and Mayer-Tasch (2015) have documented that in nations characterized by a significant lack of electricity reliability, enterprises dependent on electricity are compelled to allocate resources towards the acquisition of diesel generators in order to maintain uninterrupted economic activities. In the same view, Yakaka, Murtala, and Babagana (2017) assert that the unreliable electricity supply in Nigeria has prompted numerous entrepreneurs to transition to alternate energy sources, such as generators.

The study by Scott *et al.* (2014) found that the main coping practice adopted by most SMEs to mitigate the impacts of electricity load shedding is the use of standby generators followed by changes in business operations and reducing business hours. Cole *et al.* (2018) also noted use of standby generators to mitigate the effects of load shedding. According to Mwila (2017) and Phiri (2017), one coping strategy employed by small-scale enterprises is the use of alternative power sources such as generators and solar panels. By investing in these technologies, businesses can

continue their operations during power outages. Cissokho and Seck (2013) also found that owning a generator by SMEs in Senegal had positive significant impacts on SME productivity.

Although this solution may be costly initially, it proves to be a long-term investment that ensures uninterrupted productivity. Phiri (2018) also reported that a number of coping strategies are being employed by small-scale enterprises to mitigate the effects of power rationing on businesses in Zambia including use of own generators to ensure continuous electricity supply though an expensive and unsustainable solution in the medium to long-term. The the World Bank's (2022) Enterprise Survey reported that most small businesses in the 137 countries use back-up generators as a coping strategy to load shedding.

The study by Fiawoo (2016) observed that coping strategies of small businesses in Ghana to minimize negative effects of load shedding include use of electric generators, reducing labour force, temporal closure, use of solar power and uninterrupted power supply, use of power banks, inverters as well as voltage stabilizers.

The literature studied indicates that businesses are increasingly using alternative sources of power, such as backup generators, in order to mitigate the negative impacts of load shedding on their operations (Fiawoo, 2016; Phiri, 2018). For example, Fiawoo's (2016) study has demonstrated that a majority of small enterprises employ generators as a substitute power supply during episodes of electricity load shedding. Furthermore, in a study conducted by Doe and Asamoah (2014) aimed at investigating the impact of electric power variations on the profitability and competitiveness of SMEs in Ghana, it was discovered that a majority of these enterprises (66%) resort to utilizing generators as a substitute power source. The study by Kintu (2022) also found that majority of the SMEs were equipped with generators and utilized solar panels.

Use of uninterruptable power supply (UPS) has also been a coping strategy of most firms. A UPS comprises rechargeable batteries stored in one unit usually directly connected to the main power distribution source of a house or business and automatically switches on during load-shedding (Ahmed *et al.*, 2016; Banderker, 2022). According to Tembe and Hlengwa (2022), one of the most effective coping methods for small businesses is the utilization of UPS to provide backup power during load shedding. UPS systems usually last around five hours, beating the load-shedding time (Banderker, 2022).

Ahmed *et al.* (2016) highlighted that alternative power sources such as UPS can serve as a reliable contingency plan for businesses during load shedding periods. UPS systems play a vital role in safeguarding sensitive data and preventing operational disruptions. For businesses, maintaining uninterrupted power supply is vital to avoid downtime and maintain productivity (Mbomvu *et al.*, 2021). UPS installations ensure that essential operations, such as electronic communication, manufacturing processes, and customer service, continue without interruption, limiting financial losses and fostering efficiency (Phiri, 2018).

Limiting or changing production processes has also been cited in existing literature as one of the mitigation strategies to load shedding. Abeberese (2012) found that limiting hours of operation is a load shedding coping strategy for most small-scale enterprises as well as changing production processes and introducing night shifts for employees. Foster and Steinbuks (2018) have suggested that an alternative approach to modifying processes involves the utilization of manual labor and non-electricity-dependent procedures. Nevertheless, the feasibility of employing manual labor and its specific applicability within certain industries is contingent upon the inherent characteristics of the firm. In certain sectors, the utilization of manual processes may be significantly hindered by their comparatively sluggish pace and worse output quality (Foster & Steinbuks, 2018).

The study by Mohammed (2012) found several coping strategies of SMEs in South Africa and theses included use of UPS or battery backup, use of solar and generators, resorting to activities that did not require power, working from home, changing business hours in line with shedding and relocation to unaffected areas. According to the study conducted by Grainger and Zhang (2019), businesses are compelled to adopt alternative time schedules, modify input employment, and even adjust their company activities due to the presence of an unpredictable electrical supply.

Similarly, Bailey (2022) documented that enterprises confronted with the issue of inconsistent electricity supply have several options at their disposal. These include relocating to a region with a more dependable electricity infrastructure, employing factor substitution techniques, exploring the possibility of generating their own electricity, making strategic decisions regarding their business operations, and implementing measures to reduce their output.

Besides, firms also use alternative energy such as fuel (petrol, diesel and paraffin), generators and Liquefied Petroleum Gas (LPG) (Braimah & Amponsah, 2012). Meadows and Riley (2003)

reference the study conducted by Osunbitan *et al.* (2000) in their literature review pertaining to contemporary energy usage in microenterprises. The aforementioned study reveals that agro-processing enterprises situated in West African Countries exhibited a preference for diesel engines over electric engines due to the unreliability of power supplies.

The study by Kavishe (2015) reported that the coping strategies of small-scale firms to power interruptions in Tanzania included use of part-time and untrained employees and making staff work overnight and during weekends. Due to the problem of power outages, industries move to night shifts and work over time in order to continue output, as stated by Kavishe (2015). According to Hussain *et al.* (2012), 15.0% of industries in Punjab, Pakistan switched to night shifts, while 57.5% of companies implemented overtime work. According to Tavishe (2015), many small businesses in Tanzania utilise the coping mechanism of switching from day to night shifts. The study by Doe and Asamoah (2014) found that most SMEs in Ghana used rechargeable lamps and solar panels as coping strategies to loads shedding.

From the aforementioned review of empirical literature, small-scale enterprises have devised several coping strategies to cope with load shedding. More so, the Captive generation and revealed preferences method for modelling economic losses of load shedding also support the issue of coping.

2.10.1 Captive generation approach

The captive generation method, also known as the indirect method, is a technique used to assess the expenses related to load shedding. This approach focuses on the measures adopted by consumers to address power shortages, such as procuring generators, captive power units, and diesel pumps (Lubasi, 2020). The utilization of this approach can be traced back to the period of World War 1, specifically in 1917, when the US Navigation Army employed it. Subsequently, it was embraced by several European nations, including Britain, throughout the 1930s.

The purpose behind its adoption was to streamline industrial output and assess the adverse consequences of power interruptions (Ozturk, 2010). The captive generation method relies on the analysis of market-behaviour, specifically the examination of consumer spending on generators and the utilization of interruptible energy contracts (Goldberg, 2015).

It is commonly considered that firms operate with the primary objective of maximizing profits, while families are assumed to pursue the maximization of utility. When confronted with frequent power outages, a firm or home will take measures to protect itself from the resulting harm by obtaining backup producing units (Ozturk, 2010). The benefits derived from insurance coverage against power outages encompass the ability to maintain uninterrupted productivity or leisure activities facilitated by self-generated electricity, as well as the prevention of potential equipment damage that would have otherwise occurred due to the outage (Tiwari, 2014).

According to Nyasha (2014), the anticipated benefit derived from the incremental production of one kWh of electricity is equivalent to the anticipated detriment incurred from the incremental kWh obtained during a power outage. The application of this method is straightforward and can yield precise cost estimates for firms. This is due to the availability of data on the dimensions of device generating units, the expenses associated with backup systems, and the power output (measured in kWh) of the system.

These data points can easily be traced back to the respective device suppliers (Neelsen & Peters, 2013; Tiwari, 2014). Nevertheless, it has been contended by opponents that the reliance on the backup generation approach for cost estimation is contingent upon whether the backup power sources are intended for emergency purposes or are merely optional standby (Caves *et al.*, 1992).

In situations when captive generation is employed solely as a contingency measure for emergency backup power, the approach utilized may result in an overestimation of costs. In contrast, Tiwari and Gomez (2015) posited that the expenses associated with power outages surpass the price of implementing backup generating systems. This assertion is based on the recognition that indirect costs, in addition to direct costs, must be taken into account. Additionally, the methodology operates under the assumption of a market for generators that is very competitive, risk neutrality, and a production technology that allows for the smooth entry of power (Lubasi, 2020).

According to Nyasha (2014), the inclusion of risk aversion, externalities resulting in environmental regulation, and technologies with limited utility for small generators might contribute to inaccurate estimations of the marginal outage cost. The aforementioned approach is also deemed to possess certain drawbacks due to its high cost and time-intensive nature when aiming to get representative outcomes (Amadi & Okafor, 2015; Kufeoglu & Lehtonen, 2015).

2.10.2 Revealed Preferences Method

According to Oseni (2012), the revealed preference technique relies on the utilization of proxy data to infer the costs associated with power outages. This is achieved by examining the activities undertaken by enterprises in order to mitigate the economic consequences of such interruptions. The initial scholarly investigation conducted by Bental and Ravid (1982) brought attention to the possibility of estimating the financial implications of power outages on a company by utilizing information pertaining to backup generators.

The underlying foundation of this model is predicated on the supposition that organizations primarily function with the objective of optimizing their financial gains (Goldberg, 2015). Therefore, in response to the occurrence of frequent power outages, a company may take measures to protect itself from the negative consequences of such outages by procuring alternative power generation capabilities (Oseni, 2012). According to Adenikinju (2003), the firm will determine the ideal quantity of back-up power by balancing the anticipated cost of generating a kilowatt-hour (kWh) internally with the projected benefit derived from that kWh. It is important to note that the acquisition of a generating plant incurs costs for the firm. Goldberg (2015) posits that rational managers who strive to maximize profits oversee enterprises. In the face of power disruptions, these managers are inclined to invest an optimal amount of funds into generating capacity, hence minimizing the economic costs associated with such interruptions.

There are two potential implementations of the revealed preferences method. Bental and Ravid (1982) put one approach, known as the marginal cost method, forth. This method aims to determine the marginal outage cost by calculating the marginal cost of own-generation. According to Oseni (2012), this is achieved by considering that the expected marginal gain from auto-generation is equal to the expected loss resulting from the kilowatt-hours not supplied by the utility provider (p. 18). The approach relies on the underlying premise of a market for generators that operates under conditions of perfect competition. It also assumes the feasibility of gradually augmenting the capacity for electricity generation, as well as the capacity of the generated energy to adequately substitute the conventional source of power (Goldberg, 2015). Beenstock (1997) devised the second iteration of the disclosed preferences approach, which is commonly referred to as the partial backup method.

According to Oseni (2012), this particular methodology is regarded as more advantageous compared to the marginal cost method since it allows for the inclusion of potential losses that a company may experience because of insufficient backup in the event of a power interruption. According to Oseni (2012), the method enables the evaluation of both the total and unmitigated outage costs as discrete entities (p. 18). The approach employed in this study is characterized by a higher level of mathematical complexity compared to the method proposed by Bental and Ravid in 1982. It necessitates the calculation of a vulnerability curve for the operation and the mathematical modelling of the trade-off between losses that have been mitigated and those that have not. However, the examination of these aspects falls outside the purview of this literature review.

One of the key benefits of employing the revealed preferences methodology is the reliability and ease of data collection pertaining to backup generators. This result in relatively low costs associated with data collection, in comparison to the expenses incurred by surveys that are necessary for subjective and contingent evaluations (Beenstock, Goldin & Haitovsky, 1997). The utilization of a revealed preference approach enhances the likelihood of obtaining correct results, as it relies on the real-life actions of power consumers and is less susceptible to biases commonly associated with survey procedures (Goldberg, 2015).

Business surveys often yield self-assessments that have a notable propensity for strategic deception. As an illustration, the costs associated with reported outages may be potentially inflated in order to emphasize to the power provider the necessity for improved electricity reliability. Alternatively, individuals may frequently possess compelling motivations to engage in strategic misrepresentation.

Alternatively, interviewees may exhibit a lack of reliability due to their potential lack of awareness regarding the associated costs or their inability to allocate the required time to adequately complete the frequently intricate and time-consuming questionnaire (Goldberg, 2015). According to Beenstock *et al.* (1997), the issues mentioned are either non-existent or less prominent when employing the concept of revealed choice.

2.11 Theoretical Framework

The structure that can hold or support a theory of research study is the theoretical framework. This section introduces and explains the theoretical framework that explains the existence of the research issue under investigation. It determines the variables that will be measured and their statistical relationships. According to Sakaran (2017), the term "theoretical framework" refers to a model that a researcher develops, a theoretical premise, or a logical understanding of the connection that exists between two or more significant factors that have been identified as being crucial to the problem.

The main theories underpinning this investigation include the Resource Dependence Theory (RDT), the Economics of Power System Reliability and Planning Theory, Cybernetics Theory of Organisational Stress, Theory of Constraints (TOC), Production Competence Theory, Systems Theory of Management, Dynamic Capabilities Theory, the Systems Theory of Management and Transformation Theory of Production.

2.11.1 Resource Dependence Theory (RDT)

The study is anchored on the Resource Dependence Theory (RDT) advanced by Pfeffer and Salancik (1978). This theory investigates how organisations' reliance on external resources affects their behaviour (Davis & Cobb, 2010). According to this notion, an external resource is any resource on which a corporation relies that comes from outside the company and this could comprise all raw materials, energy, and labour (Kavishe, 2015). In this present research, an external resource is defined as electricity that comes from outside small-scale firms.

The RDT is a prominent framework in organizational studies that seeks to explain how organizations navigate their external environment and manage their resource dependencies (Hillman, Withers & Collins, 2009). This theory highlights the significance of resource acquisition, control, and allocation in determining an organization's behavior and outcomes (Davis & Cobb, 2010). RDT posits that organizations are influenced by their external resource dependencies and that their strategies and actions are aimed at maintaining and enhancing their access to critical resources.

The theory explains changes in an organization's activity, behaviour, and structure in relation to the external environmental resource on which it depends for survival (Kavishe, 2015). According to this theory, organisations can adjust their actions and working behaviours to match the availability of external resources (Hillman *et al.*, 2009). In the context of this research, the external resource on which the small-scale firms depend on for sustenance is electricity. This investigation is centred on small-scale enterprises (organisation), electricity (external resource) and operations (outcome). Dependence on external resources is not a concern in the RDT but due to the lack of dependability of such external resources, the organisation must make appropriate changes to cope with the lack of reliability.

The RDT is of great relevance to this present research. The Resource Dependence Theory was deemed a well-established framework that can be used to analyse the effect of load shedding on the business operations of the small-scale enterprises. In this particular research study, electricity is the external resource and business operations represent the internal process. Basing on the Resource Dependency Theory, small-scale enterprises are dependent on external resources such as electricity, which they need to survive and thrive. Thus, load shedding disrupts this resource dependency by creating uncertainty and instability in the business environment.

Furthermore, the Resource Dependency Theory suggests that organizations develop strategies to manage their resource dependencies effectively. In this context, small-scale enterprises can explore coping options such as investing in alternative energy sources like solar panels or generators. Hence, the theory was found useful to this research study as it aided in explaining the impacts of electricity load shedding on business operations and how the small-scale enterprises cope with the situation as the small-scale enterprises depend on electricity as one of the sources and inputs for production.

Precisely, the resource dependency theory was used in this study to aid in interpreting the results if small-scale firms in Masala Market depend electricity in their business operations. In conclusion, the Resource Dependency Theory provided a useful lens to understand the impacts of load shedding on small-scale enterprises' business operation at Masala Market. The theory was also used in deriving the research question on load shedding and business operations of small-scale enterprises at Masala Market in Ndola, Zambia. Moreover, the theory helped in generation of the

hypothesis associated with load shedding and business operations of small-scale enterprises at the Masala Market.

2.11.2 Economics of Power System Reliability and Planning theory

The research is also anchored on the Economics of Power System Reliability and Planning theory put forward by Mohan Munasinghe in 1979. Power system reliability refers to the ability of an electrical grid to deliver a consistent and uninterrupted power supply to consumers while planning theory involves designing and optimizing the power system infrastructure (Küfeoğlu & Lehtonen, 2016).

The theory is based on the prediction that electricity is essential for productive purposes (Olajuyin & Mago, 2022). According to Küfeoğlu and Lehtonen (2016), the theory posits that the provision of dependable electricity to consumers at the necessary time and place is contingent upon three key elements: generation, transmission, and distribution. Electricity can experience a lack of dependability in instances of power surges, blackouts or voltage fluctuations, load shedding, and blackouts (Olajuyin & Mago, 2022). Based on the theoretical framework, the impact of unreliable electricity, specifically load shedding, can be assessed through the estimation of industrial outage cost. This estimation is derived from a comprehensive examination of various factors; including spoilage, idle production, and the recuperation of lost production.

These factors are evaluated in relation to both regular working hours and overtime, ultimately resulting in suboptimal business performance (Küfeoğlu & Lehtonen, 2016). Hence, in accordance with the aforementioned hypothesis, the perturbation of the various components involved in the production, distribution, and transmission of electricity will inevitably impinge upon the provision of energy to end-users (Olajuyin & Mago, 2022).

From the theory, power outages can lead to significant economic losses, affecting productivity, disrupting supply chains, and causing inconvenience to consumers. One key aspect of Munasinghe's (1979) theory is the concept of "value of lost load" (VOLL), which quantifies the economic impact of power outages (Gorman, 2022). By assigning a monetary value to each unit of lost load, decision-makers can assess the trade-offs between investing in additional capacity and accepting a certain level of unreliability. This approach allows for more informed decision-making in power system planning.

Furthermore, it is postulated by the notion that the impact of power outages is contingent upon the specific industrial users or industry type, the length of the disruption, and the timing of the event (Gorman, 2022; Olajuyin & Mago, 2022). According to Olajuyin and Mago (2022), the idea posits that a consistent provision of power is a crucial factor for enhancing the productivity of small-sized enterprises. The other key aspect of power system reliability and planning theory is the assessment of power outage costs (Aklin *et al.*, 2016). These costs include not only the direct financial losses incurred by consumers during power outages but also the indirect costs such as lost productivity and damage to equipment (Aklin *et al.*, 2016). By quantifying these costs, policymakers can make informed decisions regarding investments in infrastructure upgrades or implementing measures to reduce outage durations (Aklin *et al.*, 2016; Gorman, 2022).

More so, the theory supports the importance of planning for providing strategies for mitigating the effects of power outages. This theory emphasizes proactive measures such as diversifying energy sources, implementing energy conservation practices, and investing in backup generators or battery storage systems (Olajuyin & Mago, 2022). By incorporating planning into their operations, small-scale businesses can minimize disruptions caused by load shedding and ensure continuity in their operations.

Hence, this theory was found of great relevance to this study on load shedding and operations of small-scale enterprises at Masala Market. Since it predicts that power outages can lead to significant economic losses, impacting productivity, disrupting supply chains, and causing inconvenience to consumers, Economics of Power System Reliability and Planning theory was found applicable in this research to help in interpretation of the results on the impacts of load shedding on the operations of the small-scale enterprises at Masala Market. More so, the theory helped in deriving the research question related to load shedding and business operations of the small-scale enterprises at Masala Market.

The theory provided a framework for understanding the economic impacts of load shedding on operations of small-scale enterprises as it allowed the researcher to understand the effects associated with load shedding on the operations of the small-scale enterprises at Masala Market. In conclusion, the economics of power system reliability and planning theory was found essential for understanding and addressing the impacts of load shedding on business operations of small-scale enterprises.

2.11.3 Cybernetic Theory of Organisational Stress

The research is also pegged on the theoretical lens of the Cybernetic theory of stress proposed by Edwards in 1992 and further expanded by Cummings and Cooper in 1998. The cybernetic theory of stress is a classic framework that seeks to explain how individuals perceive and respond to stressful situations (Biggs *et al.,* 2017).

According to this theory, stress is not solely determined by external events but rather by the individual's appraisal of those events (Dewe, O'Driscoll & Cooper, 2012). The cybernetic theory offers insights into the dynamic interactions between individuals, organizations, and their environments. In this theory, stress is seen because of an imbalance between the demands placed on an individual and their perceived ability to cope with those demands (Lombe & Tembo, 2023). The theory argue that individuals engage in a cognitive appraisal process when faced with potentially stressful situations (Dewe *et al.*, 2012). This appraisal involves evaluating the significance of the event (primary appraisal) and assessing one's resources for coping with it (secondary appraisal) (Dewe *et al.*, 2012). The theory further postulates that organizations function as self-regulating systems influenced by their external environments.

The primary appraisal determines whether the event is perceived as threatening or challenging. If it is seen as threatening, stress is likely to occur (Wethington & Cooper, 2000). The secondary appraisal focuses on evaluating one's ability to cope with the situation. If an individual believes they have sufficient resources or coping strategies, they are more likely to experience less stress (Cummings & Cooper, 1998). This theory emphasizes the role of perception in determining stress levels. Different individuals may appraise the same situation differently, leading to varying levels of stress experienced (Cummings & Cooper, 1998).

Additionally, this theory highlights that stress can be influenced by both internal factors and external factors (Lombe & Tembo, 2023). This theory combines elements of cybernetics, psychology, and organizational behavior to provide a holistic perspective on stress (Cummings & Cooper, 1998). At the core of the theory is the idea that stress is a result of an imbalance between demands and resources (Wethington & Cooper, 2000). According to Edwards (1992), individuals

or organisations experience stress when they perceive that they have insufficient resources to meet the demands of a situation.

More so, the cybernetic theory lends itself to a systems-based approach to stress. By viewing organizations as interconnected systems rather than isolated entities, this theory underscores the significance of considering the broader context in which stressors emerge. It encourages organizations to identify and address systemic issues related to structure, culture, and policies for comprehensive stress management.

Another crucial element of Edwards' (1992) theory is the concept of feedback loops. Edwards (1992) argues that stress is a feedback process in which individuals or organisations continually respond to and evaluate their demands and resources. Through this ongoing cycle of appraisal, individuals or organisations constantly adjust their perception of stress and their coping strategies (Edwards, 1998). Feedback loops can either amplify or dampen the stress response, depending on how individuals or organisations interpret and manage their demands and resources (Edwards, 1992).

Overall, the cybernetic theory of stress provides valuable insights into understanding how individuals or organisations perceive and respond to stressful situations. In this study, electricity load shedding is the external factor that can be stressful to small-scale enterprises in Zambia. Hence, the theory was found applicable in this research. According to Lombe and Tembo (2023), load shedding stresses the business owners by forcing them to find alternatives following low production and productivity.

Hence, this theory was of great use to this research. The usefulness of the cybernetic theory of organizational stress in understanding the coping strategies to load shedding on business operations of small-scale enterprises could not be overstated. The cybernetic theory provided valuable insights into the coping strategies to load shedding of small-scale enterprises. In this study, the cybernetic theory of organizational stress was found a valuable framework applicable and relevant to understand and address the coping strategies employed by small-scale enterprises at Masala Market in response to load shedding. In conclusion, the cybernetic theory of

organisational stress provided a useful framework for understanding how small-scale enterprises cope with load shedding.

In this regard, the theory was used in developing the research question on the coping strategies of the small-scale enterprises at Masala Market. Despite its usefulness to the study, the cybernetic theory has been criticized for lacking practical application. However, the study was not interested in testing practical application of the theory but used the theory to assist in formulation of research questions and understanding how the small-scale enterprises at Masala Market cope with load shedding.

2.11.4 Theory of Constraints (TOC)

The Theory of Constraints (TOC) also forms the theoretical framework for this research. The TOC is a management philosophy that aims to improve the performance of organizations by identifying constraints that limit their ability to achieve their goals and resolving bottlenecks or constraints. Developed by Eliyahu Goldratt in the 1980s, TOC provides a systematic approach to optimize processes and maximize efficiency. At its core, TOC suggests that every system has at least one constraint that limits its overall performance (Amadi-Echendu, 2013). By identifying and focusing on this constraint, organizations can achieve significant improvements in productivity and profitability.

TOC emphasizes the importance of managing constraints effectively. It suggests three steps: identify the constraint, exploit it to its maximum potential, and then subordinate all other processes to support the constraint's output. Furthermore, TOC encourages organizations to continuously improve by constantly reassessing their constraints and finding ways to overcome them. This iterative process allows for ongoing optimization and prevents new bottlenecks from emerging.

Furthermore, the TOC encourages organizations to view their operations as a system and take a holistic approach to problem-solving. Instead of focusing on individual bottlenecks, the theory promotes a system-wide perspective that helps organizations identify the root causes of problems and implement effective solutions. In conclusion, the TOC provides a valuable framework for improving organizational performance. By identifying constraints, exploiting them fully, subordinating other processes accordingly and continuously improving operations, organizations

can achieve higher levels of efficiency and effectiveness. Implementing TOC principles can lead to increased productivity, reduced costs, improved customer satisfaction, and ultimately greater success in today's competitive business environment.

However, like any management philosophy, TOC has its limitations. It may not be suitable for all types of organizations or industries, as some systems may not have easily identifiable constraints. Despite its limitations, the TOC proven to be a valuable tool or framework for many organizations seeking to optimize their operations.

In the context of load shedding, which refers to the deliberate shutdown of power supply to certain areas during periods of high demand, the TOC was highly useful and relevant in understanding the effects of load shedding on the operations of small-scale enterprises. While the theory of constraints is typically applied in manufacturing and production environments, it was also found applicable to load shedding scenarios. By applying TOC principles, such as identifying the system's constraint and exploiting it for maximum throughput, businesses can mitigate the impact of load shedding. Hence, the TOC was of great relevance to this study where load shedding represents constraints that affect operations of the small-scale enterprises in Zambia. TOC emphasizes the importance of identifying bottlenecks or constraints within a system.

In this case, load shedding acts as a constraint that limits the availability and reliability of power supply. By recognizing this constraint, small-scale enterprises can develop contingency plans or alternative power sources to ensure uninterrupted operations during periods of load shedding. In this regard, the Theory of Constraints was used in guiding the formulation of the research question on load shedding and business operations of the small-scale enterprises. In other words, the Theory of Constraints offered valuable insights into understanding the effects of load shedding on small-scale enterprises' business operations at Masala Market.

2.11.5 Production Competence Theory

The Production Competence Theory (PCT) also known as the competence-based theory of the firm forms part of the present study’s theoretical framework. The Production Competence Theory initially advanced by Cleveland, Schroeder and Anderson in 1989 is a framework that focuses on the role of internal capabilities and resources in shaping a firm's competitive advantage. The

Production Competence Theory focuses on a firm's ability to effectively manage its production processes and resources. It emphasizes the importance of developing core competencies that enable firms to achieve competitive advantage.

In other words, it provides insights into why some firms outperform others in the marketplace and how they can sustain their advantage over time (Cleveland, Schroeder & Anderson, 1989). Cleveland *et al.* (1989) argued the appealing proposition that production competence directly affects the performance of the company. According to Cleveland *et al.* (1989, p. 657), production competence is “the preparedness, skill, or capability that enables manufacturers to prosecute a product-market specific business strategy”. At its core, the Production Competence Theory argues that firms achieve superior performance when they possess unique bundles of resources and capabilities that are difficult for competitors to imitate or replicate (Schmenner & Vastag, 2006). These resources and capabilities, often termed "core competences," can include tangible assets, such as state-of-the-art manufacturing facilities. One crucial aspect of the theory is the distinction between core competences and peripheral competences (Schoenherr & Narasimhan, 2012).

While peripheral competences are necessary for day-to-day operations and are common across firms in an industry, core competences are distinctive and specific to a particular firm (Schoenherr & Narasimhan, 2012). These core competences determine the firm's competitive advantage by enabling it to create value for customers in a unique and superior way. The Production Competence Theory further acknowledges that firms operate within a broader business ecosystem, and the ability to leverage external resources and capabilities is essential for sustained competitive advantage (Cleveland *et al.*, 1989).

Furthermore, Production Competence Theory suggests that building and maintaining core competences require continuous investments in resources, capabilities, and knowledge (Schmenner & Vastag, 2006). Moreover, the theory emphasizes that the dynamics of the external environment, including technological advancements and changing customer preferences, necessitate a firm's ability to adapt, evolve, and innovate its competences over time (Schoenherr & Narasimhan, 2012).

In this context, load shedding represents a dynamic external environment that requires firms to adapt for improved production efficiency and competitiveness. In other words, electricity represents a significant resource for enhanced competitiveness. Thus, the Production Competence Theory was found valuable to this research seeking to establish the impacts of load shedding on operations of small-scale enterprises in Zambia. Therefore, the theory guided in the formulation of the research objectives and questions regarding load shedding and its impacts on operations of the small-scale enterprises of the small-scale enterprises at Masala Market in Ndola, Zambia.

2.11.6 Transformation Theory of Production

The study also borrows on the theoretical lens of the Transformational Theory developed by Shephard in 1970. The theory is a fundamental theory that pertains to the process of production. The theoretical framework revolves around three key components, namely input, process, and output (IPO) (Njiraini, 2021). The theory allows for the decomposition of each process into discrete tasks carried out by individuals with specialized expertise (Koskela, 2000). All actions are methodically arranged and synchronized, aligning with the principles of traditional cost accounting and scientific management.

According to Njiraini (2021), the theory posits that optimizing specific activities within the production process leads to overall optimization, under the assumption that reducing costs for each unit yields the greatest performance outcomes according to Koskela (2000). From this theory, production involves the transformation of inputs into the production of goods or services. Under this transformational theory of production, managers prioritize the achievement of efficiency at all stages of the production process, with a particular emphasis on the effective utilization of inputs from both technical and economic perspectives.

This study is grounded in transformation theory, as it focuses on the operational activities of small-scale enterprises involved in managing production processes. Moreover, within this particular setting, electricity serves as a crucial factor of production, and thus any constraints on its availability have a direct impact on the operational efficiency of enterprises. The significance of energy in the production process has been emphasized in prior research, as exemplified by the work of Njiraini (2021). The production function is employed in certain instances to examine the role of electricity as a direct input in the production process or as an indirect factor influencing the

utilization of other direct inputs, such as equipment (Adenikinju, 2003). According to this theoretical framework, the occurrence of load shedding has the potential to impede the efficient conversion of inputs into outputs. Therefore, the theory was deemed pertinent to this study, which pursued to understand the effects of electricity load shedding on business operations of small-scale enterprises in Zambia.

The transformation theory of production provided a framework for analysing how changes in input factors that is electricity supply, affect the production operations small-scale businesses. By applying this theory to the context of load shedding, the researcher was able to assess the direct and indirect impacts of load shedding on the business operations of small-scale enterprises. Thus, the transformation theory of production guided the formulation of research questions and interpretation of research findings regarding load shedding and business operations of small-scale enterprises.

In conclusion, the transformation theory of production was invaluable in understanding the effects of load shedding on small-scale enterprises' business operations. Nevertheless, the transformation theory of production has encountered criticism, with one notable critique being that the formulation of the production function does not stem from empirical practice or observation (Njiraini, 2021).

2.11.7 Dynamic Capabilities Theory

The Dynamic Capabilities Theory developed by Teece and Pisano (1994) as the extension of the Resource-Based View (RBV) also makes part of the theoretical framework for this study. Dynamic capability theory as a prominent area of study in the field of strategic management focuses on how organizations can develop and leverage their capabilities to adapt and thrive in a rapidly changing business environment (Breznik & Lahovnik, 2016; Samsudin & Ismail, 2019). Primarily, dynamic capabilities refer to a firm's ability to integrate, build, and reconfigure its internal and external resources to respond effectively to changing market conditions (Barreto, 2010; Teece, 2018). These capabilities are crucial in allowing organizations to not only adapt to environmental changes but also to proactively shape their competitive advantage (Breznik & Lahovnik, 2016).

Dynamic capabilities involve three core elements: sensing, seizing, and reconfiguring (Gebauer, 2011; Qiu *et al.*, 2022). Sensing involves the ability to perceive market changes and opportunities

(Teece, Peteraf & Leih, 2016), seizing refers to the ability to take advantage of those opportunities, and reconfiguring is the ability to adjust and modify existing resources and capabilities (Breznik & Lahovnik, 2016; Qiu *et al.*, 2022).

Dynamic capability theory suggests that sustained competitive advantage can be achieved through the creation and renewal of core competencies (Gebauer, 2011; Samsudin & Ismail, 2019). Precisely, the theory predicts a positive relationship between relationship between organizational performance and dynamic capabilities (Samsudin & Ismail, 2019). According to this Dynamic Capability Theory, organizations need to possess three key capabilities: sensing, seizing, and reconfiguring (Zhang, Yang & Liu, 2022). Sensing refers to the ability to identify and understand changes in the external environment, such as load shedding (Teece, 2018; Zhang *et al.*, 2022). On the other hand, seizing involves taking advantage of opportunities or mitigating threats presented by these changes whilst reconfiguring entails adjusting internal resources and processes to align with new circumstances (Zhang *et al.*, 2022).

According to Teece (2018), the concept of "seizing" capabilities refers to the ability of a system or organisation to promptly respond to identified and significant opportunities and threats. The actions encompassed in this process entail the allocation of resources towards the advancement of innovative technologies for commercial purposes, as well as the formulation and execution of business models for a diverse range of products and services (Teece, 2018); Teece *et al.*, 2016). More so, the tasks associated with the cognitive process of 'sensing' encompass environmental scanning, which involves the collection of unorganized information and unstructured data from the external environment, afterwards integrating it into the organizational system (Teece, 2018).

It further highlights the importance of developing organizational learning processes, fostering innovation and knowledge creation, and building strategic flexibility according to Barreto (2010). By continuously learning, adapting, and innovating, organizations can enhance their ability to sense market changes, seize emerging opportunities, and reconfigure their resources to respond proactively according to Breznik and Lahovnik (2016). One of the key aspects of dynamic capability theory is the concept of ambidexterity (Barreto, 2010; Teece, 2016). Ambidexterity refers to an organization's ability to simultaneously exploit existing competencies while exploring new ones (Deng, *et al.*, 2020).

This balancing act according to Barreto (2010), allows firms to exploit current market opportunities while exploring new markets and technologies. Successful ambidexterity requires the establishment of separate organizational units, one focused on exploiting existing capabilities and another dedicated to exploring and developing new ones (Deng, *et al.*, 2020).

Additionally, dynamic capabilities emphasize the importance of managerial decision-making processes (Deng, *et al.*, 2020). According to the theory, managers play a critical role in identifying and prioritizing opportunities, allocating resources effectively, and aligning the organization's capabilities with its strategic goals (Samsudin & Ismail, 2019). Effective decision-making at all levels ensures that the organization remains agile and responsive to changes in the business environment, thus enhancing its dynamic capabilities (Breznik & Lahovnik, 2016; Deng, *et al.*, 2020).

In conclusion, dynamic capability theory provides a valuable framework for understanding how organizations can develop and leverage their capabilities in a constantly changing business environment (Teece, 2016; 2018). According to the theory, the absence of dynamic capabilities may impede the firm's ability to sustain its competitive edge, particularly in a dynamic and evolving environment (Samsudin & Ismail, 2019).

Moreover, the final major aspect of the Dynamic Capabilities Theory is strategy (Teece *et al.*, 2016). According to Teece (2018), strategy is defined as the "coherent set of analyses, concepts, policies, arguments, and actions that respond to a high-stakes challenge". Teece (2018) argued that the dynamic capabilities that are core in enhancing processes and exploiting business possibilities must be guided and informed by strategies. According to the Dynamic Capabilities Theory, good strategies have prescient diagnoses that identify constraints and guiding policies that specify approaches to overcoming the identified constraints (Teece, 2018). Hence, the theory was found helpful in understanding the coping strategies for the small-scale enterprises to load shedding. Thus, the theory was found applicable to this current research, which sought to understand the coping strategies of the small-scale enterprise to changes in the external environment that is load shedding.

The dynamic capabilities theory provided a valuable framework for analysing how small-scale enterprises at Masala Market respond and adapt to the challenges posed by load shedding. In other

words, the Dynamic Capabilities Theory guided formulation of research questions and interpretation of the research findings. In other words, the Dynamic Capabilities Theory offered a valuable lens through which the researcher analysed the effects of load shedding on small-scale enterprises' business operations as well as the coping strategies of the small-scale enterprisers to load shedding. Through this theory, the researcher was able to understand how the small-scale enterprises sense, seize, and reconfigure their resources in response to load shedding as well understanding the coping strategies that enable the enterprises to survive and thrive the challenge of load shedding.

2.11.8 Systems Theory of Management

The research is also anchored on the Systems Theory of Management advanced by Ludwig von Bertalanffy in 1968. General systems theory has found applications in a wide range of scientific disciplines, including biology, ecology, sociology, psychology, and management (Teece, 2018). In business management, general systems theory has offered a new perspective on organizational structures and processes. By considering organizations as dynamic and interconnected systems, managers can identify the factors that contribute to their efficiency and success, as well as the potential barriers to their growth and development (Teece *et al.*, 2016). The theory is a comprehensive framework that focuses on the interrelationships and interactions between various components within an organization (Rice, 2013).

This theory emphasizes the importance of understanding organizations as complex systems rather than isolated entities according to Teece (2018). It considers organizations as open systems that interact dynamically with their environment, constantly exchanging information, materials, and energy (Teece, 2018). This perspective provides a framework for studying organizations in a broader context, understanding their dynamics, intricacies, and effects of interdependencies (Von Bertalanffy, 2010). Systems theory is built upon five core principles: interconnectedness, complexity, emergence, feedback, and adaptation (Jackson, 2007; Teece, 2018). In today's dynamic and unpredictable business environment, the systems theory of management provides valuable insights for addressing complexity and uncertainty (Chikere & Nwoka, 2015). The holistic perspective helps managers better understand the intricate relationships between internal

and external factors, allowing them to anticipate potential disruptions and adapt accordingly (Rice, 2013).

Another important aspect of this theory is its focus on adaptation and flexibility. Organizations according to the theory are viewed as open systems that must constantly adapt to internal and external changes to survive and thrive (Teece, 2018). In this context, small-scale enterprises need to be flexible enough to respond quickly to changes caused by load shedding while maintaining their core functions. By examining these adaptive mechanisms within a systems framework, small-scale businesses can identify areas where improvements are needed and implement coping strategies accordingly. Hence, the theory was found to be of importance to this research.

According to this theory, an organization is composed of multiple subsystems that work together to achieve common goals. These subsystems include individuals, teams, departments, and even external stakeholders (Jackson, 2007; Von Bertalanffy, 2010). Each subsystem has its own unique characteristics and functions but is interconnected with others through feedback loops (Rice, 2013). One key concept of the theory is that changes or actions in one part of the system can have ripple effects throughout the entire organization (Chikere & Nwoka, 2015; Von Bertalanffy, 2010).

For instance, a decision made by upper management can affect employees' morale and productivity. In this case, the decisions made by ZESCO of implementing load shedding impacts productivity of small-scale firms whilst the coping strategies of the firms may also have impact on productivity of employees. Thus, the theory was pertinent to this research as it helped in explaining and interpreting the effects of load shedding on operations of small-scale enterprises.

2.11.9 Case Study Approach to Modelling Economic Losses of Power Outages

The other approach utilized in assessing the cost of power disruptions involves the implementation of a case study. The present study focuses on a specific power interruption occurrence, wherein a comprehensive analysis is conducted to enhance comprehension regarding the economic implications associated with energy loss (Goldberg, 2015). Both economic and social costs are taken into account, while there is no effort made to assign a monetary value to the extent of inconvenience or disruptions to community activities (Oseni, 2012). The foundation of this approach entails doing a retrospective examination of particular instances of interruptions. According to Bliem (2009), the utilization of the blackout case study method offers a more

comprehensive and precise evaluation of costs, encompassing indirect costs that are not sufficiently accounted for in alternative analytical approaches.

Nevertheless, it is important to acknowledge that the findings of such studies are subject to limitations imposed by geographical constraints, as well as the unique characteristics and duration of the particular power outage under investigation (Oseni, 2012). Goldberg (2015) argues that the efficacy of this method is debatable due to the limitations of case studies. While case studies are valuable in illustrating the need of a dependable energy supply, they do not yield findings that can be extrapolated to generate comprehensive cost estimations.

The case study approach to modelling economic losses of power outages was found applicable to this research as it was used to understand the effects of load shedding on the business operations of the small-scale enterprises at the Masala Market in Ndola, Zambia. In other words, the researcher considered the case study approach to modelling economic losses of power outages an invaluable framework for understanding the effects of load shedding on business operations of small-scale enterprises. The approach therefore aided in guiding the formulation of the research question and the research design for the study.

2.11.10 Transactional Model of Stress and Coping

In order to understand effectiveness of the coping strategies of the small-scale enterprises, the study was also pegged on the Transactional model of stress and coping developed by Lazarus and Folkman in 1984. This model was first proposed by Richard Lazarus and Susan Folkman in 1984 and has since become one of the most widely accepted theories in the field of stress and coping (Ben-Zur, Zeigler-Hill & Shackelford, 2019). The coping phenomenon, as elucidated by Lazarus and Folkman in their transactional model of stress and coping, encompasses cognitive and behavioural reactions employed by individuals to effectively handle perceived pressures, whether originating internally or externally, that surpass their available personal resources (Ben-Zur *et al.*, 2019; Drnovšek *et al.*, 2010).

The model is a framework that helps in understanding how individuals perceive and respond to stressors in their environment (Martin & Daniels, 2014). Hence, this model was found useful in this research as it helped in understanding how the small-scale enterprises at the Masala Market respond to the stressful situation of load shedding.

The model also emphasizes the importance of appraisal in the stress process. Appraisal refers to the individual's evaluation of the situation and its potential impact on their well-being. Lazarus and Folkman identified two types of appraisals: primary and secondary appraisal (Martin & Daniels, 2014). Primary appraisal involves evaluating the situation and determining its relevance to one's well-being. Secondary appraisal involves evaluating one's available resources and options for coping with the situation.

The secondary appraisal is the next stage of the model and involves assessing one's available resources and coping strategies to manage the stressor (Martin & Daniels, 2014). Individuals evaluate their ability to overcome the stressor and consider potential coping mechanisms they possess (Drnovšek *et al.*, 2010). Thus, the model helped in understanding the coping strategies of the small-scale enterprises at the Masala Market to survive the adverse effects of load shedding.

Coping strategies are essential in the context of the model. Lazarus and Folkman (1984) distinguished between two broad coping techniques: problem-focused coping and emotion-focused coping. Problem-focused coping focuses on managing the stressor itself, while emotion-focused coping centers on regulating emotional responses to stress (Martin & Daniels, 2014). Problem-focused coping strategies involve active problem-solving behaviors, such as seeking information, generating alternative solutions, and taking direct action to address the stressor (Drnovšek *et al.*, 2010). Emotion-focused coping, on the other hand, aims to regulate emotions and subjective experiences.

Furthermore, according to the model, coping strategies can be effective or ineffective (Ben-Zur *et al.*, 2019). From the model, the effectiveness of coping strategies depends on various factors, including the unique characteristics of the stressor, an individual's personal resources, and the perceived controllability of the situation. Ben-Zur et *al.* (2019) cited that the model predicts that some coping strategies may be more suitable for certain situations than others may, and individuals may utilize a combination of strategies depending on the nature of the stressor.

In conclusion, the Transactional Model of Stress and Coping provides a comprehensive framework for understanding stress and individual responses to it. By highlighting the dynamic nature of stress and the appraisal process, this model allows for a more nuanced examination of stressors and coping strategies. Hence, the model was found applicable relevant and useful to this present study

as it helped in formulating the research question and hypothesis regarding effectiveness of coping strategies for the small-scale enterprises at the Masala Market. More so, the model aided in the development of the conceptual framework and the load shedding coping framework for the small-scale enterprises at the Masala Market.

2.12 Conceptual Framework

A conceptual framework describes how a researcher conceptualises and visually or diagrammatically depicts links between variables in an investigation (Cooper & Schindler, 2020). It depicts the relationship between independent and dependent variables (Mugenda & Mugenda, 2015). As a result, a conceptual framework is a map of ideas for a research project (Kothari & Garg, 2020). The conceptual framework for this study is presented in Figure 2.1. The study was based on the premise that electricity load shedding has an effect on the operations of small businesses. The purpose of the study was to determine whether small-scale businesses are affected in any way by electricity load shedding as well as understanding the coping strategies of the small-scale enterprises. The conceptual framework was developed based on theoretical literature and empirical literature reviewed in this chapter.

Precisely, the conceptual framework shown in Figure 2.1 was developed based on the predictions of the Resource Dependency Theory and the Economics of Power System Reliability and Planning theory, which predict that firms rely on constant and reliable supply electricity supply. In order to gain insight into the manner in which small-scale enterprises have coped with the phenomenon of load shedding, a visual representation of a conceptual framework was also derived from the principles of the coping theories namely the Cybernetic theory and Stress theory.

More so, the conceptual framework was adapted from previous research studies such as Adanlawo and Vezi-Magigaba (2021), Cissokho and Seck (2013), Kavishe (2015), Kintu (2022), Mohammed (2017), Njiraini (2021), Olatunji and Umukoro (2018), Schoeman and Saunders (2018) and Umar *et al.* (2019). These scholars hypothesized that electricity outages (or load shedding or electricity insecurity) have significant impacts on operations of SMEs where load shedding was measured using frequency and duration of electricity outages as also shown in Figure 2.1 below. The same studies also found that load shedding impacts operations of SMEs such as production, profitability, service delivery, sales, reputation and competitiveness.

On the other hand, majority of the prior studies have shown that the widely employed coping strategies by SMEs to cope with load shedding include use of generators, solar panels, UPS, working from home, recruitment of part time employees and changing working hours where these strategies have been found to have effects on business operations of small-scale enterprises (Banderker, 2022; Doe & Asamoah, 2014; Fiawoo, 2016; Fisher-Vanden *et al.*, 2012; Kintu, 2022 Lombe & Tembo, 2023; Phiri, 2018; Scott *et al.*, 2014; Zachariadis & Poullikkas, 2012). The conceptual framework presented in Figure 2.1 depicts the link between the variables of the study where load shedding and coping strategies are the independent variables and business operations of the small-scale enterprises as the dependent variable. Factors such as nature of business, type of industry and size of the small-scale enterprises are included as the intervening variables in this study.

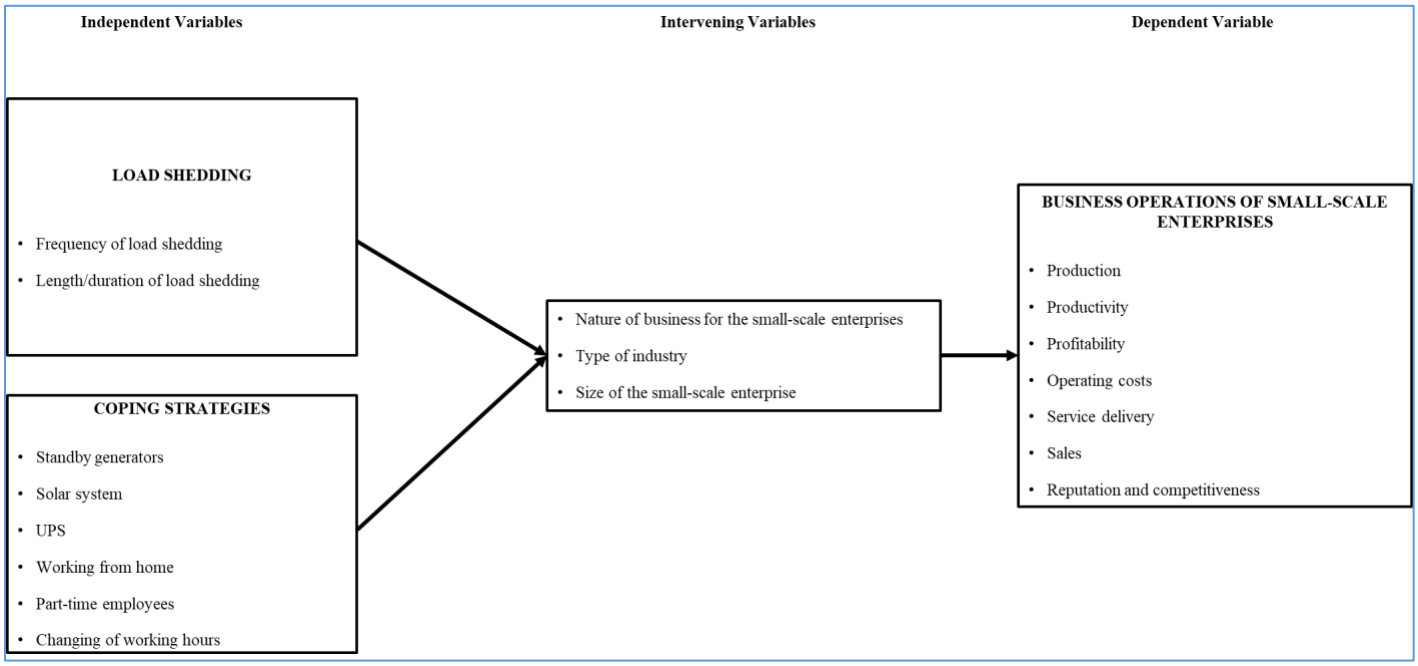

Figure 2.1: The Conceptual Framework

Source: Author (2022)

2.13 Gaps Identified in the Literature

After having reviewed both the empirical and theoretical literature on load shedding, the researcher observed that there were some gaps in the literature arising from lack of documented literature on the study topic. The main gaps identified were methodological, theoretical and empirical gaps.

Several studies have been conducted to examine the effect of load shedding to consumers in general. The few studies such as those done by Alban and Moshi (2014), Alo and Adeyemo (2021), Banda *et al.* (2020), Cissokho and Seck (2013), Ef li (2021), Lombe and Tembo (2023) and Kintu (2022), have examined the effects of load shedding on SMEs in the context of developing economies including Zambia.

However, most of the previous studies have been done outside Zambia particularly in countries such as Pakistan, Kenya, Ghana, Nigeria, Tanzania and Cameroon. This shows significant empirical gaps. In addition, the prior studies done in Zambia focused on small-scale enterprises in other geographical settings such as Kitwe (e.g. Banda *et al.*, 2020; Bwalya *et al.*, 2023) and Lusaka (e.g. Lombe & Tembo, 2023, Kintu, 2022 and Umar & Kunda-Wamuwi, 2019) whilst such studies lack in areas such as Ndola with large markets such as the Masala Market. From the review of theoretical and empirical literature, significant theoretical gaps were noted as there is a lack of frameworks to explain the effects of load shedding and coping strategies on the business operations of small-scale enterprises. This present research therefore aims to bridge the theoretical gaps by proposing a framework for small-scale enterprises to cope with electricity load shedding.

In separate investigations conducted by Ngenda (2020) and Sichone *et al.* (2016), the impacts of load shedding on larger corporations within the Zambian manufacturing sector were examined, with small-scale enterprises being excluded from the analyses. More so, Siankwilimba (2019) only studied the effects of electricity load shedding on Zambian small-scale agricultural enterprises focusing on five Southern Province districts namely Namwala, Mazabuka, Choma, Monze and Kalomo districts. Other studies such as Samboko *et al.* (2016) have focused on the agriculture sector of Zambia.

Looking at all the studies highlighted above, it can be seen that there has never been any study that has critically dedicated its investigation on assessing the impact of electricity load shedding on the operations of small-scale enterprises specifically in Masala Market, Ndola. Hence, the study in question has notable gaps that it attempted to fill in its examination of the impact of load shedding on business operations of small-scale firms in Masala Market in Ndola, Zambia. More so, there are methodological gaps identified as majority of the previous studies have either used quantitative or qualitative research designs which could be insufficient in addressing the specific research problem.

Thus, this research aimed to fill the methodological gaps by employing the mixed-method research approach to obtain more accurate and reliable results. In conclusion, the identified gaps sought to be filled by this research by focusing on small-scale enterprises at Ndola's Masala Market.

2.14 Chapter Summary

This chapter has thoroughly evaluated the research on energy load shedding and its implications on business operations and small-scale enterprise coping mechanisms. The goal of the literature review was for the researcher to determine the available scholarship on the subject and identify existing gaps, providing the foundation for the present investigation while looking for strategies to ensure the research gaps are solved. This chapter introduced the causes of load shedding, reviewing various literature on its effects on the operations of small-scale enterprises and coping strategies employed by some of them. Empirical literature from a global, African and Zambian perspective was made before introducing the theories used in the determination of load shedding costs to businesses.

More so, pursuant to the research's objectives, this chapter focussed on presenting the theoretical and conceptual frameworks for the research study. The chapter presented the theoretical framework for the study and the conceptual framework for the study. The main theories underpinning this investigation include the Resource Dependence Theory (RDT), the Economics of Power System Reliability and Planning Theory, Cybernetics Theory of Organisational Stress, Theory of Constraints (TOC), System Theory of Production, Production Competence Theory and Transformation Theory of Production. The next chapter focuses on the research methodology adopted in the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The majority of this chapter is devoted to providing an explanation of the research study's methodology. This section of the report details the steps taken to inquire about the research problem as well as the reasoning behind the various procedures or techniques used. In order to comprehend the research problem, these methods were utilized to select, process, and evaluate the data. The research's main two questions are addressed in this section: the methodology that was applied to collect and analyse the data. The following sections make up the chapter's structure: research philosophy, research design, research strategy, population, sample size, sampling methods, instruments, data collection methods, and data analysis. The research methodology for this research study was structured according to the research framework of Saunders, Lewis and Thornhill (2016) illustrated in Figure 3.1.

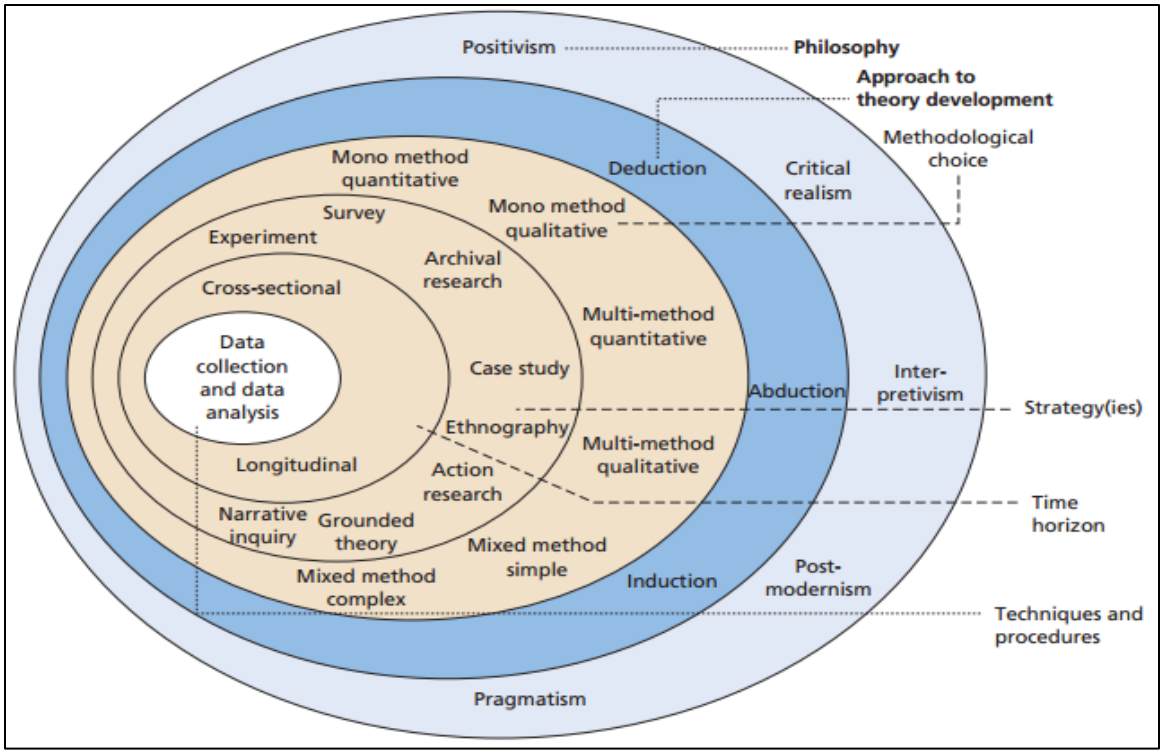

Figure 3.1: Research Onion

Source: Saunders *et al.* (2016, p. 124)

3.2 Research Philosophy

A research philosophy, according to Saunders, Lewis and Thornhill (2016), is a belief about how data about a phenomenon ought to be gathered, analysed, and utilised. From the Saunders *et al.*'s (2016) research onion, the main research philosophies that can be employed in business management researches are Positivism, Interpretivism, Critical Realism, Post-modernism and Pragmatism. Given the nature of the study, the researcher adopted the pragmatism research philosophy, which is compatible with mixed-method researches.

According to Maarouf (2019), although several scholars have suggested many different research philosophies applicable to mixed researches, pragmatism research philosophy is considered by many scholars to be the most common and suitable philosophical justification for mixed method researches. As also argued by Sekaran and Bougie (2019) that researches in social sciences and business management require a robust pragmatic methodological approach to ensure that research questions are addressed effectively, objectively, and efficiently, the pragmatism research design was found suitable to this current research.

In order to understand pragmatism as a research philosophy relevant to this study, it is important to examine its ontological, epistemological, and axiological assumptions. Ontologically, pragmatism research philosophy assumes that reality is both objective and subjective and is constantly changing and evolving (Maarouf, 2019). Epistemologically, pragmatism research philosophy emphasizes the importance of experience in acquiring knowledge arguing that knowledge is not discovered but rather constructed through active engagement with the world (Maarouf, 2019).

In this study, knowledge regarding the subject under investigation was acquired from the load shedding experiences of the managers or owners of the small-scale enterprises at the Masala Market. Lastly, axiologically, pragmatism research philosophy values practicality over abstract ideals or moral principles by recognizing that different individuals or groups may have different values and priorities based on their unique experiences and contexts.

In this study, the researcher believed that the small-scale enterprises at the Masala Market could have been impacted differently by load shedding. With this in mind, the pragmatism research philosophy was found the most applicable and suitable research philosophy in this research.

The main motivation behind the preference of the pragmatism research philosophy is the mixed-method design of the study where both quantitative and qualitative research methods were employed. Another motivation for the use of the pragmatism research philosophy was that it embraces multiple methods of data collection and analysis. This is because pragmatism researchers believe that no single method can answer all of the research questions; hence, they use a combination of methods (Tashakkori & Teddlie, 2020). The use of the pragmatism research philosophy therefore made it possible to triangulate data, which ensured that the research findings are robust and reliable.

3.3 Research Design

A research design refers to the plan or blueprint for the data collection, measurement, and analysis (Kothari & Garg, 2020). In this study, the researcher decided to use a descriptive cross-sectional survey design in order to achieve the research objectives. This decision was made because of the nature of the study where data was collected over SMEs in Masala Market. In addition, the researcher decided to employ the explanatory research design given the nature of the research objectives.

Explanatory research design is a research design employed to understand the causes and effects of different phenomena (Kothari & Garg, 2020; Kumar, 2020). The explanatory research design was considered appropriate for this research because the design allowed for analysing the impacts of load shedding and coping strategies on business operations of the small-scale enterprises. In this regard, the explanatory research design aided in explaining relationships between variables (load shedding, coping strategies and business operations of small-scale enterprises) and determining causality. This research design also permitted the researcher to employ statistical analyses to achieve the objectives of the study.

3.4 Research Approach

The method the researcher chooses to collect, analyse, and interpret data is called a research approach (Babbie & Mouton, 2020). There are three methods for conducting research: mixed-method (abduction), qualitative (inductive), and quantitative (deductive) approaches. Deductive reasoning starts with a general theory or hypothesis and then tests it through specific observations or experiments (Sekaran & Bougie, 2019). On the other hand, inductive reasoning begins with

specific observations and then formulates a general theory based on those observations (Saunders et al., 2016).

As argued by Cooper and Schindler (2020), the researcher's choice of approach is determined by the philosophy they choose. Hence, basing on the pragmatism research philosophy, the study adopted the abductive research approach which is a combination of the deductive and inductive research approaches. The abductive research approach was applied in this research where both quantitative and qualitative data were gathered using survey questionnaires, in-depth interviews and observations. In this regard, both deductive reasoning and inductive reasoning were applied in the study which sought to tests hypotheses (deduction) and also develop a framework from data collected (induction). Saunders et al. (2016) support that integrating deductive and inductive research approaches lead to more comprehensive and robust findings. In this regard, integrating both the deductive and inductive research approaches aided in having an in-depth understanding the effects of load shedding and coping strategies on the business operations of the small-scale enterprises at the Masala Market in Ndola, Zambia. While deductive reasoning aided in establishing causal relationships between the variables, inductive reasoning helped in explaining the relationships.

In this regard, the concurrent mixed approach was used in this study where the researcher collected both qualitative and quantitative data simultaneously and analysed them in a single phase. The researcher began by collecting quantitative data through survey questionnaires administered to the small-scale enterprises at the Masala Market in Ndola, Zambia. Additionally, qualitative data was collected through in-depth interviews and observations to gain insights into perceptions, views, and experiences with load shedding. The researcher then integrated the findings from both sets of quantitative and qualitative data to understand the impacts of load shedding on business operations of the small-scale enterprises at Masala Market. Furthermore, integrating deductive and inductive approaches enhanced the reliability and validity of research findings by triangulating evidence from multiple sources. By using both quantitative data derived from deductive methods and qualitative data obtained through inductive methods, the researcher also cross-validated the results, increasing confidence in the conclusions.

3.5 Methodological Choice

The decision to use a mixed-method, quantitative, or qualitative research design is known as "methodological choice" (Saunders *et al.*, 2009). A single method of data collection is used in the mono method, which then uses the appropriate qualitative or quantitative analysis methods. In the different strategy plan, more than one information assortment methods and examination techniques are utilized (Collis & Hussey, 2013).

A mixed-method approach, on the other hand, employs methods for qualitative and quantitative data collection and analysis (Creswell, 2013). This research employed the mixed-method methodological choice where both quantitative and qualitative data were gathered and analysed to understand the impacts of load shedding on business operations of the small-scale enterprises at the Masala Market.

3.6 Research Strategy

The research strategy delineates the approach that the researcher intends to employ, as proposed by Saunders *et al.* (2016). There exist various research methodologies, including experimental design, archival research, survey design, case study, action research, ethnography, grounded theory as well as and narrative inquiry (Saunders *et al.*, 2016). For the purposes of this research, the survey research strategy was adopted. The survey research strategy was employed by employing survey questionnaires and interviews to collect relevant data for the study. More so, the survey research strategy allowed for a large-scale data collection, providing a representative sample that permitted generalizable conclusions. The survey research strategy was found relevant to this study as this research strategy is compatible with the mixed-method research approach and the pragmatism research philosophy. According to Creswell (2013), another reason to employ the survey research strategy is its versatility in gathering both qualitative and quantitative data. Thus, the survey research strategy was found relevant to this study, which sought to gather both qualitative and quantitative data on the impacts of load shedding and coping strategies on the business operations of the small-scale enterprises at the Masala Market in Ndola, Zambia.

3.7 Time Horizon

The scope of this study was constrained to a particular timeframe, necessitating the use of a cross-sectional time horizon. The concept of time horizon pertains to the designated timeframe during which the project is anticipated to be finalized (Creswell, 2012). Saunders *et al.* (2016) argue that the inclusion of temporal horizons is essential in study design, regardless of the chosen research methodology. There exist two distinct categories of temporal frames, specifically longitudinal and cross-sectional. Longitudinal studies involve the repetition of data collection over an extended period of time, allowing for the examination of changes and trends over time. On the other hand, cross-sectional studies are confined to a specific period and do not involve the collection of data over many time points (Saunders *et al.*, 2016). This approach allowed the researcher to examine various variables and their relationships within a given population.

By studying multiple subjects simultaneously, cross-sectional time horizon provides valuable insights into the characteristics and behaviours of different groups. However, it is important to note that cross-sectional time horizon has limitations as well. Since data is collected at one point in time, it does not allow for analysing changes or causality over time (Saunders *et al.*, 2016). Additionally, there may be potential biases due to self-reporting or sampling methods (Creswell, 2012).

3.8 Study Population

A population, according to Cooper and Schindler (2020), is the entire collection of elements from which we wish to draw some conclusions. Additionally, Cooper and Schindler (2020) mentioned that a procedure known as sampling must be used in order to arrive at a conclusion about the entire population. According to Polit and Hungler (2020), the population is defined as the sum or total of all items, subjects, or members that meet a set of requirements. The study population, on the other hand, is a subset of the target population from which the sample is actually selected (Creswell, 2012). This study was conducted on the Copperbelt Province of Zambia, specifically Ndola's Masala Market. According to the Ndola Chamber of Commerce (2022), there were 1250 small-scale enterprises operating at Masala Market by the year-end of 2022. The target population was managers and/or owners of the small-scale enterprises.

3.9 Determination of Sample Size

Memon *et al.* (2020) claim that the process of determining a sample size is a crucial endeavor in order to derive accurate and informative conclusions from study findings, contingent upon the accessibility of the population of interest. The topic of sample size computations has generated much controversy among academics, as seen by the several rules of thumb that exist in the literature (Memon *et al.*, 2020). The sampling frame for the study was the list of small-scale enterprises obtained from the Ndola Chamber of Commerce (2022) report. In other words, the sampling frame was the list-based sampling frame.

This research adopted Yamane's (1973) formula shown in equation (4.1) to determine the ideal sample size. The researcher used the 95% confidence level and 5% sampling error margin in the formula. According to the Ndola Chamber of Commerce, (2022), current statistics show that there are 1250 small-scale enterprises operating at Ndola's Masala Market. The sample size calculations using the Yamane's (1973) formula are presented as follows:

$$n = \frac{\mathrm{N}}{1+\mathrm{N}[\mathrm{e}]^2} \quad \text{(3.1)}$$

Where; N = Total population; n = total sample size and e = desired sampling margin error (Yamane, 1973). Basing on the population size (N) of 1250, sampling error margin (e) of 5%, the sample size for the study was estimated to be 304 as computed in equation (4.2):

$$n = \frac{1250}{1+1250[0.05]^2} = 303.03 \sim 304 \quad \text{(3.2)}$$

This sample size of 304 was used for the quantitative survey research and this represented 24.32% of the total population. As supported by Creswell (2012), samples sizes between 10-30% of the total population are representative. On the other side, the sample size for the qualitative part of the study was determined using the data saturation technique. Glaser and Strauss (1967) and Creswell (2012) recommend the concept of saturation for achieving an appropriate sample size in qualitative studies. Creswell (2012) suggest that a sample size of between 5 and 30 is sufficient for qualitative researches and allows data saturation. This is so because the addition of one more respondent will not add value to the research, but will just saturate the sample.

3.10 Sampling Techniques and Procedures

Researchers need not collect data from all cases for them to be able to answer research questions (Kothari & Garg, 2020). As a result, researchers need to choose a sample. Usually, researchers do not have time nor resources to analyse the entire population so they employ a sampling technique to reduce the number of cases (Taherdoost, 2016). In this study, the researcher employed sampling where the sampling process outlined by Taherdoost (2016) summarised in Figure 4.1 below was followed:

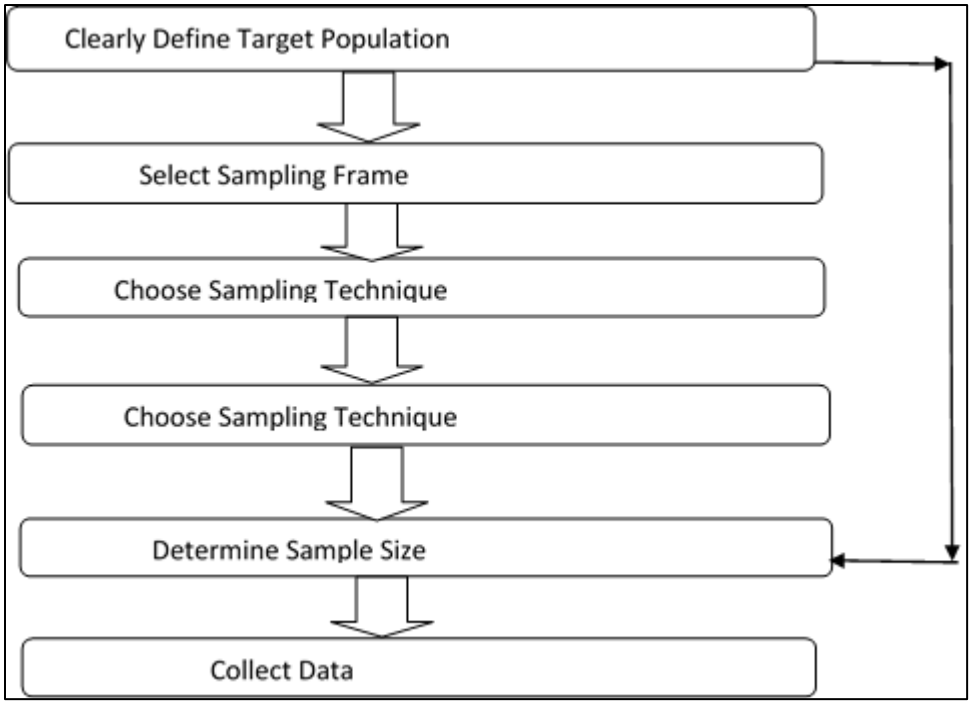

Figure 3.1: Sampling Process Steps

Source: Taherdoost (2016)

In this research, the researcher used both probability and non-probability sampling methods namely simple random sampling and purposive sampling respectively:

3.10.1 Simple Random Sampling

The study employed the simple random sampling technique to select participants for the survey research. Sekaran and Bougie (2019) define simple random sampling as the process of selecting a sample from a larger population in such a way that each individual has an equal chance of being

chosen. This sampling technique was undertaken by first defining the target population that is owners and/or management of the small-scale enterprises at the Masala Market. After that, the sampling frame using the Ndola Chamber of Commerce (2022) was employed to carry out the simple random sampling technique. With the aid of a computer, the individual cases from the sampling frame were assigned random numbers generated automatically using a computer and each case was randomly chosen.

This method was considered to be unbiased as it ensures that every member of the population has an equal probability of being included in the sample (Sekaran & Bougie, 2019). One of the main advantages of simple random sampling is its simplicity and ease of implementation. The process involves assigning a unique number or identifier to each individual in the population and then using a random number generator to select the desired sample size (Saunders *et al.*, 2016). This straightforward approach eliminated any bias or favouritism in the selection process, making the results more representative of the entire population.

Furthermore, in this study, simple random sampling was used because the population was grouped in a small geographical area, as such it was easy to visit them one by one to collect data. The disadvantages associated with simple random sampling were evaluated and the final decision was that the advantages outweighed the disadvantages. In statistics, a simple random sample is a subset of individuals chosen randomly from a larger set in which a subset of individuals is chosen randomly, all with the same probability (Saunders *et al.*, 2016).

3.10.2 Purposive Sampling

On the other hand, the study made use of the purposive sampling technique to select participants to the interviews. Purposive is an intentional selection approach wherein specific places, individuals, or events are chosen in order to gather crucial information that cannot be acquired through alternative options (Kothari & Garg, 2020). Under purposive sampling, researchers incorporate cases or participants into their sample based on their belief that these cases or people merit inclusion (Sekaran & Bougie, 2019).

For this study, judgmental sampling, one type of purposive sampling was utilised. Using this judgment sampling technique, the researcher purposively selected owners and/or management of

the small-scale enterprises who were deemed to be in the best position to provide in-depth information required. The following sampling criteria was employed to purposively select the participants to the in-depth interviews:

a) The small-scale enterprise has been operating at the Masala Market for at least five years

b) The small-scale enterprise relies much on electricity for its business operations

c) The small-scale enterprise has been severely impacted by load shedding

d) The small-small enpetrprise has come up with some coping mechanisms to deal with the load shedding challenge

There were several reasons for preferring the judgemental purposive sampling technique. The researcher employed purposive sampling to select owners or managers for the small-scale enterprises with at least five years of establishment and at least five years in business. This allowed the researcher to gather in-depth information regarding load shedding and its impacts on business operations. As stated by Hesselberg (2014), it is crucial to select informants who possess expertise in the subject of study and demonstrate a keen understanding of diverse features in order to obtain a range of narratives and perspectives.

Furthermore, the researcher's decision to select respondents was influenced by considerations of accessibility and time restrictions. Specifically, the researcher opted for respondents who could readily offer the necessary and valuable information without incurring significant costs, if any (Saunders *et al.*, 2016). According to Ranjit (2018), the key factor in purposive sampling is the researcher's discernment in selecting individuals who may offer the most valuable insights to fulfil the study's objectives. Purposive sampling involves the deliberate selection of individuals who possess the necessary information and are willing to participate in sharing said information (Sekaran & Bougie, 2019).

3.11 Methods of Data Collection

According to Polit and Hungler (2020), data collection refers to the systematic gathering of opinions and perceptions that have the possibility to address research questions. Data can be divided into two categories: primary data and secondary data, and they serve as the primary

foundation for data collection. The significance of data collection in a research lies in its ability to provide a solid foundation for the analysis and interpretation of research findings (Creswell, 2020). There are two broad groups of data collection methods: primary data collection methods and secondary data collection methods (Creswell, 2012). The study employed primary data collection methods. The study employed primary data collection methods namely survey questionnaire, in-depth interviews and observations:

3.11.1 Survey Questionnaire

The questionnaire was the main instrument for data collection for this research. According to Bryman and Bell (2020), a questionnaire is a set of predetermined questions are written on a sheet of paper for the sampled population to respond. For this study, semi-structured questionnaires were used to collect both qualitative and quantitative data from respondents regarding electricity load shedding and business operations of small-scale enterprises and coping strategies at Masala Market in Ndola, Zambia. The semi-structured questionnaire contained both close-ended and open-ended questions that allowed the researcher to extract large volumes of data from respondents. The close-ended questions were rated on a five-point Likert scale.

The Likert scale ranged from 1 representing strongly disagree, 2 representing disagreed, 3 representing neutral, 4 representing agree and 5 representing strongly agree. Questionnaires were administered to owners and/or managers to represent the sampled small-scale enterprises. The questionnaire was structured into four main sections where Section A collected socio-demographic data of the respondents, Section B collected data relating to frequency of electricity load shedding, Section C contained questions concerning effects of electricity load shedding on business operations and Section D contained questions pertaining to coping strategies of the small-scale enterprises.

In overall, the use of semi-structured questionnaires was advantageous to the study. The questionnaire permitted the researcher to gather large amounts of data over a large sample within a short period of time. However, the major drawback of questionnaire is the risk of low response rate. Nevertheless, the researcher made all efforts necessary and possible to increase response rate for instance, the researcher kept on reminding the respondents to fill-in the questionnaires via follow-ups and phone calls.

3.11.2 In-depth Interviews

The study also employed in-depth interviews to collect primary qualitative data. The researcher conducted semi-structured interviews with managers or owners who were purposefully selected to participate. The semi-structured interview is a qualitative method of gathering data, wherein the researcher poses a set of predefined yet open-ended questions to the participants (Whiting, 2013). The present study employed in-depth interviews as a method of data collection. In this study, data collection was conducted through face-to-face interviews.

The purpose of these interviews was to examine the impact of electricity load shedding on the operations of small-scale firms and to identify coping methods employed at Masala Market in Ndola, Zambia. The researcher utilized the interview guide to ensure consistency throughout the interviews. With an interview guide, the researcher was able to guide the respondents through the questions and just record the responses based on the answers that they were giving.

However, the researcher had the opportunity to ask any relevant questions and had the opportunity to probe further. The interviews were carried out at the business premises of the small-scale enterprises. Prior the interview process, the researcher made preliminary visits to the small-scale enterprises to have an understanding of the business operations and create a relationship of trust with the target participants. Thereafter, appointments for interviews were set. Subsequently, the interviews were recorded in order to provide substantiation and facilitate transcription.

In doing so, the researcher gathered in-depth data to answer the research questions. The key-informant interviews provided the researcher with in-depth data to triangulate the survey data. The interviews also provided information that could have been missed or partially explained in the survey questionnaires. Another noteworthy aspect of the interviews was the provision of an option for the interviewer to assist in clarifying ambiguous inquiries and pose supplementary questions that delve into greater depth.

3.11.3 Observations

The study also made use of non-participatory personal observations to gain a clear picture of the effects of load shedding and how the SMEs were coping with the prevailing electricity load shedding. Majority of the observations were made during the interviews where observations were

made. The researcher also observed body gestures of the participants to the study. A structured observation sheet was then used to gather information. The researcher's digital camera and field note book were used for collecting personal observations.

The observations yielded rich and in-depth data since the researcher eye witnessed some of the experiences without relying on someone's narrations of the experiences. However, personal observations have the possibility of "subjective interpretation" (Kothari, 2019). Nevertheless, the researcher conscientiously tried to validate interpretations using data from secondary sources, questionnaires and interviews.

3.12 Reliability

According to Drost's (2011) study, reliability refers to the degree to which measurements can be replicated when conducted by various individuals on separate occasions, under varying circumstances, and using different instruments that assess the skill being measured. The term "reliability" can alternatively be conceptualized as the extent to which a measurement of a construct yields consistent results (Kothari & Garg, 2020).

Using the data from the pilot study, Cronbach's Alpha (α) reliability coefficients were estimated and they were interpreted as follows: $\alpha = 1$: reliability is perfect, $0.9 \leq \alpha < 1.0$: reliability is excellent, $0.7 \leq \alpha < 0.9$: reliability is acceptable, $0.6 \leq \alpha < 0.7$: reliability is questionable, $0.5 \leq \alpha < 0.6$: reliability is poor and $\alpha < 0.5$: reliability is not acceptable (Cooper & Schindler, 2020). The results of Cronbach test are presented in Table 3.1. Data from the pilot study was utilized where thirty owners and managers of smallscale enterprises participated.

Table 3.1: Reliability test results

	Statistic
Cronbach's Alpha	0.748
Number of Items	31

Source: Survey findings (2023)

The results displayed in Table 3.1 show that the questionnaire with 31 items had Cronbach's statistic of 0.748. Basing on this result, it was deduced that the questionnaire was reliable and internally consistent. As stated by Bryman and Bell (2020), Cronbach's Alpha statistics of 0.7 or more indicate reliability and internal consistency of the questionnaire. Cooper and Schindler (2020) reported that Cronbach's Alpha statistics between 0.7 and 0.9 imply acceptable reliability.

3.13 Validity

On the other hand, the study checked for validation of the data collection instruments. For validity, the questionnaire, interview guide and observation guide were given to five experts who checked for content and face validity. The researcher therefore used corrections and suggestions made by the experts to improve validity of the research instruments. Content and construct validity was also ensured through constructing the questionnaire following comprehensive examination of the relevant prior literature.

For improved validity, the research instruments were pilot tested. As stated by Sekaran and Bougie (2019), a pilot test, sometimes referred to as a feasibility study, encompasses a comprehensive run-through of the complete research endeavour, encompassing activities ranging from the administration of the study through the entry and analysis of data. The objective of conducting a pilot study was to verify that the questions effectively elicited the intended replies and to identify any instances of ambiguous phrasing or inaccuracies prior to the widespread dissemination of the survey (Taherdoost, 2020). The research instruments were administered to thirty owners of small-scale enterprises who were not part of the final sample. Moreover, the use of methodological triangulation enhanced validity, credibility and reliability of the research data gathered.

In addition, the Kaiser-Meyer-Olkin (KMO) test was undertaken in SPSS to determine construct validity of the questionnaire. As per Hair, Page and Brunsveld (2019), the KMO statistic of at least 0.7 indicates sampling adequacy implying high construct validity. The results of validity test using the KMO test for sampling adequacy is presented in Table 3.2.

Table 3.2: Validity test results: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.756
Bartlett's Test of Sphericity	Approx. Chi-Square	2622.987
	df	351
	Sig.	0.000

Source: Survey findings (2023)

The results displayed in Table 3.2 show that the semi-structured questionnaire with 31 items had a KMO statistic of at 0.756 implying sampling adequacy and that the questionnaire met the construct validity criterion. As per Hair *et al.* (2019), KMO statistics of at least 0.7 indicate sampling adequacy implying high construct validity. In conclusion, the questionnaire collected reliable and valid data.

3.14 Trustworthiness

For the qualitative part, validity and reliability was ensured following the four criteria: dependability, credibility, transferability and confirmability. Since the study had the qualitative research part, it was found crucial to establish trustworthiness as it ensured the validity and authenticity of the qualitative data and strengthened the overall research quality. In doing so, the researcher engaged in prolonged engagement with the participants for the interviews. By spending an extended period of time with the participants, the researcher established rapport, build trust, and gained a deeper understanding of the participants' experiences and perspectives.

Prolonged engagement also allowed the researcher to capture the richness and complexity of the participants' experiences with load shedding, leading to more credible and reliable qualitative data. Furthermore, trustworthiness was enhanced through methodological triangulation. Through employing different methods, such as interviews and observations, the researcher cross-validated the qualitative data. Triangulation increased the trustworthiness of the qualitative research findings as it reduced the chances of results misinterpretation or bias.

Furthermore, member checking was another important strategy employed for ensuring trustworthiness of the qualitative findings. This involved sharing the research findings with the participants and seeking their feedback and input. By involving the participants in the

interpretation and analysis of the data, the researcher ensured that the participants' voices were accurately represented and that the findings aligned with the participants' experiences. Member checking also provided the participants the opportunity to correct any misinterpretations or inaccuracies, further enhancing the credibility and dependability of the research findings.

The other strategy employed in this research was peer debriefing. This involved seeking feedback and insights from other peer researchers or experts in the field of business management research. Peer debriefing helped the researcher to identify any flaws or biases in their study design, data collection, or data analysis procedures. By engaging in critical discussions with peers and experts, the researcher was able to refine the research methods thereby enhancing trustworthiness of the findings.

More so, the other strategy employed to ensure trustworthiness was maintaining a detailed audit trail. Through this, the researcher documented all decisions, actions, and processes undertaken throughout the research process. An audit trail provided an opportunity for the researcher to reflect on choices and justify their methodological choices. It also enabled other researchers to assess the credibility and dependability of the research by tracing steps followed in data collection, analysis, and interpretation.

3.15 Operationalisation and measurement of variables

Basing on the previous empirical studies and objectives of the present study, the main variables for the study are load shedding (independent variable), coping strategies (independent variable) and business operations of small-scale enterprises (dependent variable). The operationalisation of theses variables is summarised in Table 3.3.

Table 3.3: Operationalisation and measurement of variables

Variable	Data collection tool	Measurement of variable	Measurement scale	Reference Source
Load shedding	Survey questionnaire	Frequency of load shedding (Less than 1	Ordinal scale	Adanlawo and Vezi-Magigaba (2021), Cissokho

	(Section A, question 10)	hour, 1-5 hours, 6-10 hours and more than 10 hours)		and Seck (2013), Doe and Asamoah (2014), Kintu (2022); Mohammed (2017) and Njiraini (2021)
Coping strategies	Survey questionnaire (Section D, question 19)	Individual item score on coping strategies of small-scale enterprises	5-point Likert scale	Drnovšek *et al.* (2010), Dunya *et al.* (2019), Fiawoo (2016); Kavishe (2015)
Business operations of small-scale enterprises	Survey questionnaire (Section C, question 16)	Individual and mean item scores of items on business operations of small-scale enterprises	5-point Likert scale Likert scale	Dunya *et al.* (2019), Kintu (2022)

3.16 Data Analysis

Data analysis is a technique that is used to find perception in data, such as metrics, facts, and figures. This technique is often used when several events such as gathering, cleaning and organizing data occur. These essential processes are important when organizing data for business purposes. Data analysis software is one of the tools used when carrying out data analysis. Data analysis is also described as data analytics and is used to analyse data that has been collected in order to derive informed findings founded on the data. The process of using logic to get understanding of information already gathered is known as data analysis (Kothari & Garg, 2020; Saunders *et al.,* 2020).

According to Creswell (2020), data analysis is the most important part of nay research. In this study, quantitative data and qualitative data analysis techniques were employed. The researcher utilized four distinct stages of data preparation in this study, specifically data capturing, cleaning, editing, coding. The aforementioned stages were utilized in order to guarantee the comprehensiveness and preparedness of the collected data for analysis. After data was collected, the researcher engaged in data cleaning, data transcription, editing, sorting and coding. During the data cleaning process, the researcher went through all the completed questionnaires checking for partially and fully completed questionnaires. This study implemented minimum quality requirements, which entailed the exclusion of questionnaires exhibiting missing responses of over 10 percent, as well as those containing unclear responses.

Through this process, the researcher identified 24 partially completed questionnaires. The partially completed questionnaires were considered invalid and were discarded from the analysis. Following this, the researcher proceeded in coding the data in Microsoft Excel. The coding was done based on the five-point Likert scale employed. The Likert-scale responses were coded as follows: 1 for Strongly disagree, 2 for Disagree, 3 for Not sure, 4 for Agree and 5 for Strongly agree. The coded data was exported to the Statistical Package for the Social Sciences (SPSS) software version 27 for statistical analyses. On the qualitative data, the researcher went through all the transcribed interview scripts where there main themes and patterns in data were noted leading to coding of the data basing on the themes that emerged from the data or from the literature review.

Quantitative data was analysed using univariate descriptive analyses such as frequency distributions as well as bivariate correlation analysis as illustrated in the research design matrix in Table 3.2.

Table 3.2: Research Design Matrix

Research Objective	Research Question	Data Collection Tool	Data Analysis Technique
To investigate the ways in which electricity load	In what ways does electricity load shedding affect business operations	a) Survey questionnaire	a) Univariate descriptive analysis

shedding affects business operations of small-scale enterprises at Masala Market in Ndola, Zambia	of small-scale enterprises at Masala Market in Ndola, Zambia?	b) Interviews	b) Bivariate correlation analysis c) Content analysis
To establish coping strategies and their effectiveness on business operations of small-scale enterprises at Masala Market in Ndola,	What coping strategies are being implemented by small-scale enterprises at Masala Market in Ndola, Zambia and how effective are they on business operations of small-scale enterprises at Masala Market in Ndola, Zambia?	a) Survey questionnaire b) Interviews c) Observations	a) Univariate descriptive statistics b) Bivariate correlation analysis c) Content analysis
To propose a framework for small-scale enterprises to cope with electricity load shedding	What framework can be employed by small-scale enterprises at Masala Market in Ndola, Zambia to cope with electricity load shedding?	Research findings	Framework development

Source: Researcher's constructions

Thereafter, bivariate analyses using the Pearson Correlation statistics were computed in SPSS version 27 to test the research hypotheses outlined in Chapter 1. Precisely, the correlation statistics were estimated in order to ascertain whether or not there were statistically significant associations between the main variables of the study. Previous similar studies such as Ajibola *et al.* (2021) and

Njiraini (2021) also used correlation analysis to determine the effect of load shedding on operations/performance of small-scale enterprises. For the purpose of determining the statistical significance, the 5% level of significance was utilised. The following rule of thumb set by Schober, Boer and Schwarte (2018) for interpreting correlation statistics (r) was employed (Table 3.3):

Table 3.3: Interpretation of correlation statistics

Magnitude of correlation statistic	Interpretation
r=1	Perfect correlation
$0.9 \leq r < 1.0$	Very strong correlation
$0.7 \leq r < 0.9$	Strong correlation
$0.5 \leq r < 0.7$	Moderate correlation
$0.3 \leq r < 0.5$	Weak correlation
$0.0 < r < 0.3$	Very weak correlation
r=0	No correlation

Source: Schober et al. (2018)

For qualitative data, the study employed inductive approach using content analysis. The selection of this particular method was made in order to facilitate the concurrent gathering and examination of data, as well as to enable the emergence of themes to occur organically throughout the data collection process. Content analysis allowed the researcher to systematically analyse large amounts of data. By categorizing and coding textual or visual content, the researcher was able to identify patterns and themes within the data. This enable the researcher to gain a comprehensive understanding of the phenomenon being studied.

3.17 Ethical Considerations

The field of research ethics primarily concerns itself with the ethical dynamics that arise from the interactions between researchers and the individuals they investigate (Creswell, 2020). Professional ethics encompasses various aspects, including but not limited to, the establishment of collaborative ties among researchers, the cultivation of mentorship relationships, the protection of intellectual property, the prevention of data fabrication, and the avoidance of plagiarism (Bryman & Bell, 2020). Bryman and Bell (2020) emphasize the necessity for social science research activities to conform to a prescribed set of ethical principles and acceptable practices. The criteria

encompass several key principles, namely voluntary involvement, informed consent, risk assessment, confidentiality, and anonymity (Bryman & Bell, 2020; Trochim, 2010).

3.17.1 Ethical approval

Ethical approval is a crucial aspect of any research study, ensuring that the rights and welfare of participants are protected. It involves a thorough evaluation of the proposed research project to ensure that it meets ethical standards and guidelines (Bryman & Bell, 2020). Prior to the data collection process, ethical clearance was sought from the university's ethics committee and permission to carry out the study was obtained from the Ndola City Council.

3.17.2 Accessibility of research site and participants

Following ethical approval, the researcher sought permission to access the small-scale entrepreneurs operating at the Masala Market. The permission to carry out the research at the market and access the participants was obtained from the management at the Ndola City Council. According to Høyland, Hollund and Olsen (2015), the accessibility of participants in research is a crucial aspect that researchers must consider when conducting studies.

3.17.3 Confidentiality, anonymity and privacy

Confidentiality and anonymity were upheld by not requesting the participants to provide their identities and all information gathered was treated as confidential and not shared to anyone else. Allowing the participants to withdraw at any point helped in avoiding emotional or physical harm of the participants.

3.17.4 Honesty, integrity and professionalism

Honesty and integrity were also upheld as data collected was presented in its original form without any alterations or fabrications to suit the expectations or perceptions of the researcher. This study also demonstrated the researcher's commitment to upholding professional standards and principles in the reporting, execution, and application of scientific endeavours. Consequently, the results were communicated with utmost integrity, devoid of any falsification or misrepresentation by the researcher. The researcher also made diligent efforts to appropriately document the findings of the investigation.

3.17.5 Informed consent

Observance of ethics in this study entailed that no participant took part in the study without their informed consent where all participants did it out of their own will. In this study, the researcher commenced the interview by elucidating to the respondents on what the essence of the study was. The introduction was done through an introductory letter from the university and a further explanation after which respondents were given an opportunity to whether go ahead with the study or decline.

Before the administration of the questionnaires was done, a sensitization exercise at which the researcher explained the objectives of the study and how the entrepreneurs were going to benefit from the findings and recommendations that would come out of the study. This exercise made it possible for almost all the sampled respondents to be fully aware of the objectives of the study. This made the work of the researcher easier than it would have been had the researcher not started with the sensitization exercise. This sensitization exercise provided a perfect platform for the researcher to clarify and clear the myth that surrounded the study. This clarification was important to avoid respondents giving fake answers because of being suspicious of the purpose of the study.

The sensitization exercise was conducted in small groups in the presence of market officials and constituency official from Kabushi Constituency from which Market is domiciled. To get informed consent, the first step was to explain the research to people in a way they could understand. As a result, the researcher began this multistep procedure by speaking with community leaders at Masala Market and explaining the research to them after receiving ethical approval from the Ethics Committee. After that, the leaders organized a community forum where people who were interested could learn more about the research and ask questions. The researcher had to spend two hours just individually sensitizing Masala Market entrepreneurs. The one-on-one approach contributed significantly to their trust and comprehension of the research's objectives. The researcher ensured that all the target respondents were availed the following information:

i) The objective of the study;

ii) The anticipated responsibilities of a research participant, including the estimated time commitment for participation;

iii) Anticipated potential risks and benefits, encompassing psychological and social aspects;

iv) The voluntary nature of participation and the absence of adverse consequences for withdrawing at any point;

v) The preservation of confidentiality;

vi) The contact details of the primary investigator in the local area, who can be reached for inquiries or issues pertaining to the research, should be provided;

vii) The requisite details, including the name and contact information, of an individual who can be approached for inquiries regarding the rights of individuals participating in the research study (often the chairperson of the local ethics commission responsible for overseeing the research).

All this information was availed to the respondents in both local language and English language that the participant could understand. The researcher ensured that potential participants were competent to make a decision about being in the research, and free from coercion or undue inducement to participate the researchers or others. Individual informed consent may be written or oral. In this study, a form was used for consent. However, forms are really only one part of an informed consent process.

3.18 Chapter Summary

The research methods and techniques adopted in the research has been presented in this chapter. The research followed a mixed-method approach. Therefore, in this chapter, the research method related to the mixed-method research was drawn and discussed. Research philosophy, research strategy and research design adopted in the research were presented, explained and justified. In addition, in this chapter, the study population, sampling methods, sample size, data collection methods and tools, validity and reliability issues, data presentation and analysis techniques, as well as ethical considerations were presented. The research procedures that led to the analysis, interpretation, and discussions in the next chapter have been discussed in this chapter. This chapter therefore laid the foundation for the next chapter, which focuses on presentation, analysis and interpretations and of findings.

CHAPTER 4: PRESENTATION AND ANALYSIS OF FINDINGS

4.1 Introduction

The chapter focuses on research findings that were discovered using questionnaire surveys, observations, document reviews, and in-person interviews. This chapter of the study presents the research's findings and includes data analysis and justifications for the significance of the data collection's findings in order to reach a conclusion. This chapter focuses on providing comprehensive data analysis and outcomes presentation. Since the study employed a mixed research design for data gathering, both qualitative and quantitative data are analysed in this chapter.

This chapter presents the findings from the data collected as well as the analyses of the research findings. The response rate for the study and the validity and reliability test results are presented and analyzed in this chapter as well as the demographic information for the respondents. The researcher first presents the response rate thereafter providing the demographic characteristics of the participants. The results are presented according to the research objectives which are:

i) In what ways does electricity load shedding affect business operations of small-scale enterprises at Masala Market in Ndola, Zambia?

ii) What coping strategies are being implemented by small-scale enterprises at Masala Market in Ndola, Zambia and how effective are they on business operations of small-scale enterprises at Masala Market in Ndola, Zambia?

iii) What framework can be employed by small-scale enterprises at Masala Market in Ndola, Zambia to cope with electricity load shedding?

4.2 Response Rate

This section presents the response rate for the questionnaires and interviews. The term "response rate" or "completion rate" pertains to the proportion of actual response of participants, divided by

the total number of targeted participants and is denoted as a percentage (Bryman & Bell, 2020). The response rate for the survey questionnaire is shown in Table 4.1 and Figure 4.1.

Table 4.1: Questionnaire response rate

	Frequency (n)	**Percentage (%)**
Questionnaires distributed	304	100.0
Unreturned questionnaires	47	15.5
Returned questionnaires	257	84.5
Partially completed or spoilt questionnaires	24	7.9
Completed and valid questionnaires	233	76.6

Source: Survey findings (2023)

The results depicted in Table 4.1 show that out of the 304 distributed questionnaires, 47 (15.5%) questionnaires were not returned whilst 257 (84.5%) questionnaires were collected back by the researcher. Of the 257 returned questionnaires, a total of 24 (7.9%) questionnaires were either partially completed or incorrectly filled such that they were rendered spoiled and invalid for analysis. A total of 233 (76.6%) questionnaires were therefore found valid representing a successful response rate of 76.6%.

This response rate was deemed excellent in light of the recommendations made by Kothari and Garg (2020), who stated that a response rate of 50 percent is sufficient for analysis and reporting, a response rate of 60 percent is typically considered good, and a response rate of 70 percent or higher is considered to be excellent. The survey response of 70% was good for the study as Bryman and Bell (2020) posited that response rates of at least 70% are good and acceptable for analyzing data and drawing inferences from the data collected. In light of the recommendations, it was deduced that the response rate of 76.6% was excellent for this study which boosts the researcher's confidence in generalising the findings.

On the other hand, the researcher successfully interviewed fifteen owners of small-scale at Masala Market in Ndola district, Zambia basing on the purposive sampling technique. This sample was

determined using the data saturation technique. This interview response was considered suffice for this research. In order to get data saturation in qualitative research, it has been recommended in prior studies that a minimum sample size of 12 participants should be employed (Fugard & Potts, 2015). Nevertheless, the researcher made the decision to carry out a total of 15 interviews, reaching a point of saturation where participants began providing responses that were consistent with those of other previously interviewed participants. According to Creswell (2012), interviews between 5 and 30 are suffice for qualitative researches allow researchers to reach data saturation.

According to Braun and Clarke (2021), it is recommended that interviews should have a minimum sample of ten in order to achieve data saturation. Hennink and Kaiser (2022) have demonstrated that in order to achieve data saturation, interviews ranging from 10 to 20 are necessary. Xie and Chen (2021) argue that qualitative research studies can achieve data saturation by carrying out interviews with at least ten participants. For the analysis of the interview data, it was determined that 15 interviews were sufficient to provide in-depth information to the research questions. To determine data saturation in the interviews, the researcher considered several factors. Firstly, the researcher carefully reviewed and analysed the interview transcripts. By examining the content of each interview, the researcher identified recurring themes or patterns that indicated data saturation. Where different participants to the interviews, the researcher, repeatedly mentioned similar ideas or concepts reached the conclusion that enough information had been collected.

Secondly, the researcher compared and contrasted the responses provided by the different interview participants. Where there was consistency among participants' answers regarding a particular topic or issue, it indicated that data saturation has been was achieved. Additionally, the researcher employed the theoretical sampling technique during interviews to reach data saturation. This involved purposefully selecting participants who possessed unique perspectives or experiences related to load shedding. Data saturation was there determined after additional participants failed to provide any new insights or information beyond what had already been obtained.

4.3 Socio-Demographic Information of Participants

This section intends to present the demographic data of the respondents. The demographic information focuses mostly on the respondents' gender, age, level of education, designation, size of the small-scale enterprise and nature of business of the small-scale enterprises. The socio-demographic results from 233 survey participants are presented in Table 4.2:

Table 4.2: Socio-demographic characteristics of survey respondents (n = 233)

Demographic variable	Scale	Frequency (n)	Percentage (%)
Gender	Male	141	60.5
	Female	92	39.5
Age	18 to 30 years	44	18.9
	31 to 40 years	59	25.3
	41 to 50 years	53	22.7
	51 to 60 years	58	24.9
	Over 60 years	19	8.2
Academic Status	Secondary education	76	32.6
	Certificate/Diploma	36	15.5
	Undergraduate degree	77	33.0
	Postgraduate degree	24	10.3
	Other	20	8.6
Years of operation of the small-scale enterprise	Less than 1 year	43	18.5
	1-5 years	63	27.0
	6-10 years	78	33.5
	11-15 years	37	15.9
	More than 15 years	12	5.2
Designation	Owner	86	36.9
	Manager	54	23.2
	Both owner and manager	93	39.9
	Manufacturing	18	7.7

Demographic variable	Scale	Frequency (n)	Percentage (%)
Nature of business of the small-scale enterprise	Fast food and restaurant	26	11.2
	Printing, photocopying and typing	58	24.9
	Retail and distribution	31	13.3
	Internet cafe	23	9.9
	Welding and construction	10	4.3
	Hair saloon and barbering	31	13.3
	Computer and cell phone repairs	12	5.2
	Clothing and retail	12	5.2
	Other	12	5.2
Size of the small-scale enterprise	1-10 employees	168	72.1
	11-50 employees	49	21.0
	51-100 employees	16	6.9

Source: Survey findings (2023)

Table 4.2 above demonstrates the distribution of the owners and/or managers of the sampled small-scale enterprises operating at Masala Market in Zambia. It can be seen from the table presented that out of the sample of 233 (100.0%) respondents, 60.5% (n = 141) of the participants were males whereas 39.5% (n = 92) were females. These results show that majority of the small-scale enterprises were owned and managed by males.

Although both males and females were represented in the study, the results show an imbalanced gender distribution in terms of business ownership and management across the small-scale enterprises. The gender imbalance is also supported by the recent statistics published by the ZCCI showing that the SME sector of Zambia is male dominated with over 60% of male led business start-ups. The results are in line with statistics provided by World Bank SME (2021) survey that around 60% of the SMEs in Zambia are owned by males whilst 42% of the micro-enterprises and 36% of SMEs in Zambia are female-led enterprises.

From the results in Table 4.2, it can be noted that 25.3% (n = 59) of participants cited that they were in the age range of 31 to 40 years followed by 24.9% (n = 58) who cited that they were aged between 51 and 60 years and 22.7% (n = 53) cited were aged between 41 and 50 years. Those aged between 18 and 30 years constituted 18.9% (n = 44) of the sample whilst 8.2% (n = 19) were aged over 60 years.

These results indicate that majority of the individuals who run or manage the small-scale enterprises at Masala Market are aged from 30 years upwards. The results imply the participants were more mature enough to provide honest responses on the influence of load shedding on operations of the small-scale enterprises. More so, the results show that age categories were represented in the study implying enhanced validity findings as the researcher based on age did no sampling bias.

Moreover, Table 4.2 above presents a distribution of education levels attained by the business owners and managers of small-scale enterprises who participated in this study. The results show that the largest proportion of the participants (33.0%) (n = 77) had undergraduate degrees followed by those who had attained secondary education (32.6%) (n = 76) and those with college certificates or diplomas (15.5%) (n = 36). Twenty four out of the 233 participants (10.3%) had postgraduate degrees whilst the minority (8.6%) (n = 20_had other educational qualifications such as professional courses and others went as far as grade 12 in their education whilst others did not beyond grade eight in their education. The results are in line with the statistics by the Zambia National Chamber of Commerce (2021) that most of the owners of the SMEs in Zambia are college and university graduates who have failed to find formal employment.

However, the distribution in Table 4.2 also clearly shows that business owners at Masala Market have very humble education background to venture into business. More so, the results entail that majority of the participants were educated such that they could interpret and understand aspects in regards to load shedding and operations of the small-scale enterprises. Hence, they provided relevant responses.

Moreover, the participants were asked to indicate the total years of operation of their respective small-scale enterprises. The results concerning the age of the small-scale enterprises have been presented in Table 4.2 above. As illustrated in Table 4.2, a substantial proportion of the participants

(33.5%) (n = 78) reported that their small-scale enterprises had been in operation for a period of 6 to 10 years whilst 27.0% (n = 63) indicated that their businesses were between 1 and 5 years of age and 15.9% (n = 37) testified that their small-scale enterprises had been in operation for a period of 11 to 15 years. More so, 18.5% (n = 43) reported that their small-scale enterprises had been in operation for a period of less than a year. The minority (5.2%) (n = 12) cited that their respective small-scale enterprises had been in operation for overs 15 years.

These results show that majority of the small-scale enterprises had been in business for a period not more than 10 years. This could be an implication that some SMEs had graduated to be large businesses or some small-scale enterprises have failed to survive. Besides, the results shown indicate that majority of the participants to the survey had in-depth knowledge on load shedding and business operations based on their experience in business.

The participants indicated their designations in their respective small-scale enterprises. The results have been displayed in Table 4.2. The results displayed in Table 4.2 show that a substantial percentage of research participants (30.9%) (n 93) were both owners and managers of the small-scale enterprises followed by 36.9% (n = 86) who were business owners and 23.2% (n = 54) who were managers but not owners of the small-scale enterprises at Masala Market in Ndola District, Zambia. The results indicate that research participants had different designations indicating a variety of data was gathered thereby improving validity of the research results. The results also reflect that most of the owners of the small-scale enterprises are the managers of the entities.

The research participants were further required to indicate the industry or nature of their businesses. The results presented in Table 4.2 show that 24.9% (n = 58) of the participants cited that their small-scale enterprises were into the business of document printing, typing and photocopying whilst 13.3% (n = 31) of the participants indicated that they were into hair saloon and barbering. The other participants indicated that their small-scale enterprises were in the businesses of retail and distribution (13.3%) (n = 31), fast food and restaurant (11.2%) (n = 26), internet cafe (9.9%) (n = 23), manufacturing (7.7%) (n = 18), clothing and retail (5.2%) (n = 12), computer and cellphone repairs (5.2%) (n = 12) and welding and construction (4.3%) (n = 10). Besides, another 5.2% (n = 12) of the respondents cited that their small-scale enterprises were into other businesses such as tourism and hospitality, agriculture, baking and confectionery, sausage making, financial services, electronics, motor mechanics and car spray painting, consultancy and

gas filling. The results show that the small-scale enterprises included in the survey were from various industries implying no sampling bias was done. This further enhanced validity of the findings.

Lastly, the participants were asked to indicate the size of their businesses in relation to number of employees. The results have been presented in Table 4.2. The results presented in Table 4.2 show that majority of the participants to the study representing 72.1% (n = 168) of the total survey participants indicated that their businesses had employees between 1 and 10 whilst 21.0% (n = 49) indicated that their businesses had 11 to 50 employees. The minority (6.9%) (n = 16) cited that their respective businesses had 51 to 100 employees. The results reflect that most the small-scale enterprises have not more than ten employees.

This distribution does not mean any sampling bias but the nature of the small-scale enterprises. In other words, most of the small-scale enterprises operating at Masala Market can be classified as micro-enterprises as the Zambia's MSME Development Policy classify enterprises with not more than ten full time employees as micro-enterprisers (Kawimbe, 2023).

4.4 Frequency of Load Shedding for Small-Scale Enterprises Face During Business Hours

Firstly, the study aimed to establish the frequency of load shedding those small-scale enterprises at the Masala Market face during business hours. In pursuit to this, the researcher collected both primary and qualitative data using questionnaires, interviews and observations. The results pertaining the frequency of load shedding faced by the small-scale enterprises during business hours are presented, analysed and discussed in this section.

In doing so, the participants to the survey were asked to indicate if they experience load shedding as well as the frequency of loads shedding. The results are summarised in Table 4.3 showing cross-tabulations.

Table 4.3: Frequency of Load Shedding at Masala Market (n=233)

			Do you experience the current load shedding during business hours (0800 hours-1700 hours)?		
			Yes	**No**	**Total**
Frequency of load shedding	**Often**	**Count**	**88**	**0**	**88**
		% within Do you experience the current load shedding	37.8%	0.0%	37.8%
		% of Total	37.8%	0.0%	37.8%
	More often	**Count**	**54**	**0**	**54**
		% within Do you experience the current load shedding	23.2%	0.0%	23.2%
		% of Total	23.2%	0.0%	23.2%
	Always	**Count**	**91**	**0**	**91**
		% within Do you experience the current load shedding	39.1%	0.0%	39.1%
		% of Total	39.1%	0.0%	39.1%
	Total	**Count**	**233**	**0**	**233**
		% within Do you experience the current load shedding	100.0%	0.0%	100.0%
		% of Total	100.0%	0.0%	100.0%

Source: Survey findings (2023)

As shown in Table 4.4, all the 233 participants to the survey (100%) indicated that they experienced load shedding during business hours (0800 hours-1700 hours). The same participants who indicated that they experienced load shedding were asked to indicate how often they experienced load shedding during business hours (0800 hours-1700 hours). From the findings 39.1% (n = 91) reported that they always experienced load shedding during business hours (0800 hours-1700 hours) whereas 37.8% (n = 88) indicated that their small-scale enterprises often faced load shedding during business operating hours (0800 hours-1700 hours).

The remaining 54 participants (23.2%) highlighted that they more often experienced load shedding during business hours (0800 hours-1700 hours). These results alone indicate that the small-scale enterprises at Masala Market frequently experience load shedding during business hours (0800 hours-1700 hours). The results are similar to those of previous studies. For instance, Mchopa *et al.* (2014) revealed frequent power outages in Tanzania due to power rationing where small businesses

experience long hours without electricity. The frequent prolonged load shedding faced by the small-scale enterprises at Masala Market is comparable to the findings of the qualitative study by Braimah and Amponsah (2012) which revealed blackouts lasting for about 10.3 hours in a day facing SMEs in Ghana. More so, the results regarding frequency of load shedding are in line with the findings by Makhdoom, Nawaz and Narejo (2017) who cited that 65% of the SMEs in Pakistan faced load shedding for about 6 to 8 hours.

Furthermore, the survey participants were asked to indicate the average number of hours of lead shedding they experience in a day. The responses to the question are portrayed in Table 4.4.

Table 4.4: Length/duration of Load Shedding Experienced by Small-Scale Enterprise at Masala Market (n=233)

			Do you experience the current load shedding during business hours (0800 hours-1700 hours)?		
			Yes	**No**	**Total**
Duration of load shedding	**1-5 hours**	**Count**	**89**	**0**	**89**
		% within Do you experience the current load shedding	38.2%	0.0%	38.2%
		% of Total	38.2%	0.0%	38.2%
	6-10 years	**Count**	**75**	**0**	**75**
		% within Do you experience the current load shedding	32.2%	0.0%	32.2%
		% of Total	32.2%	0.0%	32.2%
	More than 10 years	**Count**	**69**	**0**	**69**
		% within Do you experience the current load shedding	29.6%	0.0%	29.6%
		% of Total	29.6%	0.0%	29.6%
	Total	**Count**	**233**	**0**	**233**
		% within Do you experience the current load shedding	100.0%	0.0%	100.0%
		% of Total	100.0%	0.0%	100.0%

Source: Survey findings (2023)

The results displayed in Table 4.4, show that a significant proportion of 38.2% (n = 89) of the participants stated that they experienced load shedding for a period extending from 1 to 5 hours whilst 32.2% indicated that on a daily basis, they experience load shedding for a period between 6 hours to 10 hours. Another significant proportion of the survey participants (29.6%) reported that on average, they faced load-shedding extending to more than ten hours on a daily basis. These survey results have indicated the small-scale enterprises at the Masala Market experience significant load shedding extending up to more than ten hours in day. The study by Banda *et al.* (2021) also cited that the 2019-2020 load shedding was worse than everwhere ZESCO increased the extent of the load shedding to at least 15 hours a day for majority of its commercial, household and industrial consumers. This could have significant implications to the business operations of the small businesses.

Similar findings to the survey were also obtained from the interviews were all the fifteen participants stated they experienced significant load shedding during business hours. Some of the substantiating responses of the interview participants are summarised in Table 4.6 below.

Table 4.6: Substantiating responses of the interview participants

Participant	**Response**	**Business**
Participant A	"As small businesses operating here at Masala Market, we experience load shedding on a daily basis spanning to over ten hours and some days to over ten hours. This recurring issue is so disheartening"	Welding and fabrication
Participant C	"Load shedding has become a recurring nightmare in our businesses, as we face power outages for about four to eight hours on a daily basis. This issue has plagued our businesses and has become the story of our daily living. It is a matter of great concern that we are forced to stay in without electricity for such prolonged periods, disrupting our operations and routines and causing inconvenience"	Printing, Photocopying and Typing
Participant D	"In recent years, the issue of prolonged power outages has become a pressing concern for many people. It is disheartening to witness how frequently we are faced with this problem, with instances of three days	Welding and fabrication

Participant	Response	Business
	in a week without electricity becoming all too common. In addition, the burden of load shedding has become a daily occurrence for us and as small businesses were significantly impacted"	
Participant G	"This issue of load shedding and power rationing by ZESCO has left us speechless as we experience blackouts extending to five hours or even more on a daily basis"	Dressmaking and tailoring
Participant K	"Yeah, as you can see it's not business as usual due to the ongoing load shedding due to the ZESCO's power rationing. I have come here at around 9.00 am and find no electricity and up to now, which is almost 2.00 pm nothing yet. This is not only for today but it's a daily experience"	Internet cafe
Participant O	"We frequently encounter load shedding for up to six hours in a day. Somedays we can be luck as we can get back electricity after 2 or 3 hours. This has significantly impacted our t-shirt printing and graphic designing business as we rely heavily on electricity-powered machinery for printing and designing t-shirts"	Printing and designing

Source: Survey findings (2023)

The quotations presented in Table 4.6 show that the participants to the in-depth interviews agreed that they frequently experience load shedding during business hours from 0700 hours to 1700 hours. From the interview findings, it has been noted that the small-scale enterprises operating at Masala Market frequently experience load shedding of up to more than five hours in day. These interview findings support the survey findings presented earlier in this section, which showed that the small-scale enterprises at Masala Market face load shedding of five up to more than ten hours. The study by Banda *et al.* (2021) also cited that the 2019-2020 load shedding was worse than everwhere ZESCO increased the extent of the load shedding to at least 15 hours a day for majority of its commercial, household and industrial consumers.

The researcher whilst doing the data collection at the Masala Market also observed the issue of prolonged load shedding experienced by the small-scale enterprises. Table 4. In summary, the

quantitative and qualitative findings have shown that the small-scale enterprises at the Masala Market in Ndola, Zimbabwe. The following section presents the results regarding how the frequent prolonged load shedding could has affected the business operations of the small businesses at the Masala Market.

4.5 Effects of Electricity Load Shedding on Business Operations of Small-Scale Enterprises in Zambia

The aforementioned findings have shown the prevalence and high frequency of electricity load shedding experienced by the small-scale enterprises at Masala Market in Zambia. This section therefore aims to present, analyse and discuss the findings relating to how the frequent prolonged load shedding affects the business operations of the small-scale enterprises at the Masala Market. The aim of this study being to investigate the ways in which electricity load shedding affects small-scale enterprises in Zambia. To achieve this specific objective, the study aimed to find answers to the research question: "In what ways does electricity load shedding affect business operations of small-scale enterprises at Masala Market in Ndola, Zambia?" To find answers to this question, data was collected using interviews, survey questionnaires and observations. Starting with the survey findings, the respondents were therefore requested to indicate if load shedding was a major concern for the operations of their businesses. The results pertaining to the question are presented in Table 4.7.

Table 4.7: Concern About Load Shedding to the Small-Scale Enterprises (n=233)

Do you consider load- shedding as a major concern for your business operations?	Frequency	Percent
Yes	214	91.8
No	19	8.2
Total	233	100.0

Source: Survey findings (2023)

The results presented Table 4.7 show that majority of the respondents (91.8%) (n = 214) indicated that they consider load shedding a concern to the operations of their businesses whilst 8.2% (n = 19) of the participants reported that load shedding is of not much concern. These results reflect that load shedding is of great concern to the small-scale enterprises at the Masala Market in Ndola,

Zambia. The survey findings were corroborated by the findings from the interviews. Majority of the participants (11 out of 15 participants) to the interviews reported that load shedding was of great concern to their businesses that rely on electricity. One of the businesses owners of a printing and graphic designing business stated:

> "*Although load shedding affects everyone here at the Masala Market, it is of great concern to our printing business that rely on availability of electricity as our machines cannot be powered by solar*" [Participant B; Business owner]

In the same vein, another participant, Participant F, a business owner and manager of the cellphone and computer repairing business also argued that load shedding was of great concern to his businesses. The participant stated:

> "*Load shedding is a major concern for all businesses here at Masala Market and nationwide. However, one such business that is severely affected by the load shedding is the computer and cell phone repairing business, as our main source of power is grid electricity. Technicians require electricity to diagnose and fix technical issues*" [Participant F; Business owner & manager]

Other participants to the interviews also mentioned that electricity load shedding was of great concern to their businesses passing the following comments:

> "*The sausage making process heavily relies on electrical equipment, including grinders, mixers, and smokehouses. These machines require a consistent and uninterrupted power supply to ensure efficient production. Hence, load shedding is of concern to my business as it leads to delays in production schedules and compromise product quality*" [Participant E; Business owner & manager]

> "*Electricity is an essential asset to this business of ours which specialise in welding and metal fabrication. In our business, electricity powers the equipment required for cutting, shaping, and joining metals. Thus, there is a growing concern regarding electricity shedding*" [Participant F; Business owner & manager]

"*Electricity load shedding is of much concern in our t-shirt printing and graphic designing business which heavily rely on electricity to power equipment, such as printers, computers, and heat press machines*" [Participant O; Business owner]

The abovementioned quotations from the interview data show that electricity load shedding is of concern to most of the small-scale businesses at the Masala Market. The findings corroborate the results obtained from the survey. From these results, it was therefore inferred that electricity load shedding is of great concern to the small-scale enterprises at the Masala Market. The results show that majority of the small-scale enterprises depend on reliable electricity supply for operations. Previous studies have also indicated that load shedding is a concern to small-scale enterprises as electricity is an essential resource that plays a vital role in the operations of modern business enterprises (Owusu et al., 2022; Cissokho & Seck, 2013; Njiraini, 2021).

Consequently, the respondents to the survey were asked to indicate the degree of importance of electricity availability to their production cycles. The results are summarised in Table 4.8.

Table 4.8: Importance of Electricity Availability to Production Cycles of Small-Scale Enterprises (n=233)

Importance of electricity to production cycle	**Frequency (n)**	**Percentage (%)**
Not sure	37	15.9
Agree	35	15.0
Strongly agree	161	69.1
Total	**233**	**100.0**

Source: Survey findings (2023)

The survey findings displayed in Table 4.8 show that 161 out of the 233 survey participants representing 69.1% of the sample strongly agreed that electricity availability was of great importance to the production cycles of their small-scale enterprises whilst 15.9% (n = 37) moderately agreed that electricity was somehow important to the production cycles of their small scale enterprises. More so, a proportion of 15.0% (n = 35) agreed that electricity availability was

of importance to the production cycles of their small-scale enterprises. Scholars such as Doe and Asamoah (2014) reported that electricity is the backbone of businesses as it is of importance in production. Furthermore, the participants to the survey were asked to indicate the extent to which electricity load shedding affected the business operations of their small-scale businesses. The responses to these questions are presented in Table 4.9.

Table 4.9: Extent of Influence of Load Shedding on Business Operations of Small-Scale Enterprises (n=233)

In your view, do you agree that to a large extent that electricity load shedding impacts operations of the business?	**Frequency (n)**	**Percentage (%)**
Not sure	38	16.3
Agree	88	37.8
Strongly agree	107	45.9
Total	**233**	**100.0**

Source: Survey findings (2023)

The results presented in Table 4.9 show that majority of the survey respondents (45.9%) (n = 107) agreed strongly that load shedding to a very large extent impacted operations of their small-scale enterprises followed by 37.8% (n = 88) who agreed that load shedding greatly impacted the operations of their businesses. In addition, 16.3% (n = 38) of the respondents cited that load shedding to a moderate extent affected the operations of their businesses. Those who reported moderate extent could be owners or managers of the small-scale businesses that not wholly rely on electricity including retail businesses whilst those who reported to a greater extent could be owners and managers from businesses that are so dependent on electricity such as welding and fabrication as well as t-shirt printing and designing businesses that use heavy duty machines. In overall, the results have shown that electricity load shedding has had great impacts on the business operations of the small-scale enterprises at the Masala Market. A significant number of research

studies has also revealed that electricity shedding has significant impacts on business operations (Banda *et al.*, 2020; Scott *et al.*, 2014; Trung & Kajozi, 2017).

In line with the above, the survey participants were asked to indicate the direction of the impacts of the electricity load shedding on the business operations of the small businesses operating at the Masala Market. Table 4.9 presents the distribution of the responses pertaining to the effects of load shedding on the operations of the small-scale enterprises at the Masala Market.

Table 4.9: Effects of Load Shedding on Business Operations of Small-Scale Enterprises (n=233)

In what ways does electricity load shedding impacts operations of the business?	**Frequency (n)**	**Percentage (%)**
No effect	17	7.3
Negatively	178	76.4
Positively	38	16.3
Total	**233**	**100.0**

Source: Survey findings (2023)

The results presented in Table 4.9 depict that over three-quarters of the participants to the survey (76.4%) underscored that electricity load shedding in Zambia negatively affected the business operations of the small-scale enterprises at the Masala Market. However, whilst 16.3% (n = 38) of the survey participants indicated that load shedding positively affected the business operations of their small-scale businesses, the smallest proportion of 7.3% (n = 17) reported that load shedding had no effect on the business operations of their small-scale businesses.

The justification for the "no effect" responses could be that some of the small-scale enterprises do not rely on electricity for production but for other purposes such as lighting or others have effective alternative sources of energy. In overall, the results presented in Table 4.9 have shown that load shedding has negative impacts on the operations of the small-scale businesses at the Masala

Market. The following section presents the results on the particular operations impacted by the load shedding.

The participants to the survey were asked to indicate their level of agreement to the statements relating to how load shedding affected the operations of the small-scale enterprises. Table 4.10 presents the descriptive statistics and the Chi-square ($\chi 2$) statistics. The descriptive statistics in Table 4.10 show the frequency distributions of the responses.

Table 4.10: Effects of Load Shedding on Business Operations of Small-Scale Enterprises (n=233)

Effects of load shedding on business operations of small-Scale enterprises		**Strongly disagree**	**Disagree**	**Not Sure**	**Agree**	**Strongly agree**
Failure to meet production targets due to lost production time	**n**	**-**	**-**	**-**	**106**	**127**
	%	-	-	-	45.5	54.5
Disruption of production processes	**n**	**-**	**19**	**-**	**72**	**142**
	%	-	8.2	-	30.9	60.9
Affects communication systems	**n**	**-**	**69**	**-**	**70**	**94**
	%	-	29.6	-	30.0	40.3
Reductions in productivity	**n**	**-**	**56**	**-**	**73**	**104**
	%	-	24.0	-	31.3	44.6
Increase in operating and production costs	**n**	**-**	**19**	**-**	**35**	**179**
	%	-	8.2	-	15.0	76.8
Delays in the delivery of orders	**n**	**-**	**-**	**-**	**88**	**145**
	%	-	-	-	37.8	62.2
Undermines capacity to provide quality services and products to customers	**n**	**-**	**-**	**-**	**88**	**145**
	%	-	-	-	37.8	62.2
Loss of customers and income	**n**	**-**	**-**	**-**	**72**	**161**
	%	-	-	-	30.9	69.1
Loss of reputation and competitiveness	**n**	-	-	-	**87**	**146**
	%	-	-	-	37.3	62.7
Decrease in profit levels/margins	**n**	-	-	-	**54**	**179**

	%	-	-	-	**23.2**	**76.8**
Poor service delivery	**n**	-	-	-	**88**	**145**
	%	-	-	-	37.8	62.2
Temporal closure of business	**n**	**-**	**19**	**-**	**34**	**180**
	%	-	8.2	-	**14.6**	**77.3**

Source: Survey findings (2023)

The results presented in Table 4.10 show that majority of the survey respondents (54.5%) (n = 127) strongly agreed that load shedding resulted in failure by their businesses to meet production targets due to lost production time. Furthermore, another proportion of 45.5% (n = 106) show that the survey respondents also agreed that load shedding resulted in the small-scale enterprises failing to meet production targets due to lost production time. The study by Nyanzu and Adarkwah (2016) also found that electricity load shedding disrupts production processes.

More so, the proportion of 60.9% (n = 142) show that most of the survey respondents strongly agreed that load shedding disrupted the production processes of their businesses. More so, 30.9% (n = 72) of the respondents agreed that load shedding disrupted production processes of small-scale businesses. Despite that 8.2% (n = 19) of the respondents disagreed that load shedding disrupted production processes of their small-scale enterprises, the results infer that load shedding disrupted the production processes of the small-scale enterprises at the Masala Market. Scott *et al.* (2014) also reported that electricity load shedding in many developing countries is perceived by small-scale enterprises to negatively impact operations by halting production.

As also shown in Table 4.10, majority of the survey respondents that is 40.3% (n = 94) agreed strongly that load shedding affected communication systems of their small-scale enterprises. This was backed by another significant proportion of 30.0% (n = 70) agreed that that load shedding affected communication systems for their small-scale enterprises at the Masala Market. Although, 29.6% (n = 69) disagreed that load shedding affected communication systems, the overall results show that majority of the small-scale enterprises at the Masala Market had their communication systems impacted by load shedding taking place at the market. Studies such as Walsh *et al.* (2021) and Owusu et al. (2022) also reported that load shedding affects communication systems of

business entities as power outages can disrupt internet connectivity and telephone lines, making it difficult for businesses to communicate with clients and customers.

Moreover, as presented in Table 4.10, most of the survey participants that is, 44.6% (n = 104) were in strong agreement that electricity load shedding led to reductions in productivity. Furthermore, another substantial proportion of 31.3% (n = 73) agreed that productivity was one of the business operations of the small-scale enterprises at the Masala Market impacted by load shedding. In addition, 24.0% (n = 56) of the survey participants disagreed that that load shedding impacted productivity levels of their small-scale enterprises. In overall, the findings lead to the inference that load shedding significantly impacted the businesses operations of the small-scale firms by causing decline in productivity levels of the firms. The study conducted by Botha (2019) also found that unreliable electricity supply in South Africa affected firm productivity.

The findings presented in Table 4.10 further reveal that a significant proportion of the survey participants (76.8%) (n = 179) expressed strong agreement to the statement that load shedding leads to increased operating and production costs. However, 15.0% (n = 35) agreed whereas 8.2% (n = 19) of the survey respondents disagreed that load shedding resulted in increase in operating and production costs. Based on the majority responses, it can be deduced that load shedding significantly impacts operations of the small-scale enterprises at the Masala Market by increasing operating and production costs. Mchopa *et al.* (2014) also noted that power outages resulted in escalated production costs.

Furthermore, the results presented in Table 4.10 show that a substantial percentage of the survey respondents (62.2%) (n = 145) strongly agreed that load shedding resulted in delays in the delivery of orders. On the other side, 37.8% (n = 88) agreed that that delays in delivery of orders was among the business operations of the small-scale enterprises impacted by load shedding. In overall, the results showed that load shedding significantly affected the operations of the small-scale enterprises by causing delays in the delivery of orders. The study by Mohammed (2012) also found that load shedding negatively impacted SMEs by affecting service delivery.

As also publicized in Table 4.10, majority of the survey participants (62.2%; n = 145) agreed strongly that load shedding undermined capacity of their small-scale enterprises to provide quality

services and products to customers. Another significant proportion of 37.8% (n = 88) agreed that load shedding undermined the capacity of the small-scale enterprises to provide quality services and products to customers. In overall, these results show that load shedding affected the business operations of most of the small-scale enterprises at the Masala Market by undermining their capacities to provide quality services and products to customers. The effects of load shedding on product/service quality were also established in existing empirical research studies such as Abeberes (2012), Fashanu (2021) and Scott *et al.* (2014).

More so, the proportion of 69.1% (n = 161) of the survey respondents agreed strongly that load shedding resulted in loss of customers and income for the small-scale enterprises at the Masala Market in Ndola, Zambia. The remaining proportion of 30.9% (n = 72) agreed that load shedding resulted in loss customers and income. Overall, these descriptive results indicated that the load shedding which cause loss of customers and income has adversely affected most of the business operations of the small-scale enterprises at the Masala Market. Olajuyin and Mago (2022) also revealed that load shedding adversely affects performance of SMEs leading loss of customers.

Additionally, the findings presented in Table 4.10 show that majority of the participants that is, 62.7% (n = 146) strongly agreed that load shedding results in loss of reputation and competitiveness of the small-scale enterprises at the Masala Market in Ndola, Zambia. More so, 37.3% (n = 87) agreed that load shedding resulted in loss of reputation and competitiveness. In overall, majority of the results showed that majority of the survey participants showed that load shedding results in loss of reputation and competitiveness of the small-scale enterprises. The results in overall indicate that load shedding significantly affected business operations of the small-scale enterprises at the Masala Market by causing loss of reputation and competitiveness. Olajuyin and Mago (2022) also revealed that load shedding adversely affects performance of SMEs leading loss of business reputation.

Furthermore, as revealed by the results in Table 4.10, majority of the survey participants (76.8%, n = 179) were in strong agreement that load shedding leads to decrease in profit levels and margins of the small-scale enterprises at the Masala Market in Ndola, Zambia. Another proportion of 23.2% (n = 54) agreed that load shedding resulted in decreases in profit levels or margins. These results demonstrate that load shedding affected the business operations of most of the small-scale

enterprises at the Masala Market by lowering profit margins and levels. Mohammed (2012) also found that load shedding negatively impacted the SMEs by reducing operating profits.

Additionally, the findings shown in Table 4.10 indicate that most of the participants to the survey (62.2%, n = 145) were in strong agreement that load shedding results in poor service delivery by the small-scale businesses at the Masala Market. The remaining proportion of 37.8% (n = 88) agreed that load shedding resulted in poor service delivery by the small-scale enterprises at the Masala Market. The findings indicate that load shedding significantly impacts the business operations of the small-scale enterprises by causing poor service delivery. Schoeman and Saunders (2018) and Umar *et al.* (2019) also found that load shedding impacts operations of SMEs such as service delivery.

Lastly, the participants to the survey indicated that load shedding leads to temporal closure of business. The results presented in Table 4.10 show that a majority of the survey participants (77.3%, n = 180) strongly agreed that load shedding resulted in temporal closure of businesses. More so, 14.6% (n =34) agreed that load shedding resulted in temporal closure of business thereby affecting business operations of the small-scale enterprises at the Masala Market. However, 8.2% (n = 19) disagreed that load shedding results in temporal closure of business. In overall, the findings showed that load shedding significantly impacts the business operations of the small-scale enterprises by causing temporal business closure. The study by Fiawoo (2016) also observed that load shedding results in temporal closure of small-scale businesses.

In line with the aforementioned results and the need to test the hypothesis stated in Chapter 1, the researcher proceeded in carrying out Pearson Correlation test. This test was purposively carried out to determine the magnitude and strength of the relationship between load shedding and business operations of the small-scale enterprises at the Masala Market. The results are shown Table 4.11.

Table 4.11: Correlation Statistics for Load Shedding and Business Operations of Small-Scale Enterprises at Masala Market, Ndola, Zambia

Business operations of small-scale enterprises	**Load shedding**	
	Pearson Correlation (r)	**Sig. (2-tailed)**

Failure to meet production targets due to lost production time	**0.200****	**0.002**
Disruption of production processes	**0.327****	**0.000**
Affects communication systems	**0.183****	**0.005**
Reductions in productivity	**0.446****	**0.000**
Increase in operating and production costs	**0.303****	**0.000**
Delays in the delivery of orders	**0.744****	**0.022**
Undermines capacity to provide quality services and products to customers	**0.325****	**0.000**
Loss of customers and income	**0.863****	**0.011**
Loss of reputation and competitiveness	**0.424****	**0.000**
Decrease in profit levels/margins	**0.902****	**0.008**
Poor service delivery	**0.744****	**0.022**
Temporal closure of business	**0.332****	**0.000**

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey findings (2023)

The results in Table 4.11 show the Pearson correlation statistic of 0.200 which is statistically significant at 5% level ($p = 0.002<0.05$) show that load shedding significantly leads to failure to meet production targets due to lost production time leading to the small-scale enterprises failing to meet production targets. These results imply that load shedding has significant negative impacts on the business operations of the small-scale enterprises at the Masala Market. Scott *et al.* (2014) also found that electricity lead shedding negatively affects operations of SMEs through lost production time.

More so, the Pearson correlation statistic of 0.327 is statistically significant at 5% level ($p = 0.000<0.05$) show that load shedding significantly disrupted the production processes of the small-scale enterprises. These results infer that load shedding negatively impacts the business operations of the small-scale enterprises at the Masala Market by causing disruptions of production processes. The findings are in line with Ef li (2021) who concluded that load shedding negatively impacted operations of small and medium-sized firms by causing disruptions in production operations.

As also shown in Table 4.11, the Pearson correlation test showed a statistic of 0.183 which is statistically significant at 5% level ($p = 0.005<0.05$). These results point out that load shedding

significantly affected the communication systems of the small-scale enterprises at the Masala Market in Zambia. In other words, load shedding negatively affects the business operations of the small-scale enterprises at the Masala Market. Owusu et al. (2022) also found that load shedding negatively affects operations of SMEs by disrupting communication systems of the businesses.

Moreover, the findings of the Pearson correlation test ($r = 0.446$; $p = 0.000<0.05$) indicate that load shedding significantly impacts the business operations of the small-scale enterprises by leading to reductions in productivity. All the results lead to the inference that load shedding negatively impact the business operations of the small-scale firms at the Masala Market in Zambia by causing decline in productivity of employees. Similarly, several studies also found that load shedding negatively impacts operations of small-scale enterprises by reducing productivity (Ahadu, 2019; Cissokho, 2019; Moyo, 2012; Fiawoo, 2016; Mchopa et al., 20145; Scott *et al.*, 2014; Trung & Kajozi, 2017; Lombe & Tembo, 2023).

The findings presented in Table 4.11 further reveal that the Pearson Correlation test yielded statistically significant results ($r = 0.303$; $p = 0.000<0.05$), indicating that load shedding significantly resulted in increased operating and production costs of the small-scale enterprises at the Masala Market. From the results, it was deduced that load shedding has significant negative effects on the business operations of the small-scale enterprises at the Masala Market by increasing operating and production costs. The findings are consistent with the findings of other related previous studies (Ajibola *et al.*, 2018; Doe & Asamoah, 2014; Forkuoh & Li, 2015; Rahman et al., 2018).

Furthermore, the results presented in Table 4.11 show that a show that load shedding significantly impacts the business operations of the small-scale enterprises by causing delays in the delivery of orders ($r = 0.744$; $p = 0.022$). These results show that load shedding at the Masala Market negatively affects the business operations of the small-scale enterprises by causing delays in delivery of orders. The operational effect of delayed delivery of orders was also revealed in previous studies such as Aberes (2012) and Doe and Asamoah (2014).

More so, the Pearson correlation test estimated a statistic of 0.325 which is statistically significant at 5% level ($p = 0.000<0.05$). These results show that load shedding significantly undermines the capacity to provide quality services to the market by the small-scale enterprises at the Masala

Market in Zambia. Thus, the results infer that load shedding has significant negative impacts on the business operations of the small-scale enterprises by undermining capacity to provide quality services and products to customers. Previous studies (such as Ajibola *et al.,* 2018; Doe & Asamoah, 2014; Mohammed, 2012; Olajuyin & Mago, 2022) also revealed that load shedding negatively impacts business operations of small-scale enterprises as it undermines the capacity to offer quality products or services.

Furthermore, the Pearson correlation results presented in Table 4.11 show that the load shedding significantly resulted in loss of customers and income for the small-scale enterprises ($r = 0.863$; $p = 0.011<0.05$). These results mean that load shedding has significant negative impacts on the business operations of the small-scale enterprises by causing loss of customers and income. Comparably, studies such as Doe and Asamoah (2014) and Schoeman and Saunders (2018) reported that load shedding adversely impacts business operations of SMEs through loss of customers.

The findings presented in Table 4.11 show that the Pearson correlation test yielded a statistically significant statistic ($r = 0.424$; $p = 0.000<0.05$), indicating that load shedding significantly impacts the business operations of the small-scale enterprises at the Masala Market by causing loss of reputation and competitiveness. In short, the results imply that load shedding has significant negative impacts on the business operations of the small-scale enterprises at the Masala Market. Previous studies such as Doe and Asamoah (2014) found that electricity load shedding in Ghana resulted in loss of reputation and competitiveness.

More so, the Pearson correlation test estimated a statistic of 0.902 which is statistically significant at 5% level ($p = 0.008<0.05$) showing that load shedding significantly reduced profit margins and levels of the small-scale enterprises at the Masala Market in Zambia. The results infer that load shedding negatively affected the operations of the small-scale enterprises at the Masala Market. Numerous prior studies that have examined the influence of electrical load shedding on business operations have found detrimental effects on business operations in terms of profitability (Banda *et al.*, 2020; Scott *et al.*, 2014; Trung & Kajozi, 2017).

In addition, the findings of the Pearson correlation test ($r = 0.744$; $p = 0.022<0.05$) indicate that load shedding significantly impacts the operations of the small-scale enterprises by causing poor

service delivery. In overall, results indicate that load shedding has significant negative impacts on the business operations of the small-scale firms at the Masala Market by causing poor service delivery. Mohammed (2012) also found that load shedding negatively affected the SMEs' operations by impacting service delivery.

In addition, the Pearson correlation results ($r = 0.332$; $p = 0.000<0.05$) show that load shedding significantly impacts the operations of the small-scale enterprises by causing temporal business closure. These results mean that load shedding has significant negative impacts on the business operations of the small-scale firms at the Masala Market by prompting temporal closure of businesses. Doe and Asamoah (2014) also found that electricity outages/irregular electricity supply significantly affected SMEs' operations by prompting closure of many small businesses.

In overall, all the results presented in Table 4.10 have shown that load shedding cause significant impacts on the business operations of the small-scale enterprises at the Masala Market. More explicitly, the descriptive results have shown that, load shedding in Zambia adversely impacts the business operations of the small-scale enterprises at the Masala Market by: (i) causing failure to meet production targets due to lost production time, (ii) disrupting production processes, (iii) affecting communication systems, (iv) causing reductions in productivity (v) increasing operating and production costs, (vi) causing delays in the delivery of orders, (vii) undermining capacity of the small-scale enterprises to provide quality services and products to customers, (viii) causing loss of customers and income, (ix) causing loss of reputation and competitiveness, (x) decreasing profit levels/margins, (xi) causing poor service delivery and (xii) causing temporal closure of business.

From the results, load shedding significantly impacts the various business operations of the small-scale enterprises ranging from production to service delivery. In addition, the Chi-square and correlation results have shown that load shedding has significant impacts on the business operations of small-scale enterprises at Ndola's Masala Market. More precisely, the correlation results showed that load shedding has significant negative impacts on the operations of small-scale enterprises at Ndola's Masala Market.

The presented and analysed quantitative survey results were substantiated by the findings from the in-depth interviews where the participants agreed that load shedding pose adverse effects on the

operations of the small-scale enterprises at the Masala Market in Zambia. One of the participants, an owner and manager of the sausage making small business operating at the Masala Market remarked:

> "*The episodes of load-shedding are having detrimental impacts on our local businesses which rely on electricity as without electricity we cannot do any sausage processing. One of the major consequences of load shedding on sausage processing business is the disruption of production schedules, as sausage processing requires a constant and uninterrupted supply of electricity to power machinery and refrigeration units. When load shedding occurs, these machines cannot operate efficiently or at all, leading to delays in production and potentially spoiling raw materials. Closure of business has become necessary due to our reliance on power for operational purposes. As you can see, there is no business since morning as we do not have electricity and this is costly to some of us who pay rentals and municipal rates and fees. We implore the Zambian government to expeditiously devise effective measures to mitigate the issue of load-shedding*" [Participant E; Business owner & manager]

Another participant, owner and manager of a small business into welding and fabrication complained that loads shedding negatively impacted productivity and profits of the small-scale enterprises reliant on reliable electricity supply:

> "*For our business, load shedding is an epidemic. It interferes with my business, which rely on reliable electricity supply. As small businesses with no capacity to generate own electricity, we are having a difficult time right now. Our businesses are being killed out quietly by load shedding. Businesses in this Masala Market are going out of business one by one. Although we are still there and working, the load shedding has had a significant negative impact on our productivity due to lost production time and profits due to escalation of costs"* [Participant D; Business owner & manager]

A business owner of a document printing and typing and t-shirt printing business also provided similar views. This participant stated:

> "*I rely on electricity to run my document photocopying, printing, scanning, and t-shirt printing business. I was obliged to start utilising a solar powered system when the most*

current wave of load shedding began, but it is not enough, as I cannot power all my machines using solar power. Most importantly, Heat Press Machines cannot be powered by solar but by only grid electricity. Because of daily load shedding, I lose many clients and income by temporarily stopping production till electricity is restored" [Participant O; Business owner]

Another participant to the interviews, a manager to the car spray painting and diagnostics business said:

"*I have lost so many customers because of the load shedding and I don't have a generator. When we have no electricity, customers leave with their money after we urge them to go, as we could not assist them. Currently, I am sitting here doing nothing-productive waiting for electricity to come back. This makes us fail to meet the expectations of the customers will be impatiently waiting for their cars"* [Participant I; Business manager]

Participant J, owner to a consultancy firm argued that load shedding significantly impacts their business, which rely on stable internet access and electricity by affecting communication as well as service delivery to clients:

"*You'll discover that if load shedding occurs, I have to wait until after four to eight hours to resume my business. As a result, I miss numerous contracts that may have generated income for my consultancy startup. Although we have a backup system, load shedding affects the internet connectivity in case the internet service providers also face the same problem of load shedding. As a result, internet will be poor such that we face challenges in communicating with our clients via digital means such as ZOOM. This also compromises our service delivery as well as income"* [Participant J; Business owner]

In addition, the excerpts are some of the statements of the other interview participants regarding the effects of loading shedding on the operations of their businesses:

"*There is no doubt that power outages impact our business of tailoring and dressmaking. The dressmaking and tailoring businesses are significantly affected by the wide-ranging repercussions of load shedding. The dressmaking and tailoring sectors are highly dependent on the utilization of power in order to ensure optimal operational efficiency. A*

continuous power source is essential for all aspects of the business, ranging from sewing machines to pressing irons. Nevertheless, the occurrence of load shedding poses significant obstacles to tailors, so impeding operations, profitability, reputation and productivity and us dressmakers. To begin with, the occurrence of load shedding results in substantial disruptions that impede timely completion of orders. This phenomenon has not only impacted our reputation but also leads to client dissatisfaction, perhaps resulting in loss of both existing and potential customers" [Participant G; Business owner]

"*While its impact is felt across various sectors, one business that suffers significantly from the load shedding this internet cafe business of ours. When load shedding occurs, the business is severely affected as load shedding disrupts the smooth operation of the internet café by resulting in sudden disconnections from the internet and loss of unsaved data for customers. Such interruptions not only frustrate customers but also lead to a decline in customer satisfaction and loyalty thereby affecting our service delivery, reputation and loss of customers. More so, it affects profitability of the internet cafe as it reduces operating hours as we are sometimes forced to close earlier than usual there by directly impacting revenue generation. The power outages have had a substantial impact on our daily revenue. In absence of load shedding, we can cater to approximately 15-20 clients on a daily basis, generating a daily income ranging from 1,000 kwacha to 1,500 kwacha. Currently, due to load shedding our daily earnings range from approximately 600 kwacha to 800 kwacha"* [Participant K; Business manager]

"*The load shedding disrupts our daily operations as saloons and barber shops. We heavily rely on electrical appliances such as hairdryers, clippers, and curling irons. Thus, without electricity, we are sometimes unable to provide our services efficiently or at all. This leads to dissatisfied customers and potential loss of clientele as well as loss of reputation and income"* [Participant M; Business owner & manager]

"Load shedding disrupts normal business operations by causing power outages during crucial and peak hours for our business. We heavily rely on electricity to run our machinery, computers, and other essential equipment. When power is abruptly cut off, production comes to a halt, leading to delays in fulfilling orders and meeting customer

demands. This also result in dissatisfied customers who may turn to competitors for their needs and we have been slowly losing market share" [Participant N; Business manager]

In summation, the results from the survey questionnaire and in-depth interviews have shown that load shedding significantly impacts the operations of the small-scale enterprises at the Masala Market. Precisely, the quantitative and qualitative findings have shown that the frequent prolonged load shedding negatively affects the business operations of the small-scale enterprises at the Masala Market in Zambia. Both the qualitative and quantitative results have shown that load shedding adversely impacts the small-scale enterprises by making the small businesses fail to meet targets, disrupting production processes, affecting communication systems with customers, causing significant reductions in productivity, increasing costs, causing delays in delivery of orders and services, undermining capacity of small-scale enterprises to provide quality services and products to customers, causing loss of customers and income, causing loss of reputation and competitiveness, decreasing profit levels/margins, causing poor service delivery and causing temporal closure of business.

Findings from the study revealed that small-scale enterprises at Masala Market suffer so much from load shedding of electricity power supply either announced or unannounced, and these have adverse effect on the profitability of most of the small-scale enterprises surveyed. The results of this present research are also in line with the findings by Doe and Asamoah (2014) who established various coping strategies of SMEs to load shedding in Ghana including delayed or cancelled orders, increased production costs, loss of reputation and competitiveness, lost sales and customers and reduced product/service quality. More so, the negative correlation between load shedding and business operations confirms the findings by Fashanu (2021) and Fiawoo (2016) who found significant negative effects of load shedding on firm operations. The study by Phiri (2017) also showed that load shedding had has negative impacts on productivity and profitability of small business enterprises. Likewise, the findings that load shedding impacts quality service delivery also support the findings by Frederick and Selase (2014) that load shedding impacts service or product quality delivery.

The study by Mohammed (2012) also found that load shedding negatively impacted SMEs by reducing operating profits, affecting service delivery, reducing competitiveness and sales turnover. The results also corroborate the findings by Duru and Yusuf (2017), Doe and Asamoah (2014) and

Olatunji and Umukoro (2018) which specified that electricity outages significantly affected operational efficiencies of small-scale enterprises by causing closure of many businesses. In a nutshell, the findings of this present have supported existing literature that load shedding has significant negative effects on the business operations of the small-scale enterprises.

4.6 Coping Strategies and Their Effectiveness on Businesses Operations of Small-Scale Enterprises at Masala Market to Load Shedding

Following establishment of the effects of load shedding on the operations of the small-scale enterprises at the Masala Market, this research aimed to establish the coping strategies of small-scale enterprises and their effectiveness on the business operations of the small-scale enterprises. In doing so, the research aimed to answer the question: "What coping strategies are being implemented by small-scale enterprises at Masala Market in Ndola, Zambia and how effective are they on business operations of small-scale enterprises at Masala Market in Ndola, Zambia?" The researcher therefore collected data using questionnaires, interviews and observations in order to achieve the state objective and answer the corresponding research question. This section therefore presents analyses and discusses the findings pertaining the research objective on the coping strategies of the small-scale enterprise. The participants to the survey were therefore asked if their businesses had a backup in the case of load shedding. The results are presented in Table 4.12.

Table 4.12: Availability of a Back-up for Load Shedding Among Small-Scale Enterprises (n=233)

Does your business have a backup in the case of load shedding?	**Frequency**	**Percent**
Yes	173	74.2
No	60	25.8
Total	233	100.0

Source: Survey findings (2023)

The survey results displayed in Table 4.12 show that majority of the participants that is 74.2% (n = 173) indicated that their small-scale enterprises had backup for load shedding whilst the

remaining 25.8% (n = 60) reported that they had no back up for load shedding. The results imply that most of the small-scale enterprises at the Masala Market have recognised the importance of electricity to their businesses and the implications of load shedding such that they have invested in backup systems for load shedding. These results indicate that the owners and managers of the small-scale enterprises at the Masala have some coping strategies in place. Thus, the findings of the study corroborate the findings of several prior empirical studies. For instance, the study by Fisher-Vanden *et al.* (2012) discovered that load shedding in China had forced small-scale enterprises to devise some coping strategies to ensure minimum disruptions to business operations. In the same view, Yakaka, Murtala and Babagana (2017) assert that the unreliable electricity supply in Nigeria has prompted numerous entrepreneurs to transition to coping strategies.

The survey participants were therefore asked to indicate their level of agreement to the ten coping strategies obtained from the literature review and researcher's observations. Table 4.13 shows the results pertaining the copying strategies of the small-scale enterprises at the Masala Market, Ndola, Zambia.

Table 4.13: Coping Strategies of Small-Scale Enterprises to Load Shedding (n=233)

Coping strategies of small-scale enterprises	**SD**	**D**	**NS**	**A**	**SA**
Use of standby generators	35 (15.0%)	76 (32.6%)	0 (0.0%)	72 (30.9%)	50 (21.5%)
Use of solar panels and inverters	0 (0.0%)	38 (16.3%)	0 (0.0%)	73 (31.3%)	122 (52.4%)
Use of LPG gas powered machines and equipment	51 (21.9%)	132 (56.7%)	0 (0.0%)	50 (21.5%)	0 (0.0%)
Changing of working hours in relation to load shedding	0 (0.0%)	0 (0.0%)	0 (0.0%)	54 (23.2%)	179 (76.8%)

Coping strategies of small-scale enterprises	SD	D	NS	A	SA
Rechargeable lamps and solar lights	0 (0.0%)	0 (0.0%)	0 (0.0%)	182 (78.1%)	51 (21.9%)
Working from home	48 (20.6%)	39 (16.7%)	0 (0.0%)	51 (21.9%)	95 (40.8%)
Resorting to activities or operations that do not require electricity	0 (0.0%)	0 (0.0%)	0 (0.0%)	160 (68.7%)	73 (31.3%)
Using uninterruptable power supply (UPS)	123 (52.8%)	75 (32.2%)	0 (0.0%)	0 (0.0%)	35 (15.0%)
Temporal relocation to unaffected areas	0 (0.0%)	15 (6.4%)	0 (0.0%)	108 (46.4%)	110 (47.2%)
Employing part time employees	0 (0.0%)	0 (0.0%)	0 (0.0%)	142 (60.9%)	91 (39.1%)

NB: SD, D, NS, A and SA means strongly disagree, disagree, not sure, agree and strongly agree rerspectively

Source: Survey Findings (2023)

The findings in Table 4.13 show that 32.6% (n = 76) of the participants disagreed their small-scale enterprises had standby generators whilst 30.9% (n = 72) agreed that they had standby generators. Whilst 21.5% (n = 50) strongly agreed, 15.0% strongly disagreed that they used standby generators during times of load shedding. In overall, the results show that there were mixed findings regarding use of standby fuel powered generators by the small-scale enterprises at the Masala Market. These findings indicate that whilst a significant proportion of the small-scale enterprises has standby generators others also do not have standby generators to use in times of load shedding. This could be because of the costs associated with use of generators including fuel costs and maintenance costs. In overall, the results show that use of standby generators is a coping strategy to some of the small-scale enterprises at the Masala Market. The study by Scott *et al.* (2014) also found that the

main coping practice adopted by most SMEs to mitigate the impacts of electricity load shedding is the use of standby generators, followed by changes in business operations and reducing business hours. Cole *et al.* (2018) also noted use of standby generators to mitigate the effects of load shedding.

Furthermore, as shown in Table 4.13, majority of the survey participants (52.4%; n = 122) strongly agreed that their respective small-scale enterprises made use of solar panels and inverters to cope with load shedding. More so, 31.3% (n = 73) agreed that their small-scale enterprises employed solar panels and inverters as coping strategies to load shedding. However, 16.3% (n = 38) disagreed that they used solar panels and inverters to cope with load shedding. The justification for this could be that for those businesses that use heavy-duty machines such as t-shirt printing may not use solar panels to power the machines. MMajority of the prior studies have shown that the widely employed coping strategies by SMEs to cope with load shedding include use of solar panels (Banderker, 2022; Doe & Asamoah, 2014; Fiawoo, 2016; Fisher-Vanden *et al.*, 2012; Kintu, 2022; Lombe & Tembo, 2023; Phiri, 2018; Scott *et al.*, 2014; Zachariadis & Poullikkas, 2012).

The results shown in Table 4.13 further indicate that majority of the participants (56, 7%; n = 132) disagreed that their small-scale enterprises used LPG gas powered machines and equipment. The minority (21.5%; n = 50) agreed that they used LPG gas powered machines and equipment to cope with load shedding. These findings imply that use of LPG gas powered machines and equipment is a coping strategy to few small-scale enterprises at the Masala Market. This could be due the costs and health risks associated with use LPG as well as applicability of the LPG gas powered machines and equipment to the businesses. Braimah and Amponsah (2012) also found that small firms also use alternative energy such as Liquefied Petroleum Gas (LPG).

Moreover, the results presented in Table 4.13 show that majority of the survey participants (76.8%; n = 179) agreed strongly that their small-scale enterprises were coping with the load-shedding situation by changing working hours in relation to the load shedding whilst 23.2% (n = 54) agreed. These findings showed that "changing of working hours in relation to load shedding" was among the mostly employed coping strategy by majority of the small-scale enterprises at the Masala Market. According to Tavishe (2015), many small businesses in Tanzania utilise the coping mechanism of switching from day to night shifts.

The survey findings in Table 4.13 that is 78.1% (n = 182) show that majority of the participants agreed that their small-scale enterprises made use of rechargeable lamps and solar lights as a coping strategy to load shedding. More so, 21.9% (n = 51) of the survey respondents strongly agreed that use of rechargeable lamps and solar lights was among the coping strategies of the small-scale enterprises. In overall, the results show that use of rechargeable lamps and solar lights is a coping strategy to most small-scale enterprises at the Masala Market, as they will need lighting in their premises. The study by Doe and Asamoah (2014) found that most SMEs in Ghana used rechargeable lamps and solar panels as coping strategies to loads shedding.

Additionally, the proportion of 40.8% (n = 95) of the survey participants agreed strongly that their respective small-scale enterprises practiced working from home as a coping strategy to load shedding, whilst 21.9% (n = 51) agreed. However, 20.6% (n = 48) strongly disagreed whilst 16.7% (n = 39) disagreed that their small-scale enterprises practiced working from home to cope with load shedding. The results imply that whilst some small-scale enterprises embrace working from home whilst others do not. The justification for this could be that for some businesses working from home may not be applicable. Prior studies have shown that SMEs practice working from home (Banderker, 2022; Doe & Asamoah, 2014; Fiawoo, 2016; Fisher-Vanden *et al.,* 2012; Kintu, 2022; Lombe & Tembo, 2023; Phiri, 2018; Scott *et al.*, 2014; Zachariadis & Poullikkas, 2012).

From Table 4.13, majority of the survey participants (68.7%; n = 160) agreed that their respective small-scale businesses resorted to activities and operations that do not require electricity availability. The remaining proportion of 31.3% (n = 73) strongly agreed. From these findings, it has been deduced most small-scale enterprises at the Masala Market resort to activities and operations that do not require electricity availability in the case of load shedding. Dunya *et al.* (2019) who investigated the impact of electricity load management on the functioning of small-scale firms in Ghana also found that the firms resorted to operations that do not rely much on electricity in case of load shedding.

Additionally, the results presented in Table 4.13 indicate that majority of the survey participants (52.8%; n = 123) strongly disagreed that their respective small-scale enterprises made use of UPS as a coping strategy to load shedding. This was backed by 32.2% (n = 75) of the participants who disagreed, However, only 15.0% (n = 35) of the survey participants agreed strongly that they use UPS to cope with load shedding. These findings clearly show that most of the small-scale

enterprises at the Masala Market did not use UPS to mitigate the effects of load shedding. The possible explanation to this is that UPS does not last long and is only applicable to small voltage appliances. However, according to Tembe and Hlengwa (2022), one of the most effective coping methods for small businesses is the utilization of UPS to provide backup power during load shedding.

The results presented in Table 4.13 demonstrate that majority of the survey participants (47.2%; n = 110) agreed that their small-scale businesses temporarily relocate to areas not affected by load shedding as their coping strategies. Another significant proportion of 46.4% (n =108) agreed that their small-scale enterprises practice temporal relocation to load shedding unaffected areas whilst 6.4% (n = 15) indicated that their small-scale enterprises did not practice temporal, relocation. From the findings, it can be deduced that most of the small-scale enterprises at the Masala Market in Zambia practice temporal relocation to unaffected areas in case of load shedding at the market. However, this coping strategy is not applicable to all businesses, as some businesses may not permit temporal relocation as indicated by the 6.4% (n = 15) of the survey respondents. Mohammed (2012) and Bailey (2022) found that coping strategies of SMEs include relocation to unaffected areas.

More so, the survey findings portrayed in Table 4.13 show that majority of the participants (60.9%; n = 142) agreed that their small-scale enterprises employ part time employees as a coping strategy to the load shedding situation. In addition, 39.1% (n = 91) of the survey respondents strongly agreed that their small-scale enterprises employed the coping strategy of employing part time employees. The findings clearly demonstrate that most of the small-scale enterprises at the Masala Market have employed part time employees as a coping strategy to load shedding. The rationale behind this strategy is that, employing part time employees will reduce the costs for the business, as full time will be paid much for less work done, due to lost production time during load shedding. The study by Kavishe (2015) also reported that the coping strategies of small-scale firms to power interruptions in Tanzania included use of part-time and untrained employees.

In overall, the survey results presented in Table 4.12 and Table 4.13 have shown that the small-scale enterprises have coping strategies to load shedding. The survey results have shown that the mostly employed coping strategy by the small-scale enterprises at the Masala Market is change of working hours in relation to load shedding followed by employment of part time employees,

temporal relocation to unaffected areas, use of rechargeable lamps and solar lights, use of solar panels and inverters, working from home, use of standby generators, use of LPG gas powered machines and equipment and use of UPS.

These survey results were authenticated by the findings from the interviews and observations. For instance, during the process of administering the questionnaires and conducting interviews, the researcher noted that some of the small-scale enterprises had standby generators, solar systems and UPS systems. Supporting evidence was also obtained from the interviews. One of the participants to the interviews stated:

> "*As small businesses, we are adversely impacted by load shedding. As a response, we have and continue to invest in alternative sources of energy such as generators and solar panels. These solutions have been helping us to sustain operations as they offer backup power supply during load shedding periods, enabling the business to continue their operations without interruptions. While these investments may initially be costly, they prove beneficial in the end by reducing downtime and minimizing financial losses. However, generators are not sustainable by solar is"* [Participant B; Business owner]

Another interview participant also had similar perceptions to those made by Participant B. The interview respondent said:

> "*The load shedding and the need to survive, we have adjusted our working hours to align with the load shedding schedule. By carefully planning our activities around the anticipated power outages, we are managing to optimize productivity during periods of electricity outages. However, this strategy requires effective communication with customers and employees"* [Participant F; Business owner & manager]

Participant I, a business manager to a small-scale enterprise at the Masala Market, also mentioned the coping strategies of working from home as well as undertaking activities that do not demand electricity:

> *"Load shedding has forced individuals and businesses here at the Masala Main Market to adapt by working from home and engaging in activities that do not rely on electricity were possible. In my case, we can engage in other activities such as tyre fitting, car body*

polishing and car body scrubbing among other operations that do not require energy source. More so, we have replaced our electric compressors with petrol powered compressors" [Participant I; Business manager]

Participant L also remarked:

"*The impacts of load shedding have forced us to invest in alternative sources of energy such as solar panels or generators to ensure uninterrupted power supply during load shedding periods. Apart from these were have adopted flexible working hours and employed part time employees and these have been helping us to manage load shedding effectively. By adjusting operating hours to coincide with periods of stable power supply, were have been able to maintain productivity levels"* [Participant L; Business owner & manager]

Several coping strategies include remote working were noted by one of the owners and managers of the small-scale enterprises at the Masala Market. The participant narrated:

"*We come up with several strategies. More recently, wworking from home has emerged as a viable solution for tailors and us dressmakers during load shedding periods. Following load shedding, I have managed to secure another sewing machine that I use at home. Another coping strategy linked to working from home is temporal relocation to unaffected areas. Furthermore, we have started utilizing solar energy as an alternative power source during load shedding periods. As you can see, we have managed to install solar panels are at our workshop to generate electricity for running sewing machines and other necessary equipment. In addition to all these, we also resort to activities and tasks that do not need electricity like pattern making, cutting fabrics, hand stitching, and designing garments that do not necessitate electrically powered machinery. We have also turned to night shifts as one of our coping strategies*" [Participant H; Business owner & manager]

In relation to the aforementioned findings, the research participants were asked to indicate their perceptions regarding effectiveness of the coping strategies of the small-scale enterprises at the Masala Market in Zambia. The findings are presented in Table 4.14.

Table 4.14: Effectiveness of the Coping Strategies of the Small-Scale Enterprises (n=233)

In your observations, do you agree that the coping mechanisms are effective?	**Frequency**	**Percent**
Strongly disagree	0	0.0
Disagree	125	53.6
Not sure	38	16.3
Agree	0	0.0
Strongly agree	70	30.0
Total	233	100.0

Source: Survey findings (2023)

Table 4.14 show that the largest proportion of the participants (53.6%; n = 125) disagreed that the coping strategies of their small-scale enterprises were effective whilst 30.0% (n = 70) of the participants strongly agreed that the coping strategies were very effective. The other proportion of 16.3% (n = 38) were not sure if the coping strategies of their small-scale enterprises were effective. In conclusion, the results in Table 4.14 have shown that although the small-scale enterprises at the Masala Market have employed several coping strategies, some of the coping strategies were not so effective to ensure uninterrupted business operations during periods of load shedding.

The study further carried out bivariate correlation analyses to determine the effectiveness of each of the coping strategies on the business operations of the small and medium scale enterprises. The results are presented in Table 4.15.

Table 4.15: Correlation Statistics for Effectiveness of Coping Strategies of Small-Scale Enterprises (n =233)

Effectiveness of Coping Strategies of Small-Scale Enterprises	**Business Operations of Small-Scale Enterprises**	
	Pearson Correlation (r)	**Sig. (2-tailed)**
Use of standby generators	**0.316****	**0.000**
Use of solar panels and inverters	**0.834****	**0.014**
Use of LPG gas powered machines and equipment	**-0.121**	**0.066**
Changing of working hours in relation to load shedding	**0.198****	**0.002**
Rechargeable lamps and solar lights	**-0.114**	**0.084**
Working from home	**-0.210****	**0.001**
Resorting to activities or operations that do not require electricity	**0.127**	**0.054**
Using uninterruptable power supply (UPS)	**0.027**	**0.683**
Temporal relocation to unaffected areas	**0.263****	**0.001**
Employing part time employees	**-0.440****	**0.000**

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey findings (2023)

The correlation results shown in Table 4.15 show a weak positive correlation ($r = 0.316$; $p = 0.000 < 0.05$) implying ineffectiveness of the strategy of use of standby generators on the business operations of the small-scale enterprises at the Masala Market. The study also revealed a strong positive correlation for use of solar panels and inverters ($r = 0.834$; $p = 0.0014 < 0.05$) implying the coping strategy as highly effective. More so, several coping strategies were found to have statistical insignificance at 5% level namely use of LPG gas powered machines and equipment ($r = -0.121$; $p = 0.066 > 0.05$), rechargeable lamps and solar lights ($r = -0.114$; $p = 0.084 > 0.05$), resorting to activities or operations that do not require electricity ($r = 0.127$; $p = 0.054 > 0.05$) and use of UPS ($r = 0.027$; $p = 0.683 > 0.05$).

These findings imply ineffectiveness of the coping strategies in ensuring smooth flow of the business operations of the small-scale enterprises in times of load shedding. However, some coping strategies such as changing of working hours in relation to load shedding ($r = 0.198$; $p = 0.002 < 0.05$), working from home ($r = -0.210$; $p = 0.001 < 0.05$), temporal relocation to unaffected areas ($r = 0.263$; $p = 0.001 < 0.05$) and employment of part time employees ($r = -0.440$; $p = 0.000 < 0.05$) were found have weak but statistically significant correlations with business operations of small-scale enterprises at Masala Market. These results showed less effectiveness of the coping strategies. Similarly, studies such as Lombe and Tembo (2023) found that majority of the coping techniques for SMEs in Zambia were less effective. The study by Dunya *et al.* (2019) also found the coping measures of SMEs in Ghana were less effective in addressing the challenges posed by load shedding to the operations of the SMEs.

In overall, the descriptive and correlation results have indicated that majority of the coping strategies were not effective except for a few such as use of solar panels and inverters. The participants to the in-depth interviews also mentioned the ineffectiveness of some of the coping strategies. The following are some of the substantiating responses of the participants to the interviews:

> "*While we have implemented various coping strategies to mitigate the impacts of load shedding, some these measures have proven to be largely ineffective in terms of boosting productivity. One of the ineffective coping strategies is the use of backup generators. These generators are expensive to maintain and use due to high fuel costs making the business incur higher costs. This has caused the business to only use generators for a limited period thereby affecting productivity. More so, the generators often fail to provide sufficient power capacity needed for business operations during prolonged load shedding periods"* [Participant A; Business owner]

> "*Not all strategies are effective, for instance, one of the ineffective coping strategies is the use of UPS. I have come to observe that UPS systems are largely ineffective in mitigating the impact of power outages as they provide only temporary relief during load shedding. While they can offer short-term backup power for critical equipment, their limited battery capacity means that they cannot sustain operations for extended periods. This leaves the*

business vulnerable to prolonged downtime and potential financial losses" [Participant C; Business owner & manager]

"Well, whilst some strategies are effective and sustainable, most of the strategies that have been employed by the entity looks to be ineffective. For instance, night shifts may seem like a viable solution as they allow the business to continue operating during load shedding. However, this strategy poses several challenges as night shifts disrupt employees' natural sleep patterns, leading to fatigue and decreased productivity" [Participant I; Business manager]

"*Yeah, they are not all them [coping strategies] that are effective as some are not so effective. For instance, whilst solar panels are often seen as a sustainable and environmentally friendly alternative electricity sources, solar panels in most instances are not be able to meet the energy demands of the business. The main issue lies in the limited capacity of solar panels to generate electricity consistently. Solar panels are dependent on weather conditions and daylight hours, making it unreliable during cloudy days or at night"* [Participant L; Business owner & manager]

The survey findings and interview findings have all shown that the coping strategies currently employed by the small-scale enterprises are not effective. The results have shown that most of the current coping strategies of the small-scale enterprises were not yet effective to address the challenge of load shedding. Similarly, Lombe and Tembo (2023) found that majority of the coping techniques for SMEs in Zambia were less effective. The study by Dunya *et al.* (2019) also found the coping measures of SMEs in Ghana were less effective in addressing the challenges posed by load shedding to the operations of the SMEs. In other words, the results show the great importance of electricity to the business operations of the small-scale enterprises. These findings further point out to the need to find out the best ways possible for the small-scale enterprises to cope with the effects of electricity load shedding.

4.7 Load-shedding Coping Framework for Improved Business Operations of Small-Scale Enterprises at Masala Market

Lastly, the study aimed to propose a framework for small-scale enterprises to cope with electricity load shedding. Based on the findings of the study, coping theories and conceptual framework, the

researcher proposed a framework for small-scale enterprises to cope with electricity load shedding. The proposed framework is presented in Figure 4.1.

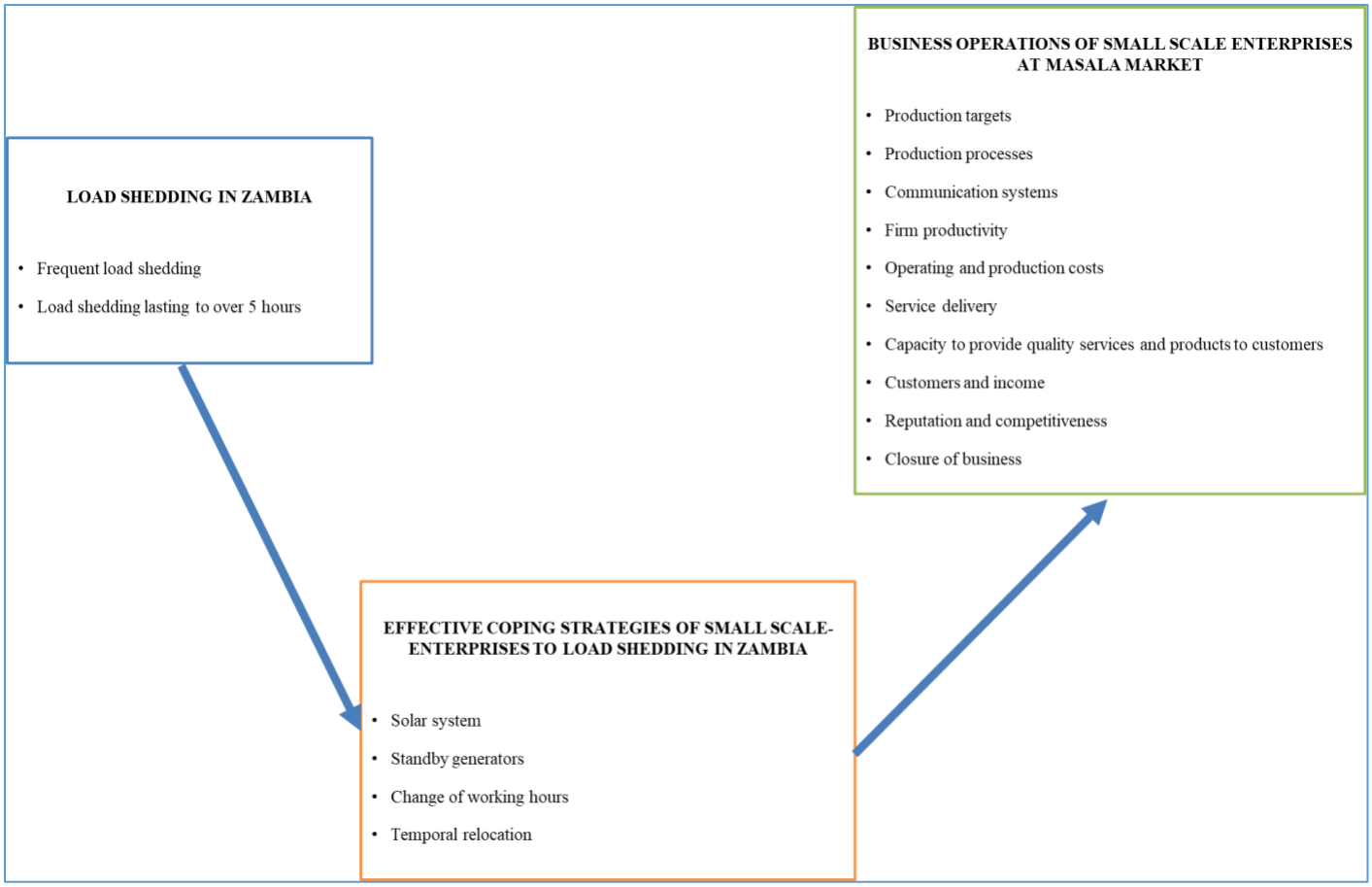

Figure 4.1: Load-shedding coping framework for improved business operations of small-Scale Enterprises

Source: Researcher (2023)

The proposed framework presented in Figure 4.1 show that load shedding in terms of load shedding frequency and duration may have significant effects on the business operations of the small-scale enterprises. However, to ensure uninterrupted business operations in times of load shedding the small-scale firms at the Masala Market may employ effective coping strategies such as solar systems, change of working hours and temporal relocation. In other words, the proposed framework can guide small-scale enterprises at the Masala Market to cope with load shedding.

4.8 Chapter Summary

In this chapter, data from the study were presented and analyzed and findings were presented and discussed. The findings have been presented according to the research objectives outlined in Chapter 1 and discussed in relation to the empirical and theoretical literature presented in Chapters 2 and Chapter 3. The answers to the research questions have been presented using data from questionnaires, interviews, document review and observations. In particular, the frequency of loads shedding was established as well as the impacts of load shedding on the business operations of the small-scale enterprises at the Masala Market. In addition, the coping strategies of the small-scale enterprises at the Masala Market have been determined. The following chapter presents the discussions of the research findings.

CHAPTER 5: DISCUSSION OF RESEARCH FINDINGS

5.1 Introduction

The previous chapter presented and analysed the research findings. This chapter is an extension of the previous chapter as it focuses on presenting the discussion of the findings. The discussion of findings is structured according to the research objectives. The results are discussed in line with theoretical and empirical literature reviewed in Chapter 2 and Chapter 3. The other purpose of the discussion of the findings is to show if the finding led to the rejection or acceptance of the hypotheses stated in Chapter 1. The discussion of research results allows the researcher to present the findings, draw conclusions, and identify the implications of the findings for existing theories or knowledge gaps.

5.2 Frequency of Load Shedding that Small-Scale Enterprises Face During Business Hours

From the findings presented in the previous chapter, there is substantial evidence that the small-scale enterprises at the Masala Market experience frequent prolonged load shedding. The results are similar to those of previous studies. For instance, Mchopa *et al.* (2014) revealed frequent power outages in Tanzania due to power rationing where small businesses experience long hours without electricity. The frequent prolonged load shedding faced by the small-scale enterprises at Masala Market is comparable to the findings of the qualitative study by Braimah and Amponsah (2012) which revealed blackouts lasting for about 10.3 hours in a day facing SMEs in Ghana. More so, the results regarding frequency of load shedding are in line with the findings by Makhdoom, Nawaz and Narejo (2017) who cited that 65% of the SMEs in Pakistan faced load shedding for about 6 to 8 hours.

The study by Banda *et al.* (2021) also cited that the 2019-2020 load shedding was worse than everwhere ZESCO increased the extent of the load shedding to at least 15 hours a day for majority of its commercial, household and industrial consumers. The review of the research by Kintu (2022) showed that because of demand surpassing supply, ZESCO implemented a nationwide load-shedding program in 2019 that entails scheduled power outages lasting up to eight hours every day. From the results, load shedding remains a concern for the small-scale enterprises in Zambia

given the frequency of at least five hours of load shedding in a day. This load shedding could have affected the operations of the small-scale enterprises. The findings on the frequency of load shedding at the Masala Market in Ndola, Zambia have provided answers to this research thereby helping the researcher to understand the impacts of the load shedding on the business operations of the small-scale enterprises.

5.3 Effects of Electricity Load Shedding on Business Operations of Small-Scale Enterprises in Zambia

The results presented in the previous chapter showed that load shedding cause significant negative impacts on the business operations of the small-scale enterprises at the Masala Market. More explicitly, the descriptive results have shown that load shedding in Zambia adversely impacts the operations of the small-scale enterprises at the Masala Market by: (i) causing failure to meet production targets due to lost production time, (ii) disrupting production processes, (iii) affecting communication systems, (iv) causing reductions in productivity (v) increasing operating and production costs, (vi) causing delays in the delivery of orders, (vii) undermining capacity of the small-scale enterprises to provide quality services and products to customers, (viii) causing loss of customers and income, (ix) causing loss of reputation and competitiveness, (x) decreasing profit levels/margins, (xi) causing poor service delivery and (xii) causing temporal closure of business. From the results, load shedding significantly impacts the various operations of the small-scale enterprises ranging from production to service delivery.

Load shedding disrupts the daily business operations of small-scale enterprises, as they are heavily reliant on electricity such that they suffer significant financial losses due to interrupted production and reduced customer footfall. In addition, the correlation results have shown that load shedding has significant negative impacts on the business operations of small-scale enterprises at Ndola's Masala Market. More precisely, the correlation results showed that load shedding has significant negative impacts on the operations of small-scale enterprises at Ndola's Masala Market. The results therefore led to the failure to reject the hypothesis that load shedding has significant effects on the business operations of the small-scale enterprises at the Masala Market.

These similar effects of the loading shedding on the operations of the small-scale enterprises have been widely documented in existing literature. The findings have shown the importance of

electricity availability to the business operations small-scale enterprises at the Masala Market. Literature has shown that electricity is an important resource for businesses including SMEs. The findings confirm the Resource Dependency Theory as the concern for electricity load shedding by most of the participants indicate that the small-scale businesses rely on electricity for their business operations. The effects of load shedding on business operations of small-scale enterprises also support the findings of prior studies. For instance, the findings are in consistency with the findings by Banda *et al.* (2020) that the load shedding leading to close business, drop in sales, reduced turnover, and increased operating costs has affected many SMEs.

More so, the findings on the effects of load shedding on productivity are in line with the findings by Abotsi (2016), Mchopa *et al.* (2014), Moyo (2012); Trung and Kaijozi (2017), Scott *et al.* (2014) and Walsh *et al.* (2021) revealed that load shedding adversely impacts businesses productivity. Precisely, Scott *et al.* (2014) reported that electricity load shedding negatively impacts operations of small-scale enterprises by halting production and affecting product or service quality. More so, the results are in tandem with those by Cissokho (2019) that power disruptions have a significant detrimental impact on the productivity of small and medium-sized enterprises in Senegal.

Like previous studies such as Fiawoo (2016) and Owusu *et al.* (2022), the present study also revealed that load shedding impacts operations by disrupting communications systems. The findings on service quality were also established in existing empirical research studies such as Abeberes (2012), Fashanu (2021) and Scott *et al.* (2014). Similarly, the present findings relating to the impacts of load shedding on profitability support the findings by Doe and Asamoah (2014), Mbobvu *et al.* (2021) that load shedding negatively impact profitability of the small-scale enterprises.

These results also concur with the Systems Theory of Management, which predicts that changes or actions in one part of the system can have ripple effects on an organization (Chikere & Nwoka, 2015). More so, the findings are also are in line with the "Economics of power system reliability and planning theory" which states that electricity supply is essential for the operations of businesses.

The results of this present research are also in line with the findings by Doe and Asamoah (2014) who established various coping strategies of SMEs to load shedding in Ghana including delayed or cancelled orders, increased production costs, loss of reputation and competitiveness, lost sales and customers and reduced product/service quality. More so, the negative correlation between load shedding and business operations confirms the findings by Fashanu (2021) and Fiawoo (2016) who found significant negative effects of load shedding on firm operations. The study by Phiri (2017) also showed that load shedding has had negative impacts on productivity and profitability of small business enterprises. Likewise, the findings that load shedding impacts quality service delivery also support the findings by Frederick and Selase (2014) that load shedding impacts service or product quality delivery.

The study by Mohammed (2012) also found that load shedding negatively impacted SMEs by reducing operating profits, affecting service delivery, reducing competitiveness and sales turnover. The results also corroborate the findings by Duru and Yusuf (2017), Doe and Asamoah (2014) and Olatunji and Umukoro (2018) which specified that electricity outages significantly affected operational efficiencies of small-scale enterprises by causing closure of many businesses. In a nutshell, the findings of this present have supported existing literature that load shedding has significant negative effects on the business operations of the small-scale enterprises. In overall, the findings obtained regarding the effects of load shedding on the business operations have provided insightful answers to the research question: "In what ways does electricity load shedding affect business operations of small-scale enterprises at Masala Market in Ndola, Zambia?"

5.4 Coping Strategies and Their Effectiveness on Business Operations of Small-Scale Enterprises at Masala Market to Load Shedding

The findings presented have shown that there are several coping strategies employed by the small-scale enterprises at the Masala Market to deal with load shedding and ensure uninterrupted business operations. The results from the survey, interviews and observations have shown that the coping strategies employed by the small-scale enterprises at the Masala Market include change of working hours in relation to load shedding followed by employment of part time employees, temporal relocation to unaffected areas, use of rechargeable lamps and solar lights, use of solar panels and inverters, working from home, use of standby generators, night shifts, use of fuel

powered compressors, use of LPG gas powered machines and equipment and use of UPS. The findings indicated the coping behaviour of the small-scale enterprises at the Masala Market hence concurring with coping theories.

These strategies have been widely documented in existing literature. Thus, the findings of the study corroborate the findings of several prior empirical studies. For instance, the study by Fisher-Vanden *et al.* (2012) discovered that load shedding in China had forced small-scale enterprises to use backup systems such as use of standby diesel generators to ensure minimum disruptions to business operations. More so, the results of the present results corroborate the findings by Zachariadis and Poullikkas (2012) who found small-scale enterprises in Cyprus have resorted to using solar systems and generators as coping strategies to load shedding. The present findings also support the findings by Scott *et al.* (2014) that main coping practices adopted by most SMEs to electricity load shedding include use of standby generators and changing business operations and business hours.

Other studies such as Cole *et al.* (2018), Mwila (2017) and Phiri (2017) have also reported that coping strategies employed by small-scale enterprises include use of generators and solar panels. The study by Dunya *et al.* (2019) found that over 50% of the SMEs in Ghana used generators during times of power cuts.

More so, the findings are comparable to those of Fiawoo (2016) who also found that SMEs in Ghana employ several coping strategies such as use of electric generators, reducing labour force, temporal business closure, use of solar and UPS systems. However, the present results of the study that few small-scale enterprises sue UPS systems contradict those by Makhdoom, Nawaz and Narejo (2017) 55.3% of SMEs in Pakistan use UPS. Additionally, in a study conducted by Mohammed (2012), various coping strategies employed by SMEs in South Africa were identified including use of UPS, adoption of solar power and generators, engaging in activities that do not rely on electricity, implementing remote work arrangements, adjusting business hours to align with electricity shedding schedules and relocating operations to areas unaffected by power outages. These coping strategies were also noted in this study through most of the small-scale enterprises do not use UPS systems.

In a support, the coping strategies of night shifts and employment of part time employers were also cited by previous scholars such as Bailey (2022) and Kavishe (2015). In conclusion, there are several coping strategies that the small-scale enterprises employ to ensure uninterrupted operations in times of load shedding. The findings also confirm the Dynamic Capabilities Theory, which promotes the need for dynamic capabilities in changing external environments. In this case, the coping strategies reflect the dynamic capabilities of the small-scale enterprises.

The findings have all shown that the coping strategies currently employed by the small-scale enterprises are not effective. These findings therefore point out to the need to find out the best ways possible for the small-scale enterprises to overcome the effects of electricity load shedding. Previous studies have also indicated ineffectiveness of some of the coping strategies of small-scale enterprises to load shedding. For instance, the study by Banderker (2022) cited that UPS systems are not effective as they only last for up to five hours whilst load shedding may extent to more than five hours. The findings also support the findings by Phiri (2018) that coping strategies implemented to lessen load shedding by small-scale firms in Zambia had not improved profitability and productivity of the firms.

Similarly, Lombe and Tembo (2023) found that majority of the coping techniques for SMEs in Zambia were less effective. The study by Dunya *et al.* (2019) also found the coping measures of SMEs in Ghana were less effective in addressing the challenges posed by load shedding to the operations of the SMEs. The findings also confirmed the Transactional Model of Stress and Coping, which predicts that coping strategies can be effective or ineffective varying with the situation (Ben-Zur *et al.*, 2019). In contrast, Cissokho (2019) revealed that small-scale firms equipped with a generator have proven to be effective in mitigating the detrimental impact of power outages on productivity.

In overall, the findings have indicated that the objective of the study was achieved using the data collected and analysed. In other words, the findings of the study have answered the research question: “What coping strategies are being implemented by small-scale enterprises at Masala Market in Ndola, Zambia and how effective are they on business operations of small-scale enterprises at Masala Market in Ndola, Zambia?”.

5.5 Chapter Summary

The chapter has presented the discussion of the findings. Indications where the findings agree or disagree with existing literature and theories have been made. The discussion of the findings has shown that most of the findings of the present study support existing literature and theories. Conclusions and recommendations drawn from the research findings are presented in the following chapter.

CHAPTER 6: CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

6.1 Introduction

This chapter aims to provide conclusive remarks on this research. Precisely, this chapter presents the conclusions for the study. In particular, this concluding chapter includes the summary of the study, summary of the research findings, conclusions/deductions based on the research findings, recommendations for policy and practice, limitations of the research and lastly areas for further research. The chapter also outlines the contributions of the study to theory, policy and practice.

6.2 Summary

The summary encompasses two main components: a comprehensive overview and summary of the entire study and a concise summary of the primary research findings outlined as follows:

6.2.1 Summary of the Research

The research sought to investigate the impact of electricity demand and load shedding on the operations of the small-scale enterprises in Zambia using the case study of the small-scale enterprises operating at the Ndola City Council's Masala Market. To achieve the main aim, the research was guided by the following research objectives:

i) To investigate the ways in which electricity load shedding affects business operations of small-scale enterprises at Masala Market in Ndola, Zambia;

ii) To establish coping strategies and their effectiveness on business operations of small-scale enterprises at Masala Market in Ndola, Zambia;

iii) To propose a framework for small-scale enterprises to cope with electricity load shedding.

To achieve the stated objectives, this research was carried out where it comprised of six main chapters arranged in chronological order from Chapter 1 to this final chapter that is Chapter 6. Chapter 1, which was the introductory chapter of this study, presented the background of the research leading to the research problem and research objectives. The research questions and

statements of hypotheses were presented as well as the significance and justification of the research. In addition, the chapter presented the scope of the study, limitations of the study, assumptions of the research, and operational definitions of key terms and lastly outline of the research.

Chapter 2 provided the full literature review of load shedding and its impacts on businesses according to different scholars and authors. This chapter provided an introduction to load shedding, definitions of load shedding, small-scale enterprises and business operations as well as the global context of the background and contribution of small-scale enterprises. More so, the chapter presented the critical review of literature on the role and importance of electricity to businesses including SMEs and the impact of load shedding on operations of small-scale enterprises and the coping strategies of SMEs to load shedding. Overall, the literature showed how operations of SMEs are impacted by load shedding. The research gaps that the study sought to fill were outlined in this chapter.

Chapter 2 also covered the theoretical and conceptual frameworks for the study. The theoretical framework on which the study was anchored on was presented where the main theories presented and discussed include the Resource Dependence Theory (RDT), the Economics of Power System Reliability and Planning Theory, the Cybernetics Theory of Organisational Stress, the Transactional Model of Stress and Coping, the Theory of Constraints (TOC), the Production Competence Theory and the Transformation Theory of Production. In addition, the conceptual framework was developed and presented in this third chapter of the study.

Chapter 3 covered the methodology employed in this study which was structured in line the Saunders *et al.*'s (2016) Research Onion. This chapter provided a description of the research methodology, which is the design of how the study and research was conducted. The chapter provided an overview of the research techniques employed to collect and analyse the empirical data utilised in this study, as well as a description of the research design, research philosophy and research approach.

This chapter provides a description of the sampling method utilised, encompassing the sampling frame and the size of the sample. In addition, the chapter discussed the data collection methods. The chapter additionally delineated the analysis conducted, the methodologies employed in the

data analysis, and the manner in which the data is presented in the study. Precisely, the pragmatism research philosophy was adopted as well as the explanatory research design, survey research strategy and the mixed method approach.

The concurrent mixed approach was used in this study. In this research, the researcher used both probability and non-probability sampling methods namely simple random sampling and purposive sampling respectively. The study employed primary data collection methods namely survey questionnaire, in-depth interviews and observations. Data were analysed using descriptive, bivariate correlation and content analyses.

Chapter 5 presented results and analysis of the findings. The chapter focused on research findings that were discovered using questionnaire surveys, observations, document reviews, and in-person interviews. This section of the study presents the research's findings and includes data analysis and justifications for the significance of the data collection's findings in order to reach a conclusion. This chapter focused on providing comprehensive data analysis and outcomes presentation.

Since the study employed a mixed research design for data gathering, both qualitative and quantitative data are analysed in this chapter. This chapter presented and analysed the findings from the data collected using survey questionnaires, interviews and observations. Thereafter, Chapter 5 focused on the discussions of the research findings. The results were discussed in line with theoretical and empirical literature reviewed in Chapter 2 and Chapter 3.

This final Chapter (Chapter 6) presents the conclusions, implications and recommendations. The study summary, summary of results, and policy recommendations are the main topics of the sixth chapter. The chapter also makes recommendations for areas for further research while disclosing the knowledge contributions of the study in connection to business policies, practises, and theory.

6.2.2 Summary of Research Findings

This section presents the summary of the research findings presented and discussed in the preceding chapter. The findings are summarized in accordance with the research objectives as follows:

6.2.2.1 Frequency of Load Shedding that Small Scale Enterprises Face During Business Hours

The study aimed to establish the frequency of load shedding those small-scale enterprises at the Masala Market face during business hours from 0800 hours to 1700 hours. In line with this research objective, the study pursued to answer the research question: "What is the frequency of electricity load shedding in Zambia?" The study revealed that all the targeted small-scale firms experienced frequent prolonged load shedding. These results indicate that the small-scale enterprises at Masala Market frequently experience load shedding during business hours (0800 hours-1700 hours). In addition, the results indicated the small-scale enterprises at the Masala Market experience significant load shedding extending from 5 hours up to more than ten hours in day. The results also showed that the small-scale enterprises at the Masala Market in Zambia experienced load shedding more often. The results were similar to those of previous studies. For instance, Mchopa *et al.* (2014) revealed frequent power outages in Tanzania due to power rationing where small businesses experience long hours without electricity. Braimah and Amponsah (2012) which revealed blackouts lasting for about 10.3 hours in a day in Ghana. More so, the results regarding frequency of load shedding are in line with the findings by Makhdoom *et al.* (2017) which reported that 65% of the SMEs in Pakistan faced load shedding for about 6 to 8 hours. The study by Banda *et al.* (2021) also cited that the 2019-2020 load shedding was worse than everwhere ZESCO increased the extent of the load shedding to at least 15 hours a day for majority of its commercial, household and industrial consumers.

6.2.2.2 Effect of Electricity Load Shedding on Operations of Small-Scale Enterprises in Zambia

The study also aimed to investigate the ways in which electricity load shedding affects small-scale enterprises in Zambia. To achieve this specific objective, the study aimed to find answers to the research question: "What is the impact of electricity load shedding on the operations of small-scale Enterprises in Zambia?" The answers to this question revealed that load shedding is of great concern to majority of the small-scale enterprises at the Masala Market (91.8%) as these rely on electricity for production. The study also found that electricity is of great importance to majority of the small-scale enterprises at the Masala Market (69.1%). Furthermore, the study established that largely, load shedding affected the operations of the small-scale enterprises at the Masala Market. The results also showed that load shedding cause significant negative impacts on the

operations of the small-scale enterprises at the Masala Market. More explicitly, the descriptive results revealed that load shedding in Zambia adversely impacts the operations of the small-scale enterprises at the Masala Market by: (i) causing failure to meet production targets due to lost production time, (ii) disrupting production processes, (iii) affecting communication systems, (iv) causing reductions in productivity (v) increasing operating and production costs, (vi) causing delays in the delivery of orders, (vii) undermining capacity of the small-scale enterprises to provide quality services and products to customers, (viii) causing loss of customers and income, (ix) causing loss of reputation and competitiveness, (x) decreasing profit levels/margins, (xi) causing poor service delivery and (xii) causing temporal closure of business.

The findings are in line with the findings by Banda *et al.* (2020) that the load shedding leading to close business, drop in sales, reduced turnover, and increased operating costs has affected many SMEs. The findings confirmed the Resource Dependency Theory as the concern for electricity load shedding by most of the participants indicate that the small-scale businesses rely on electricity for their business operations. The operational effects of load shedding also supported the findings of previous empirical studies. For instance, the findings are in consistency with the findings by Banda *et al.* (2020) that the load shedding leading to close business, drop in sales, reduced turnover, and increased operating costs has affected many SMEs. More so, the findings on the effects of load shedding on productivity are in line with the findings by Abotsi (2016), Mchopa *et al.* (2014), Moyo (2012); Trung and Kaijozi (2017), Scott *et al.* (2014) and Walsh *et al.* (2021) which revealed that load shedding adversely impacts businesses productivity.

The effects of load shedding on product/service quality were also established in existing empirical research studies such as Abeberes (2012), Fashanu (2021) and Scott *et al.* (2014). These results also concurred with the Systems Theory of Management, which predicts that changes or actions in one part of the system can have ripple effects on an organization (Chikere & Nwoka, 2015). More so, the findings are also are in line with the "Economics of Power System Reliability and Planning Theory", which states that electricity supply is essential for the operations of businesses. The study by Makhdoom, Nawaz and Narejo (2017) which studied the impacts of load shedding on retail SMEs in Pakistan also found that load shedding significantly impacted business operations resulting in problems in dealing with customers, decreased sales, product damage and increases costs. Sichone *et al.* (2016) also found that at the subsector level, SMEs involved in the

food and metal fabrication processes in Zambia experienced sales declines of between 1.4% and 1.9% due to load shedding.

6.2.2.3 Coping Strategies and their Effectiveness on Business Operations of Small-Scale Enterprises at Masala Market to Load Shedding

Furthermore, the research aimed to establish the coping strategies of small-scale enterprises to remain operational during the periods of load shedding. In doing so, the research aimed to answer the question: "What coping strategies are being implemented by Small-scale enterprises at Masala Market to remain in operation during the periods of electricity load shedding?" These showed that the majority of the small-scale enterprises surveyed (74.2%) had backup for load shedding whilst 25.8% had no back up for load shedding. The results also showed that the most employed coping strategy by the small-scale enterprises at the Masala Market is change of working hours in relation to load shedding, followed by employment of part time employees, temporal relocation to unaffected areas, use of rechargeable lamps and solar lights, use of solar panels and inverters, working from home, use of standby generators, use of LPG gas powered machines and equipment and use of UPS in that order.

These coping strategies are supported in existing literature. For instance, the study by Scott *et al.* (2014) found that the main coping practice adopted by most SMEs to mitigate the impacts of electricity load shedding is the use of standby generators followed by changes in business operations and reducing business hours. Cole *et al.* (2018) also noted use of standby generators to mitigate the effects of load shedding. According to Mwila (2017) and Phiri (2017), one coping strategy employed by small-scale enterprises is the use of alternative power sources such as generators and solar panels. In China, Fisher-Vanden *et al.* (2012) discovered that load shedding forced small-scale enterprises to use backup systems, typically diesel generators, as a way of ensuring that there are minimum disruptions to the business operations. More so, the majority of the prior studies have shown that the most widely employed coping strategies by SMEs to cope with load shedding include use of generators, solar panels, UPS, working from home, recruitment of part time employees and changing working hours where these strategies have been found to have effects on business operations of small-scale enterprises (Banderker, 2022; Doe & Asamoah, 2014; Fiawoo, 2016; Fisher-Vanden *et al.*, 2012; Kintu, 2022; Lombe & Tembo, 2023; Phiri, 2018; Scott *et al.*, 2014; Zachariadis & Poullikkas, 2012).

However, the study established that for the majority of the small-scale enterprises (53.6%), most of the coping strategies employed were less effective. The bivariate correlation analysis revealed that most of the coping strategies of the small-scale enterprises were less effective except for the strategy of solar panels and solar inverters. Previous studies have also indicated ineffectiveness of some of the coping strategies of small-scale enterprises to load shedding. For instance, the study by Banderker (2022) cited that UPS systems are not effective as they only last for up to five hours whilst load shedding may extent to more than five hours. The findings also support the findings by Phiri (2018) that coping strategies implemented to lessen load shedding by small-scale firms in Zambia had not improved profitability and productivity of the firms.

In addition, the ineffectiveness of the coping strategies of the small-scale enterprises at the Masala Market is supported in existing literature, Lombe and Tembo (2023) found that majority of the coping techniques for SMEs in Zambia were less effective. The study by Dunya *et al.* (2019) also found the coping measures of SMEs in Ghana were less effective in addressing the challenges posed by load shedding to the operations of the SMEs. The findings also confirmed the Transactional Model of Stress and Coping, which predicts that coping strategies can be effective or ineffective varying with the situation (Ben-Zur *et al.*, 2019).

6.3 Conclusions

In general, the study wanted to find out how load shedding affected the operations of small businesses. From the findings of the study, the main conclusion reached is that the frequent prolonged load shedding in Zambia significantly affects and disrupts business operations, particularly of small-scale enterprises. More explicitly, the study has concluded that load shedding, whether planned or unplanned, causes adverse effects to the resource-constrained small-scale businesses by impacting production, reducing productivity, compromising service or product quality and affecting profitability. In this regard, electricity load shedding is of great importance to the mall scale enterprises in Zambia particularly the small-scale enterprises operating at the highly competitive Masala Main Market.

The other conclusion drawn from the findings is that load shedding remains a challenge across the country, requiring the small-scale enterprises to come up with sustainable coping strategies for enhanced and sustained performance. In addition, the findings of the study have led to the

conclusion that whilst there are significant adverse effects brought about by the load-shedding situation, there are several coping strategies that have been employed by the small-scale enterprises to mitigate the adverse effects of load shedding.

However, some of the coping strategies were found to be either ineffective or unsustainable. The study also concluded that the recurrent occurrences of power outages in Zambia pose a significant danger to small-scale enterprises, and have the potential to adversely affect the growth trajectory of this particular sector within the economy of Zambia.

6.4 Recommendations

The final objective of this study was to recommend the best ways possible that small-scale enterprises can employ to overcome the effects of electricity load shedding. Hence, from the research findings and deductions drawn, the following recommendations for practice were made. These recommendations if well implemented will most likely result in the viability and sustainability of the small-scale enterprises:

i) As shown by the findings, the small-scale enterprises operating at the Masala Market, Ndola, Zambia need to be adaptive and flexible by changing of working hours in relation to load shedding. However, effectiveness of this strategy will depend on nature of the business, as not all businesses permit changes to working hours.

ii) In addition, forming partnerships with neighbouring businesses that have access to reliable power supply can be beneficial to the small-scale enterprises at the Masala Market, Ndola, Zambia. Sharing resources during load shedding periods can help mitigate the negative effects and ensure continuity of operations of the small-scale enterprises at the Masala Market, Ndola, Zambia.

iii) The study also recommends that small-scale enterprises at the Masala Market, Ndola, Zambia consider investing in machines and equipment that use less energy, or hybrid machines that are compatible with both electricity and solar power. This will minimise the negative effects of load shedding on the operations of the small-scale enterprises.

iv) For all the small-scale enterprises that do not rely much on electricity for production, the management or owners of the enterprises must consider investing in solar system, as it sustainable and was found to be effective.

v) Furthermore, the small-scale enterprises in Zambia are also recommended to consider diversifying their product offerings or services, to reduce reliance on electricity-intensive activities. This will prevent the businesses from losing production time during periods of load shedding.

vi) In order to ensure their survival, small-scale enterprises at Masala Market must explore various alternatives to sustain their production, profitability, and workforce, as well as their socio-economic well-being. This can be achieved by either implementing one or more coping strategies identified in the present research, or by devising a long-term plan to effectively address this persistent phenomenon and mitigate associated risks.

vii) Furthermore, in the event that the occurrence of load shedding of power becomes unavoidable due to insufficient energy generation and supply, it is imperative for the government of Zambia and ZESCO to proactively disseminate a well-planned load-shedding timetable in advance. This will allow small-scale enterprises to proactively strategize and implement actions that will mitigate expenses and optimize operational effectiveness during episodes of load shedding.

viii) ZESCO should contemplate the exclusion of business centres and markets from load shedding, particularly during daylight hours. Instead, it is advisable to implement load shedding in business centres during night time, as a significant number of firms are anticipated to be closed during that period.

ix) The Zambian government should also invest in improving the country's electricity infrastructure to ensure a stable power supply and promote sustainability of the small-scale enterprises which are of great significance to the economic transformation of the Zambian economy.

6.5 Contributions of the Study

This study contributes to the existing body of knowledge, as well as having practical and policy development implications. The primary focus of this section is therefore to elucidate the contributions and implications of the research to knowledge or theory, policy and practice.

6.5.1 Contributions of the Research to Theory

The research made a theoretical contribution by examining the relationship between electricity supply and business operations of small and medium-sized enterprises (SMEs) in Zambia. The theoretical implications of this study's results are that they have made significant contributions to the existing knowledge base on load shedding and operations of SMEs, particularly in the context of developing countries. In this regard, the research added additional flesh information to the existing body of knowledge, with scholarly debates regarding the influence of load shedding on SMEs' operations and their coping strategies.

The revelations of this study add understanding to academic composition by delineating the impacts of load shedding on operations of small-scale enterprises in the context of developing economies. It could be used as a source of information and as the basis for additional study in the same area, adding to the body of knowledge.

In the academic realm, the results of this research enhance knowledge on the existing research on the subject matter, and encourage other researchers to conduct further studies on ingenious ways of investing in the energy sector, to service the small-scale enterprises who are not able to employ self-generating facilities such as solar and power generators. Doing so, the research will enable researchers acquire the required competitive edge when it comes to the all-inclusive academic prosperity of the country.

In conclusion, this research contributed to the existing body of knowledge regarding load shedding of power, and the survival tactics implemented by smaller companies. In addition to this, due of the significance of electricity to businesses, load shedding may have an influence on the employment of workers. Due of this, information regarding the effects of power outages on employment in small-scale enterprises may be useful to policy makers in Zambia. It has the

potential to serve both as a source of information and as the foundation for further research in the same field, thus contributing to the existing body of knowledge.

6.5.2 Contributions of the Research to Policy

The implications of the results obtained in this study hold great importance in the realms of policy formulation and economic examination. The results of the study contribute to policy making in Zambia. Precisely, the research makes a valuable contribution to the development and execution of energy related policies in Zambia. Policy makers in the energy sector such as the Government of Zambia, ZESCO and the Energy Regulation Board may gain important insights for effective policy making from comprehending the impacts of load shedding on the operations of small businesses. This understanding enables them to effectively supervise the development and execution of appropriate policies towards mitigating inefficiencies in power distribution, as exemplified by prolonged frequent load shedding.

Pronouncements arising from this research provide awareness and a more dependable guide on the problems encountered by small-scale enterprises to institutions such as those who formulate policies on behalf of the government such as the line Ministry, the Chamber of Commerce and industries, National Board for Small and Medium Industries, and the Association of Zambia industries. This study would also be crucial because it would reveal the actual hardships that the Zambian small business community faces during load shedding. It is also hoped that ZESCO, and other policy makers would comprehend the consequences of load shedding on the SME sector and how they would affect the nation's overall economy.

6.5.3 Contributions of the Research to Practice

The findings of the study also have practical contributions. For instance, this study provides the small-scale business owners with knowledge and guidance about the way they could put up economically efficient coping strategies against load shedding to manage and run their businesses in a very successful and sustainable manner. Its findings would benefit the SMEs in a variety of ways, such as in the creation and implementation of contingency plans to lessen the effects of load shedding. The proposed framework can also be useful to the small-scale enterprises at the Masala Market to ensure survival, in case of load shedding.

This study helped in identifying the damage caused by load shedding to the business operations of small-scale enterprises and try to find out survival strategies that mitigate the effects of electricity load shedding to the business sector, particularly the small-scale enterprises. With respect to justification practice, the research will provide ZESCO with comprehensive facts, information, and skills acquired through experience and practical understanding of the problems at hand, and can formulate institutional policies to mitigate these challenges.

In connection to justification of policy, this research would help ZESCO come up with directives that will not have a negative impact on the operation and sustainability of the industry. This study could also provide the small-scale business owners with knowledge and guidance about the way they could put up economically efficient coping strategies against power outages, to manage and run their businesses in a very successful manner. Its findings would benefit the SMEs in a variety of ways, such as in the creation and implementation of plans to lessen the effects of load shedding,

6.6 Limitations and Areas for Further Research

This study encountered some constraints. Nevertheless, the researcher took measures to mitigate these limitations in order to minimize their potential impact on the study's findings. Despite the achievement of the research objectives, the study had its own limitations, which have important implications for further research. The major limitation for this research was that it was a case study focusing only on small-scale enterprises from the Masala Market in Ndola district, Zambia such that the findings may not be generalized to the entire small-scale enterprises in Zambia.

Hence, future researchers interested in exploring the subject need to increase their sample size to improve on generalizations of the research findings to the entire SME industry for Zambia. In relation to this, further research needs to be carried out in large firms for comparisons to be made across firms.

The other limitation for the study is that it primarily relied on the perceptions, opinions, and experiences of the participants by collecting data using questionnaires and interviews. This could have affected validity of the findings. Henceforth, to enhance validity, future researchers need to triangulate survey, observations and interview data with quantitative secondary data on financial performance of the small-scale enterprises. Further researches may also be done to estimate the costs of load shedding to the small-scale enterprises at the Masala Market.

Other limitations faced included the following:

i. Some respondents who may have lost their businesses through electricity load shedding were too emotional when discussing the subject. As such, the issue of objectivity was highly questionable. However, the researcher clearly explained the purposes of the research where the individuals participated at voluntary will.

ii. Most small-scale business owners were not free to disclose their profitability during or prior to the load shedding for fear of alerting the Zambia Revenue Authority about their undeclared sales. However, the researcher assured them of confidentiality and privacy such that the information gathered was only used for the purposes of the research.

iii. Small-scale businesses rarely keep financial records. This posed a challenge to do a proper assessment of the effect of load shedding to their operations. The researcher relied on whatever verbal information that these entrepreneurs were willing to share during the face-to-face interviews.

iv. Most of the owners or managers of the SMEs were too busy with their businesses. However, the interviews were done after the target participants confirmed the time they were free. More so, the respondents were given three weeks to fill in the questionnaires.

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APPENDICES

Appendix I: Survey Questionnaire

Research Topic: "Assessing the Impact of Electricity Load-Shedding on the Operations of Small-Scale Enterprises and Coping Strategies at Masala Market in Ndola, Zambia".

Dear Respondent,

I am carrying out a study for academic purposes only. Therefore, you have been purposively selected to take part in the study as a Small-scale Enterprise owner at Masala Market whose business was still in operation since the beginning of severe load shedding in 2014 to date. I, therefore, wish to seek your consent to take part in the study. The consent form will be provided for you to fill in. However, it is worth mentioning that you are assured of the highest levels of confidentiality. If you do not feel free to take part in the study, you are free to do so as you are not compelled to take part against all odds. Further, if you opt to take part in the study, you are still free not to respond to some questions that you are not comfortable to do so. Nevertheless, you are encouraged to fully respond to the questions as this will be helpful in analyzing data according to which data will be helpful in coming up with recommendations that can be useful in policy formulation, analysis, monitoring, and evaluation. If you have any questions or wish to seek clarification, please feel free to do so. The interview shall be conducted in a language of your choice.

With much respect and appreciation,

INSTRUCTIONS

*Please respond by ticking (✔) or cross-marking (**X**) in the appropriate box or writing your information in the space provided.*

SECTION A - DEMOGRAPHIC DATA

1. **Gender (please tick)**

   - ○ Female
   - ○ Male

2. **Age**

   - ○ 18 to 30 years
   - ○ 31 - 40 years
   - ○ 41 to 50 years
   - ○ 51 to 60 years
   - ○ Above 60 years

3. **Indicate your level of education**

   - ○ Secondary level
   - ○ Certificate/Diploma
   - ○ Undergraduate degree
   - ○ Postgraduate degree
   - ○ Other (specify)_____

4. **How long your business has been in operation?**

   - ○ Less than 1 year
   - ○ 1 – 5 years
   - ○ 6 - 10 years

- ○ 11 - 15 years
- ○ More than 15 years

5. Designation

- ○ Owner
- ○ Manager
- ○ Both Owner and Manager

6. What is the nature of the business are you into? (Please tick as applicable)

- ○ Manufacturing
- ○ Fast Food and Restaurant
- ○ Printing, Photocopying and Typing
- ○ Retail and Distribution
- ○ Internet Café
- ○ Clothing and Textile
- ○ Welding and Construction
- ○ Hair saloon and barbering
- ○ Computer and Cellphone Repairs
- ○ Other (specify)_____

7. What is the size of your organisation?

- ○ 1-10 employees (micro)
- ○ 11-50 employees (small)
- ○ 51-100 (medium)

SECTION B: FREQUENCY OF LOAD SHEDDING

8. Do you experience the current load shedding? **YES [ ] NO [ ]** Tick one only

9. If Yes, how often do you experience Load Shedding during business hours (0800 hours-1700 hours)?

- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ More often
- ○ Always

10. On average, how many hours of load shedding in a day?

- ○ Less than 1 hour
- ○ 1-5 hours
- ○ 6-10 hours
- ○ More than 10 hours

11. In what other words can you describe the frequency of load shedding?

……

……

……

SECTION C: EFFECTS OF LOAD SHEDDING ON OPERATIONS OF SMALL-SCALE ENTERPRISES

12. Do you consider load- shedding as a major concern for your business operations?

- ○ Yes
- ○ No

13. Do you agree that electricity availability is important to the production cycle of your enterprise?

- ○ Strongly disagree
- ○ Disagree
- ○ Not sure
- ○ Agree
- ○ Strongly agree

14. In your view, do you agree that to a large extent that electricity load shedding impacts operations of the business?

- ○ Strongly disagree
- ○ Disagree
- ○ Not sure
- ○ Agree
- ○ Strongly agree

15. In what ways does electricity load shedding impacts operations of the business?

- ○ No effect
- ○ Negatively
- ○ Positively

16. To what extent do you agree to the following statements relating to load shedding and its impacts on operations? Use the scale, 1= strongly disagree, 2 = Disagree, 3=Not Sure= Agree, 5 = Strongly Agree

Loading shedding and operations	**Disagree strongly**	**Disagree**	**Not Sure**	**Agree**	**Agree strongly**
Failure to meet production targets due to lost production time	☐	☐	☐	☐	☐
Electricity load shedding disrupts production processes	☐	☐	☐	☐	☐

Loading shedding and operations	**Disagree strongly**	**Disagree**	**Not Sure**	**Agree**	**Agree strongly**
Load shedding affects communication systems	☐	☐	☐	☐	☐
Electricity load-shedding leads to reductions in productivity	☐	☐	☐	☐	☐
Increase in operating and production costs	☐	☐	☐	☐	☐
Delays in the delivery of orders	☐	☐	☐	☐	☐
Load-shedding undermines capacity to provide quality services and products to customers	☐	☐	☐	☐	☐
Loss of customers and income	☐	☐	☐	☐	☐
Loss of reputation and competitiveness	☐	☐	☐	☐	☐
Load shedding leads to decrease in profit levels/margins	☐	☐	☐	☐	☐
Poor service delivery	☐	☐	☐	☐	☐
Temporal closure of business	☐	☐	☐	☐	☐

17. In what other ways does load shedding impacts your business?

……

……

……

SECTION D: SMALL-SCALE ENTERPRISES' COPING STRATEGIES TO LOAD SHEDDING

18. Does your business have a backup in the case of load shedding?

○ No

○ Yes

19. To what extent do you agree to the following statements relating to coping strategies to load shedding? Use the scale, 1= strongly disagree, 2 = Disagree, 3=Not Sure= Agree, 5 = Strongly Agree

Coping strategy	**Disagree strongly**	**Disagree**	**Not Sure**	**Agree**	**Agree strongly**
Use of standby generators	☐	☐	☐	☐	☐
Use of solar panels and inverters	☐	☐	☐	☐	☐
Use of LPG gas powered machines and equipment	☐	☐	☐	☐	☐
Changing of working hours in relation to load shedding	☐	☐	☐	☐	☐
Rechargeable lamps and solar lights	☐	☐	☐	☐	☐
Working from home	☐	☐	☐	☐	☐
Resorting to activities or operations that do not require electricity	☐	☐	☐	☐	☐
Using uninterruptable power supply (UPS)	☐	☐	☐	☐	☐
Temporal relocation to unaffected areas	☐	☐	☐	☐	☐
Employing part time employees	☐	☐	☐	☐	☐

20. What other coping strategies your business given resources permit may employ?

……

……

……

21. In your observations, do you agree that the coping mechanisms are effective?

- ○ Strongly disagree
- ○ Disagree
- ○ Not sure

○ Agree

○ Strongly agree

○

THE END****THANK YOU FOR YOUR TIME!**

Appendix II: Interview Guide

Research Topic: “Assessing the Impact of Electricity Load-Shedding on the Operations of Small-scale Enterprises and Coping Strategies at Masala Market in Ndola, Zambia”.

Dear Respondent,

I am carrying out a study for academic purposes only. Therefore, you have been purposively selected to take part in the study as a Small-scale Enterprise owner at Masala Market whose business was still in operation since the beginning of severe load shedding in 2014 to date. I, therefore, wish to seek your consent to take part in the study. The consent form will be provided for you to fill in. However, it is worth mentioning that you are assured of the highest levels of confidentiality. If you do not feel free to take part in the study, you are free to do so as you are not compelled to take part against all odds. Further, if you opt to take part in the study, you are still free not to respond to some questions that you are not comfortable to do so. Nevertheless, you are encouraged to fully respond to the questions as this will be helpful in analyzing data according to which data will be helpful in coming up with recommendations that can be useful in policy formulation, analysis, monitoring, and evaluation. If you have any questions or wish to seek clarification, please feel free to do so. The interview shall be conducted in a language of your choice.

With much respect and appreciation,

Thematic Frequency of Load-Shedding

(a) Ask questions on lengthy of load shedding hours:

(b) Timing of load shedding;

(c) Is it during peak hours for your business?

(d) Any follow-up questions

1. **Thematic Area 2: Effects of Load Shedding on the Performance of Small-Scale Enterprises**

   (a) Effect of load shedding on Financial Performance (profitability, liquidity, sales volumes/sales returns; leverage)

   (b) Effect of load shedding on Operational performance (labour turnover)

2. **Thematic Area 3: Load shedding Survival/Coping Strategies of Small-Scale Enterprise**

   (a) Small-scale Enterprises to outline in great detail the coping/survival strategies during Load shedding;

   (b) Follow-up questions on each survival strategy

3. **Thematic Area 4: Recommendations**

   - Ask on best ways in which Small-Scale Enterprises can overcome overloading challenges
   - Any follow-up or related questions

APPEDIX III: APPROVAL OF STUDY

THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Great East Road Campus | P.O. Box 32379 | Lusaka10101 | Tel: +260-211-290 258/291 777 **Fax**: (+260)-211-290 258/253 952 | E-**mail**: director.drgs@unza.zm | Website: www.unza.zm

APPROVAL OF STUDY

IORG No. 0005376
HSSREC IRB No. 00006464

7th December 2022

REF NO. HSSREC:-2022-NOV.011

Mr. Humphrey C. L. Mutambo,
School of Humanities and Social Sciences,
P.O.BOX, 32379,
LUSAKA.

Dear Mr. Mutambo,

RE: "ASSESSING THE IMPACT OF ELECTRICITY LOAD SHEDDING ON THE OPERATIONS OF SMALL-SCALE ENTERPRISES AND COPING STRATEGIES AT MASALA MARKET OF NDOLA, ZAMBIA"

Reference is made to your submission of the protocol captioned above. The HSSREC resolved to approve this study and your participation as Principal Investigator for a period of one year.

REVIEW TYPE	ORDINARY REVIEW	APPROVAL NO. HSSREC:-2022-NOV-011
Approval and Expiry Date	Approval Date: 7th December, 2022	Expiry Date: 6th December, 2023
Protocol Version and Date	Version - Nil.	6th December, 2023
Information Sheet, Consent Forms and Dates	□ English.	To be provided
Consent form ID and Date	Version - Nil	To be provided
Recruitment Materials	Nil	Nil
Other Study Documents	Questionnaire.	
Number of Participants Approved for Study		

Specific conditions will apply to this approval. As Principal Investigator, it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

CONDITIONS OF APPROVAL

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to HSSREC within 5 days.
- All protocol modifications must be approved by HSSREC prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to HSSREC within 5 working days.
- All recruitment materials must be approved by HSSREC prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. HSSREC will only approve a study for a period of 12 months.
- It is the responsibility of the PI to renew his/her ethics approval through a renewal application to HSSREC.

- Where the PI desires to extend the study after expiry of the study period, documents for study extension must be received by HSSREC at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Documents received within 30 days after expiry will be labelled "late submissions" and will incur a penalty fee of K500.00. No study shall be renewed whose documents are submitted for renewal 30 days after expiry of the certificate.

- Every 6 (six) months a progress report form supplied by The University of Zambia Humanities and Social Sciences Research Ethics Committee as an IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.

- When closing a project, the PI is responsible for notifying, in writing or using the Research Ethics and Management Online (REMO), both HSSREC and the National Health Research Authority (NHRA) when ethics certification is no longer required for a project.

- In order to close an approved study, a Closing Report must be submitted in writing or through the REMO system. A Closing Report should be filed when data collection has ended and the study team will no longer be using human participants or animals or secondary data or have any direct or indirect contact with the research participants or animals for the study.

- Filing a closing report (rather than just letting your approval lapse) is important as it assists HSSREC in efficiently tracking and reporting on projects. Note that some funding agencies and sponsors require a notice of closure from the IRB, which had approved the study and can only be generated after the Closing Report has been filed.

- A reprint of this letter shall be done at a fee.

- All protocol modifications must be approved by HSSREC by way of an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by HSSREC before they can be implemented.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above-indicated address.

On behalf of HSSREC, we would like to wish you all the success as you carry out your study.

Yours faithfully,

Dr. J.I. Ziwa

DR. J. I. Ziwa

ACTING CHAIRPERSON
THE UNIVERSITY OF ZAMBIA HUMANITIES AND
SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE - IRB

CC: Director, Directorate of Research and Graduate Studies
Assistant Director (Research), Directorate of Research and Graduate Studies
Assistant Registrar (Research), Directorate of Research and Graduate Studies

APPEDIX IV: APPROVAL OF STUDY

OFFICE OF THE REGISTRAR

ZCAS University
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www.zcasu.edu.zm
registrar@zcasu.edu.zm

2 nd August, 2022

TO WHOM IT MAY CONCERN

Dear Sir/ Madam,

RE: RESEARCH INTRODUCTORY LETTER FOR MR. HUMPHREY CHISHA LUMBI MUTAMBO (ZU19312)

This serves to confirm that Mr. Humphrey Chisha Lumbi Mutambo of student number 202002799
is a Bona fide student at ZCAS University. He is enrolled on the ***Doctor of Business Administration DBA Programme***.

Mr. Humphrey Chisha Lumbi Mutambo is currently working on his Dissertation and your organization has been chosen as the main organization for reference and research activities. The title of his research is: ***"ASSESSING THE COST IMPLICATIONS OF ELECTRICITY LOAD SHEDDING ON THE OPERATIONS OF SMALL-SCALE ENTERPRISES AT MASALA MARKET IN NDOLA, ZAMBIA."***

Kindly assist him with any information that maybe relevant to him in this regard. The information
gathered will be purely used for academic purposes.

Should you need more information about the student, please do not hesitate to get in touch with undersigned on the numbers below.

Yours Faithfully,

ZCAS University
Jonathan Chiyesu
Assistant Registrar – Admissions and Retention
For/ Deputy Registrar (Academic)