

**POWER RATIONING AND PERFORMANCE OF SMALL MEDIUM MANUFACTURING
ENTERPRISES (SMMES) IN URBAN AUTHORITIES OF UGANDA: A CASE OF
KAMPALA CENTRAL DIVISION .**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF MANAGEMENT SCIENCE IN
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DECLARATION

I, Charles Kalule, do hereby declare that this dissertation is my sole effort except in instances where scholarly literature has been used. Further it has not been submitted to any higher institution of learning for any award.

Signature:_____ **Date:**_____

Charles Kalule

APPROVAL

This is to certify that the dissertation titled “**Power Rationing and Performance of Small Medium Manufacturing Enterprises (SMMEs) In Uganda: A Case of Kampala District**” has been submitted for examination with our approval as Institute supervisors.

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DEDICATION

I dedicate this report to my Family and Friends

ACKNOWLEDGEMENT

I thank the Almighty God for the gift of life and protection that he has given me to be able complete this work.

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ABBREVIATIONS

BOU:	Bank of Uganda
CVI:	Content Validity Index
DV:	Dependent Variable
EA:	East Africa
ERA:	Electricity Regulation Authority
ESI	Electricity Supply Industry
IPP	Independent Power Producers
IV:	Independent Variable
MOFPED:	Ministry Of Finance Planning and Economic Development
MSMEs	Micro Small Medium Enterprises
MW:	Mega Watts
SME:	Small Medium Enterprises
SMME:	Small Medium Manufacturing Enterprises
SPSS:	Statistical Package for Social Sciences
TOC:	Theory of Constraints
UEB	Uganda Electricity Board
UEDCL	Uganda Electricity Distribution Company
UEGCL	Uganda Electricity Generation Company
UETCL	Uganda Electricity Transmission Company
UIA	Uganda Investment Authority
UMI	Uganda Management Institute
URA	Uganda revenue authority
WBES	World Bank Enterprise Survey
ZESA	Zimbabwe Electric Supply Association

ABSTRACT

The study investigated the effect of power rationing on the performance of small and medium manufacturing enterprises (SMMEs) in Uganda. The specific objectives included: establishing the effect of power rationing on the Not Right First Time measure; establishing the effect of power rationing on the stock turns; and, establishing the effect of power rationing on overall equipment effectiveness, on small and medium manufacturing enterprises. A cross sectional survey design was used. Quantitative and qualitative approaches were used in data collection and analysis. A population of 260 respondents was identified out of which a sample of 162 was taken using both purposive and random sampling techniques. A positive response rate was realised. Key study findings obtained include a positive correlation results for not right first time measure, stock turns and results for overall equipment effectiveness. Based on the findings, the study concludes that: absence of power (Electricity) left SMMEs in paper and printing business equipment idle; making them none competitive, increased capital costs, increased production, and operating costs of doing business with low supplies made. Power was the major source of energy to support the running of paper and printing machinery while the use of generators only increased operation and production costs; power rationing raised paper and print business restart costs, repairs and maintenance. Finally, operation costs and machinery breakdown rose as a result of power rationing. The following recommendations are made; SMME should budget, purchase and install uninterrupted power systems; provide funds for technical staff training, power tariffs be reviewed, prioritize uninterrupted electricity supply, setting up a power backup plan for SMMEs, establish power rationing schedule, extend business and management training programmes, access financial support and increased investment in energy sector.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter presents a background to the study, statement problem, general objective of the study, specific objectives of the study, research questions, scope of the study, significance of the study and operational definition of terms and concepts.

1.2 Background to the study

1.2.1 Historical background

The privatization drive that started in the early 1990s, made the Government of Uganda relinquish its position as the number one employer (Tushabomwe and Kazooba, 2006). Additionally that the Civil and Public Service reforms downsized the public service, reducing staff employed by central government from 320,000 in 1990 to 191,324 in March 2001, a reduction of 40.9%. As a result, tens of thousands of retrenched civil servants joined the private sector as small scale business owners and Manufacturing SMMES owners. This led to the mushrooming of small scale business enterprises, most of which employed fewer than five persons and as many as 90% of the non-farm private sector workers. Since then, it is on record that the number of small scale businesses in Uganda has grown from 800,000 in 1995 to about 2,000,000 in 2002. These serve about 6,000,000 people at business and household level of the 26.3 million populations. Findings from the same study revealed that power rationing was one of the major constraints of SMMEs performance.

The Electricity Supply Industry (ESI) in Uganda has been characterized with high costs (tariffs) losses and subsidies for the past six years, Electricity Regulatory authority report (2011). Uganda's power sector is suffering from a shortage of generating capacity due to prolonged drought, inadequate investment in least cost generation capacity and a relatively

high load growth; the power deficit is currently estimated at 130MW and yet Umeme, the national electricity distribution company, supplies over 450,000 customers. Of these, 2,000 are large and medium-scale enterprises; 90,000 are small businesses and 350,000 are "domestic" or household consumption.

By 2004, the effective generation capacity at the Jinja Generation Complex had started shrinking driven by prolonged drought and has largely remained at an average of 140MW. This led to the escalation of load-shedding (power rationing) which imposes significant costs to the entire economy. The cost of un-served energy is very high considering lost industrial production, loss of school hours, service failures in hospitals, the cost of running private generators costing in excess of Ushs 1,000/Kwh as obvious examples.

The quarter ending September 2011 was a quite difficult one for the electricity sector and most importantly the electricity consumers. The demand for electricity outstripped supply by far resulting into day and night power rationing. The maximum demand at peak, shoulder and off-peak in this period stood at 445MW, 350MW and 300MW respectively against available maximum supply of 305 MW +/-50MW. The amount of power loadshed in each of the time periods was estimated at 120MW, 23MW, and 35MW at peak, shoulder and off-peak periods respectively era (ERA, 2011).

There was also deteriorating investor confidence and subsequent shut down of power plants by IPPs leading to reduced investment in the sector thereby increasing power rationing beyond the current levels which eventually leads to civil unrest with large financial and socio-political impacts such as we recently witnessed in Arua, Lira, Masaka, and parts of Kampala (ERA, 2011). This has resulted in massive electricity rationing and has forced the country to resort to expensive thermal generation. The country currently depends on

hydroelectricity for around 60% of its total power generation output; the remainder of Uganda's power generation comes from thermal power stations, fired by biogases and diesel

1.2.2 Theoretical background

There are a number of theories that explain the perception of consumers towards the services provided them and below is an elucidation of some of these:

Consistency theories suggest that when the expectations and the actual product performance does not match the consumer will feel some degree of tension. In order to relieve this tension the consumer will make adjustments either in expectations or in the perceptions of the product's actual performance.

Under all circumstances, positive reactions are built based on a firm's awareness that there are a number of factors that may affect effective performance and positive response strategies towards such factors seems to be ideal. In this case, the Theory of Constraints seems to underpin this study. The Theory of Constraints (TOC) by Goldratt (1984) helps organizations to identify the most important bottleneck in the processes and systems, so that they can be dealt with to improve performance. According to Goldratt, organizational performance is dictated by constraints. These are restrictions that prevent an organization from maximizing its performance and reaching its goals. Constraints can involve people, supplies, information, equipment, or even policies, and can be internal or external to an organization. For this study, the constraints were centered on energy and how alternative solutions to these constraints created variations in the performance of SMMEs.

1.2.3 Conceptual background

This study conceptualizes the independent variable and dependent variable to be one-to-many relationships as opposed to the other of many to one. Power rationing response strategies include Switch off, Run on alternative and performance Overtime. These could have an effect

on the performance in terms of Not Right First Time-Defective units produced; Stock Turn-Sales and Inventory replenishment; overall equipment effectiveness-Reduced production.

The study conceptualizes small enterprises as employing maximum 50 people; annual sales/revenue turnover of maximum Ugandan Shillings 360 million and total assets of maximum Ugandan Shillings 360 million (Bank of Uganda Report, 2012). On the other hand a Medium Enterprise is defined as an enterprise employing more than 50 people; annual sales/revenue turnover of more than Ugandan Shillings 360 million and total assets of more than Ugandan Shillings 360 million. This formed the basis for selection of these under investigation.

Ocen (2013) reveals that given the prevalence of power outages, firms in Africa have adopted different strategies to cope with this poor electricity supply. Some of these response adjustments include choice of business, choice of location, output reduction, factor substitution and self-generation. While all these strategies are observable among African firms, the most commonly adopted strategy by firms is investments in alternative generation (i.e., complementary capital). Many electricity users – both households and firms – now find it necessary to make their own generation in part or in whole to make up for the inadequate provision resulted from the inefficiencies of the public power system. As a matter of fact, many end users of electricity (from households to large enterprises) now operate small to medium-sized plants with capacities ranging between 1 MW and 700 MW for own generation (Karekezi and Kimani, 2002). Self-generation has been on the increase and own generation now accounts for more than 20% of generation capacity in some countries on the continent (Foster and Steinbuks, 2009).

1.2.4 Contextual background

The demand for electricity in Uganda is about 260 MW during day rising to 3501 MW in the evening (ERA, 2013). The evening peak is mainly due to the domestic users who constitute the bulk of UMEME's customers this is according to the ministry of energy and mineral development in Uganda (Rugumayo, 2010) about Electricity supply situation in Uganda and future direction. This current power shortage has adversely disrupted the industrial production and commercial sector performance. This has made some small and medium industries to shift work to late evening where electricity is made available.

In Uganda a comparison between firms in different size categories as conducted indicates that the average low performance of the manufacturing and other sectors is worsened by power rationing. The performance of SMMEs and a comparison between them and larger enterprises in the manufacturing industry shows that they grow differently (Gauthier 2001), with the larger enterprises considered to have a higher growth rate than the smaller ones and are affected differently by power rationing.

Reinikka and Svensson (2002) in their study of medium and large enterprises state that even the larger Ugandan enterprises face severe constraint where by investment in productive assets is constrained by a low capacity for private investment in public complementary assets (for example, generators), which is needed because of the poor quality of public infrastructure in Uganda and SMMEs' limited access to this infrastructure.

In Uganda unreliable electric power supply coupled with poor public capital, have significantly reduced investment in productive capacity by firms (Easterly and Levine, 1997; Reinikka and Svensson, 2001). When public provision of services and infrastructure is poor, they can invest in complementary capital themselves and the cost of this strategy is that less productive capital is installed. It may be hard to measure unreliable and inadequate power

supply but according to the above study, this can mean the number of days a firm does not receive power from the public grid (Denoted as LOST DAYS).

A baseline survey on SMMESs in Uganda 2011 on SMMES perception of electricity supply showed that 42.1 considered it to be satisfactory to very good, with 3.6% considered it as very good, 19.8% good, 18.7 feel it is satisfactory. However, 32.0% perceive it as poor while 21.3% feel it is very poor and this shows that the general view of electricity provision is below average. Power supply in Uganda is not enough, consistent and there is no regular supply.

According to the Ministry of Energy and Mineral Development, (2012), Uganda's growing population as well as the emerging manufacturing sector all point to a need to increase investment in the energy sector if Uganda is to avoid a repeat of the economic slowdown in 2011 due to power Shortages. It adds that power shortages, high electricity prices and financing constraints to the processing and manufacturing industry need to be addressed if Uganda is to attain its vision of middle income status in 10 years. There is a need to attract more energy generation and supply in the country so as to meet the consumption rate which stand at 10% growth rate.

Meanwhile, self-power generation is one of the alternatives that manufacturing SMMEs can adopt to deal with poor Government investment in public infrastructure which affects their performance (Kagenda, 2010). Additionally these can use of thermal generators to continue production even when there is no power supply on the national grid. Controversially, Hunt Allcot, Allan Collard- Wexler and O'Connell (2014) assert that self-generation is more common in large power plants instead of by individual manufacturing plants; this is because there are strong economies of scale in self generation. Sometimes even large factories choose to shut down completely during power outages even if they have generators; this is because

the self-generation acts as an input on production thus affecting the price of the product at the end World Bank Enterprise Survey (WBES, 2005).

Meanwhile in the mid-1990s, Government embarked on a drive to interest the private sector to participate in Uganda's power sector through generation of new capacity. An enabling environment for private sector participation was put in place through the enactment of the Electricity Act 1999. As a result, the Hydropower Development Master Plan prepared for Government by Kennedy and Donkin consultants studied the various Victoria Nile hydropower sites to establish the least cost site for development after building the Kiira Power Station. The sites studied included Bujagali, Kalagala, Kamdini, Ayago North and Ayago South as well as Murchison Falls. The analysis carried out indicated that Bujagali was the least cost project to be developed after Kiira Power Station (International Water Power, 2013) reveals that prior to Bujagali's commissioning Uganda was not only dependent on old, expensive, diesel and gas generator sets it was also heavily reliant on power imports

In 2003, the entire East African region was faced with a drought situation with 2005 being worst hit, by the end of 2004 the water levels in Lake Victoria had experienced a sharp decline thus limiting the available electricity generation capacity at the power plant in Jinja. This caused significant impacts on the livelihood of over 30 million people who depend on Lake Victoria within the three East African countries (Ezor, et al., 2009). A number of reforms have evolved as part of efforts to improve energy supply reliability and improve performance and the Table 1.1 summarizes them:

Table 1.1: The Sequencing of the Electricity Reforms

Dates	Reforms
June 1999	Government Approves the electricity sector restructuring and Privatization Strategy
Nov 1999	The new electricity Act is passed
April 2000	The Electricity Regulatory Authority becomes operational
March 2001	The Uganda Electricity Board is unbundled and three companies created and registered namely: UEGCL, UETCL and UEDCL
May 2001	Concessions for generation and distribution are advertised
Nov 2002	Concession for generation awarded to Eskom Enterprises
Feb 2003	Appointment of the Rural Electrification Board to oversee the Rural Electrification Trust Fund (RETF)
2005	UMEME awarded 20 year concession contract to purchase electricity in bulk from UETCL to distribute and sell it to end customers

Source: Uganda Electricity Regulatory Authority Newsletter (2012)

In summary, all the above reforms have geared towards stabilizing energy supply and reduction in tariffs so that power is affordable to consumers. For instance pertaining power tariff cut off, one of the manufacturers commented, *“As manufacturers we have always been talking about reducing the cost of doing business in Uganda and power has been one of the high costs. In Uganda we have less power and we have been mixing hydro power with the generator power which turns out to be very expensive and making our products costly. The tariff reduction is a very welcome gesture as it reduces the high cost of doing business in the country.”*

This study established the energy response strategies by and how these affected performance.

1.3 Statement of the problem

Small medium manufacturing enterprises demand for electricity has sharply increased while electricity generation capacity has remained fairly steady for the last few decades. This situation has resulted into demand over stripping supply during peak periods. In order to cope up with demand during peak periods, UMEME, the major distribution company in the country has resorted to power rationing or load shedding. However, power rationing means non availability of power at certain times. This therefore means that manufacturing firms whose machinery depends on electricity to run cannot produce anything during the time they are off supply. The growth in formal and informal manufacturing has been hurt by the power supply crisis currently affecting the country. The reported number (frequency) of power outages in Uganda is slightly higher than that of its neighbors Kenya and Tanzania; the percentage of Ugandan firms which own generators is very low. The Uganda manufacturers association and the Uganda small scale industries have both indicated power shortages among the various factors affecting production in the manufacturing industry in Uganda. Some anecdotal evidence was of recent published in both the Reuters by Barry (2011), and New Vision by Balikuddembe (2012) indicates that the owners of these SMMEs had rioted and were cooled down by anti-violence police due to the fact that power rationing was affecting their businesses. According to the above articles were entitled “*Uganda Power cuts provokes riots, threaten economy.*” And “*Wakiso, Kampala residents demonstrate over load-shedding.*” respectively. Unless this critical challenge is investigated and energy distribution organizations like UMEME given findings from these business owners, there is likely to be more riots; this will affect the SMMEs fraternity which employs over 60% of Ugandans and more unemployment could result into higher crime rates. A similar study by Sing’andu

(2009) among the manufacturing firms in Zambia reveal that power rationing had led to the reduction in the amount of tax remitted to Zambia Revenue Authority due to reduced profitability. Further that it had led to some of the firms freezing the employment of new staff and failure to settle some of their financial obligations due to the decline in productivity and profitability.

In Uganda there has not been significant information on how small manufacturing firms are being affected by unreliable power supply by the electricity company. Therefore the study was undertaken to find out how power rationing affected the performance of these SMMEs in Uganda.

1.4 General Objective

The purpose of the study was to investigate the effect of power rationing on the performance of Small and Medium Manufacturing Enterprises (SMMEs) in Uganda.

1.5 Specific Objective

- a) To establish the effect of power rationing on the Not Right First Time measure of these Small Medium Manufacturing Enterprises in Kampala central division.
- b) To establish the effect of power rationing on the stock turns of Small Medium Manufacturing Enterprises in Kampala central division.
- c) To establish the effect of power rationing on Overall Equipment Effectiveness of Small Medium Manufacturing Enterprises in Kampala central division.

1.6 Research questions

- a) What is the effect of power rationing on the Not Right First Time measure of these Small Medium Manufacturing Enterprises in Kampala central division?

- b) What is the effect of power rationing on the stock turns of Small Medium Manufacturing Enterprises in Kampala central division?
- c) How does power rationing affect the Overall Equipment Effectiveness of Small Medium Manufacturing Enterprises in Kampala central division?

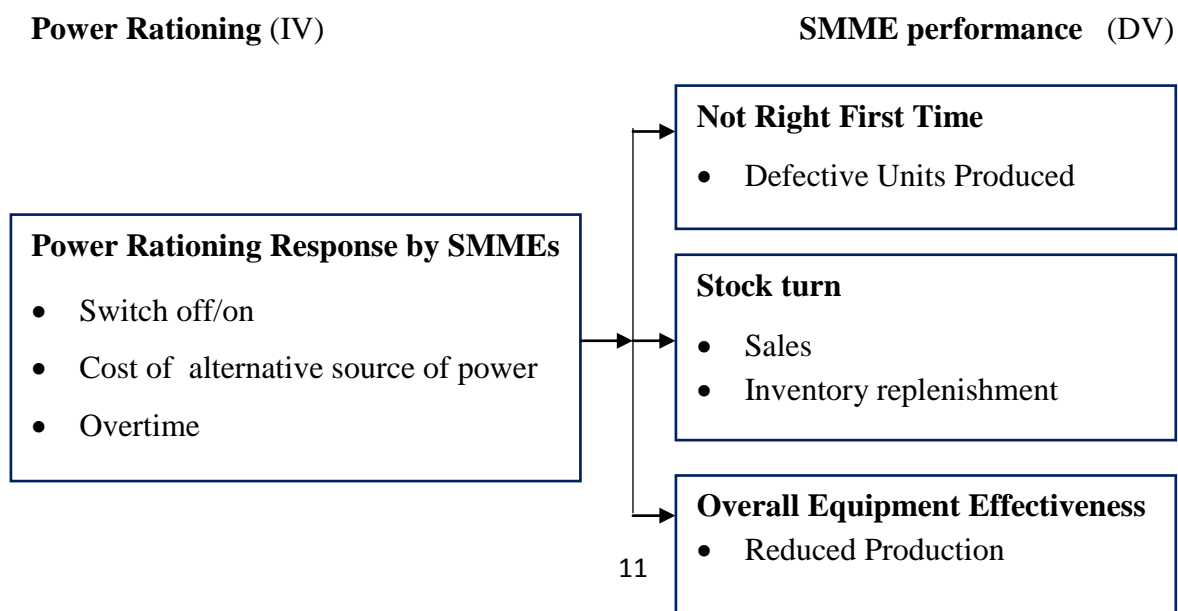
1.7 Hypothesis of the study

- 1) Power rationing has big effect on the Not Right First Time measure of Small Medium Manufacturing Enterprises in Kampala central division.
- 2) Power rationing does not affect the stock turns of Small Medium Manufacturing Enterprises in Kampala central division.
- 3) Power rationing has a causal-effect on the Overall Equipment Effectiveness of Small Medium Manufacturing Enterprises in Kampala central division.

1.8 Conceptual framework

This study conceptualizes the independent variable and dependent variable to be one-to-many relationships as opposed to the other of many to one. This is because the causal variable (IV) affects the outcome variable (DV) in a number of ways as presented in the framework:

Conceptual frame work



Source:

Adapted from Dunning and Richert (2006) study, Applying Lessons from Lean Production Theory to Transit Planning and literature review and modified by researcher.

Figure 1.1: Conceptual framework showing the relationship between Power rationing and performance of Small Medium Manufacturing Enterprises

Figure 1.1 above shows a diagrammatic representation of the problem under investigation. In this case, Power rationing is presented as an independent variable and performance of Small and Medium Manufacturing Enterprises as the dependent variable. Power rationing response by SMMEs was conceptualized in the variables of switch off/on; run on alternatives source of power; and, overtime. These variables are all believed to influence the performance of SMMEs which was measured in terms of not right first time (NRFT) denoted by defective units produced. Where it is a measure of the rate of defective units being produced, the higher it goes, the greater the waste of resources and the risk that customers are inconvenienced;

In addition, Stock turn (ST) another dependent variable dimension denoted with sub indicators including sales and inventory replenishment was seen to be affected by power rationing resulting into a number of units a business sells and time taken to replaces its inventory. Higher stock turn rates indicated that a business operated efficiently and not tying up resources in slow moving inventory.

Lastly, overall equipment effectiveness (OEE) the third dimension denoted as reduced production was seen as a way of measuring whether machinery was being efficiently used. This dimension was seen to combines three elements including amount of time the machinery was used, the rate at which it operated and the proportion of its output that was defective.

A combination of the three dependent variable dimensions including not right first time, stock turn and overall equipment effectiveness were thought to be led by power rationing. It is upon this illustration that the study was based.

1.9 Significance of the study

The study helps the whole industrial sector to lobby for improved reliable power supply from Government so as to enable the growth of the industrial sector in Uganda, and in turn I will help those intending to start up small medium manufacturing enterprises to know how to plan and tackle the power crisis in the country.

1.10 Justification of the study

Since previous studies about Micro small and medium enterprises show that they employ as many as 90% of Ugandans makes the study important as it contributes towards gaining knowledge required to layout strategies for solving some of the major problems faced by the small medium business that use electricity as a source of energy, there by contributing to poverty alleviation, one of the millennium development goals.

1.11 Scope of the study

1.11.1 Geographical Scope

Geographically, the study was conducted among the paper product and printing SMMEs located in business hub of Kampala Central division.

1.11.2 Time Scope

The period under study was a period of 10 years from 2003 to 2013. The choice of this period can be linked to the drought that affected the hydrology of Lake Victoria, hydro generation reduced and GoU chose to procure emergency diesel generators to mitigate the power supply crisis (ERA Newsletter, Issue 6, 2011). Secondly, it was during the same period of time that

the commencement of the Kiira power plant was in the making. This power shortage had adversely disrupted the industrial production and commercial sector performance. This has made some small and medium industries to shift work to late evening where electricity is made available.

1.11.3 Content Scope

The study content scope was stretched to only power rationing on the performance of Small Medium Manufacturing Enterprises (SMMEs) in Uganda. With power rationing denoted as having switch off/on, run alternative source of power and overtime. On the other hand, SMMEs performance content was limited to not right first time, stock return and overall equipment effectiveness.

1.12 Operational Definitions

Small Enterprise: The definitions of SMMEs are based on both the number of people and turnover and this is what is generally accepted by Ministry of Finance Planning and Economic Development (MoFPED) and Uganda Investment Authority (UIA). A Small Enterprise is defined as an enterprise employing maximum 50 people; annual sales/revenue turnover of maximum Ugandan Shillings 360 million and total assets of maximum Ugandan Shillings 360 million.

Medium enterprise: A Medium Enterprise is defined as an enterprise employing more than 50 people; annual sales/revenue turnover of more than Ugandan Shillings 360 million and total assets of more than Ugandan Shillings 360 million.

Kampala Central Division: The division comprises the central business area of Kampala district and includes the areas of Old Kampala, Nakasero, Kololo, Kamwookya, Kisenyi and Kampala's Industrial Area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviewed the existing literature on energy (Electricity) infrastructure in Uganda, power rationing, and the performance of Small Medium Manufacturing Enterprises in Uganda. Most of the study is cited mainly from studies carried out in developing countries.

2.2 Theoretical review

There are a number of theories that explain the perception of consumers towards the services provided them and the Theory of Constraints (TOC) by Goldratt (1984) seems to underpin the study this study on power rationing and its influence on the performance of Small Medium Manufacturing Enterprises. This theory helps organizations to identify the most important bottleneck in the processes and systems, so that they can be dealt with to improve performance. As Goldratt puts it "A chain is only as strong as its weakest link," and this is what the Theory of Constraints reflects. The TOC was published in his book "The Goal." According to Goldratt, organizational performance is dictated by constraints. These are restrictions that prevent an organization from maximizing its performance and reaching its goals. Constraints can involve people, supplies, information, equipment, or even policies, and can be internal or external to an organization. For purpose of this study, the constraints were centered on energy and how it created variations in the performance of Small Medium Manufacturing Enterprises.

The theory states that every system, no matter how well it performs, has at least one constraint that limits its performance; this is the system's "weakest link." The theory also says that a system can have only one constraint at a time, and that other areas of weakness are "non-constraints" until they become the weakest link. The theory was originally used

successfully in manufacturing, but you can use it in a variety of situations. It is most useful with very important or frequently-used processes within the organization.

Jones and Dugdale (1998) accept the TOC as having considerable potential as a theory of transformation. They claim it has "A methodology capable of directing change in specific ways and it anticipates objections and hindrances so that they may be countered". TOC clearly has clear potential to act as a vehicle to encourage to adopt the marginal costing techniques for decision-making purposes.

It also directs managers to the strategically important insight that relative product profitability is unimportant, it's the profitability of resource usage that matters, in particular the profitable use of the scarcest resources, (Doran, 2005). It is therefore a suitable theory that was used to underpin the study.

This study had three objectives and below is a review of the related literature pertaining the set objectives of the study. The assessment of the impact of blackouts on the operations may be limited by the poor record keeping behaviour of the entrepreneurs which King (2010) maintains is an attribute of the small scale informal economy. The research therefore analysed the effects of the intermittent power supply based on the enterprise owners' perception as well as by considering the coping strategies adopted by the enterprise owners and the cost implications.

2.3 Power rationing and Performance of SMMEs

2.3.1 Power rationing and Not right first time

The demand for electricity in Uganda is about 260 MW during day rising to 3501 MW in the evening. The evening peak is mainly due to the domestic users who constitute the bulk of UMEME's customers this is according to the ministry of energy and mineral development in Uganda, from a study by Rugumayo (2010) on (Electricity supply situation in Uganda and

future Direction). Electricity is one of the major driving engines for economic growth and development and is very vital input in every sectors of the economy. With electrical energy the people are empowered to work from the domestic level and the cottage industries, through the small scale and medium industries to employment in the large scale and manufacturing complexes. It's a factor input in the production process of small and medium scale manufacturing industries in particular generally for the operation of plants.

According to Musiliu and Osini, (2012) in his study on power outages, indicates that power outages causes huge damage to production material and equipment where by long power outage that occur in manufacturing production process may cause molten ore in electronically heated ovens to harden, and this may damage the ovens, destroying the materials and also resulting in huge restart costs.

Power rationing leads to damage of machinery during production and increases operation costs and expenses on repairing damaged machinery how much of it is true remains to be research. Some manufacturing firms relate the frequent machinery breakdown to the frequent and announced power rationing (Iwayemi, 2008). Corwin and Miles (1978) identified destruction of plant and equipment as one of the numerous economic effects of the 1977 New York City blackout.

Braimah and Amponsah (2012) through a qualitative study reveal that the entrepreneurs interviewed perceived the immediate effects of the frequent and unannounced blackouts to be the destruction of their equipment. The motors of the cold stores, grinding mills and wood processing firms were believed to be the most affected components of the machinery. About 32% of the cold store operators indicated that they replaced the motors of their refrigerators every year until they acquired stabilisers to control the intermittent power supply. This also led to production of defective units for those that faced power rationing problem. They added

that the frequent and unannounced blackouts destroyed their products (meat and fish) until they acquired standby sources of power. Similar effects of the frequent blackouts are reported in Asia where refrigerators are destroyed and food spoiled (Peters, Kesavan and Palmer, n.d.).

Additionally, Braimah and Amponsah *ibid* assert that about 28% and 15% of the wood processors had repaired their machinery once and twice during data collection in May, 2009.

The affected wood processors argued that the frequent machinery breakdowns were the results of the frequent and unannounced blackouts in the area. Based on their interview, a wood processor was recorded to have said: *“I was sawing wood when there was a blackout.*

When power was restored about one hour later, the electric saw I was using before the outage failed to respond. I am convinced that the fault was caused by the blackout and nothing else”. The enterprise owner’s suspicion (expressed in the above quotation) is in

tandem with the damage caused to manufacturers’ machinery due to fluctuations in power supply in Tanzania and Nigeria (Confederation of Tanzanian Industries, 2010; Iwayemi, 2008). Similarly, Corwin and Miles (1978) identified destruction of plant and equipment as one of the numerous economic effects of the 1977 New York City blackout. This was also documented to have resulted into production of defective units.

Balducci, Roop, Schienbein, DeSteele and Weimar (2002) in their study “Electrical Power Interruption Cost Estimates for Individual Industries, Sectors, and U.S. Economy” reveal that power outage led to Equipment Damage, Overtime Payments and food spoilage of the private emergency aid. Additionally, pertaining to The First Time Right, Ryan (2008) too asserts that clients care about accuracy of the data upon which they make decisions, and in business lingo “if we care, we measure.” Service providers care about their clients’ needs and efficiency in achieving them, a symptom of which is little to no rework – i.e., “get it done right the first time.”

H1: Power rationing leads to damage of equipment and damage of what is produced among firms (Not Right First Time).

2.3.2 Power rationing and stock turns

According to Rahman and Ram (2010) found power rationing an imminent problem in Dhaka, Bangladesh, affecting the service sector through both losses in sales and increased expenditures of production. Among the four sectors, electricity consumption was highest in the Health and Social Service sector. The direct impact of power rationing was lost sales/services, the indirect impact was goodwill loss and the health problem faced was general ill-feeling. The direct impact was most severe in Hotel and Restaurant and Wholesale and Retail Trade sectors. Use of IPS and personal generators was the most popular coping strategy adopted by the service sector. The highest loss was incurred by medium sized Health and Social Service sector. In adopting the solar power system, Wholesale and Retail Trade sector was most willing. They further reveal that the service sector was willing to endure 1.69 instances of power rationing of one hour duration approximately. It is also preferable to shift production activities during early morning and noon hours when service sector has low demand for electricity. Among the suggestions to combat power rationing and reduce the burden of social losses, building more power plants and reducing corruption were the most popular.

Balduce et al (2008) also concretise with a case study of an insurance claim office whose momentary power interruption resulted in data losses equivalent to 1 hour's processing. During an interruption, agents were re-directed to other, less productive activities such as filing. The re-assignment of work and resumption of production generally would take approximately 30 minutes. Thus, each power outage resulted in a loss of 90 minutes of productivity and therefore poor replenishment.

Rahman (2010) add that more than half the surveyed sectors complained about goodwill loss, of which Wholesale and Retail Trade and Hotel and Restaurant sector was highest. Inability to meet investment plans was experienced by 42.67 percent of overall sectors with Hotel and Restaurant facing the highest at 48 percent. Some of the other indirect problems included not completing the syllabus or targeted orders from customers, higher costs of production and inability to pay worker's salaries on time.

This current power shortage has adversely disrupted the industrial production and commercial sector performance. This has made some small and medium industries to shift work to late evening where electricity is made available.

Electricity plays an important role in storing finished goods ahead of demand, which storage of finished goods leads to consumer satisfaction as it assists in making finished goods available to consumers whenever needed. This implies that power outages will affects goods storage leading to cause of defective products, and any failure by firms to supply consumers on time and good quality goods definitely affects the firm's reputation as consumers demands may not be met on time. Such constraints hamper the development and growth of SMMEs firms (Musiliu, 2012). Raw material and some finished products require constant flow of electricity for their storage and power cuts would result in huge business loss thus affecting the people whose lively depend on the business.

Many may lose business and continue to make loses due to unannounced power outages this is as a result of inability to meet contract deadlines affecting consumers' confidence in SMME firms compared to large that switch to back generator installation during power outages. In Zanzibar frequent power rationing forced enterprise owner to reduce on their working hours, this affected many firm's productivity and increased loss in expenses on redundant labour (Burlando, 2010).

There is still fighting for the same power domestically and industrial wise. Industries may want to work 24 hours but are forced to work for only 12 hours because at peak hours when people go back home in the evening the power is less (Independent magazine of Monday, 14 October 2013).

Alcott (2014) in a study on the effect of electricity shortages, points out that managers have some ability to predict when there will be more electricity on a scheduled power holiday, and when they expect more electricity they call in more workers and produce more. This highlights that the effects of scheduled power rationing on production depends on the severity of the underlying shortage that power rationing is designed to address. Still in the same study it's said that electricity shortages affect firms only through input availability: demand is unaffected by power rationing. And that this would reflect the case in which manufacturers sell into national or international markets. In reality, many manufacturers sell to customers within the same state whose demand might also be affected by power rationing.

H0 –“Power rationing does not affect the stock turns of Small Medium Manufacturing Enterprises in Kampala central division”.

2.3.3 Power rationing and overall equipment effectiveness

Power rationing affects business activities in manufacturing plant in many ways. First, it affects the firm's productivity as in many cases as other inputs may be idle when there is no electricity to power them. In response to this unreliability of Africa's national electric power utilities, self-generated electricity has become an increasingly important source of power. This has led to many end-users of electricity, ranging from households to large enterprises, now generating their own power by operating small to medium-sized plants (Karekezi and Kimani, 2002), which are mainly used as back-up facilities to power supply provided by the national utility. Most of these are mainly diesel generators.

Wijayatunga (2004), in a study on the economic impact of poor quality power supply on industry in Sri Lanka indicated that power outages can lead to switching off or closure of some of the installations which are not connected to a generator. Some of the installations where production costs become non – competitive because of self-generation could be faced with closure of their businesses of which many fall under this category. This is because self-generated electricity is generally more expensive than electricity from the public grid which limits its potential as a permanent substitute for unreliable public supply, as it adds to the capital and operating costs of doing business, and in-house generation affects the range of investment available to budding, raises production costs, and lowers the competitiveness of local products (Steinbuks and Foster, 2009).

Frederick (2014) in his study of the effect of electric power fluctuation on the profitability and competitiveness of SMEs in Ghana stated that the high cost by the firms in acquiring alternative power generation cannot enable them enjoy the economies of scale advantage by public power. Despite the effect on high price of good product, produced this had lead to high importation of foreign good to meet excess domestic demand. This has leaded to wide closure of firms, unemployment and price instability. This affected their economic autonomy and performance

Moreover, the impacts of the unreliable electricity have become a regular event in most part of Nigeria. And these contribute with technical logistical failure and organization structure problem (Ukpon (1976) and Iwayemi, (1979). The factors affecting electricity reliability in Nigeria are weather, water level, social texture and fire coal of current and future electricity demand vandalization and improper maintenance culture (Udhedu, 1993). Based on literature, power rationing seems to have a negative relationship with overall performance of SMMEs.

Kerin et al. (2007) investigated the effects of unreliability of electrical power on organizations and industrial sites in Slovenia. The on-site approach involving questionnaire-based interviews was applied. Industrial networks in Slovenia were mainly subjected to interruptions in sum creating an annual financial impact of over 3,000,000 €. Another scholar Mabasa (2007) observed that the economy at large has been hit hard by ZESA's (Zimbabwe Electric Supply Association) erratic supply of power in Zimbabwe and that a lot of production is being lost by the industries through the power cuts.

H3: The more power rationing exists, the poorer the performance of SMMEs.

2.4 Summary of literature reviewed

The literature reviews showed that there was a general focus is on how poor power supply affects the economy and in the various sectors where was mainly used but there was little or no clear indication of how power shortage/ rationing directly affected the performance of SMMEs in the manufacturing sector, and these studies mainly concentrated on the other constraints like, poor public infrastructure, alternative sources of power, limited capital for investment, the overall economic impact of poor quality power supply, self-generation, and costs of unsupplied electricity. This definitely failed to give the direct connection of the effect of power rationing alone minus other factors on the performance of SMMEs.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter focuses on the research design, study population, sample size and selection, sample techniques and procedure, data collection methods, data collection instruments, validity and reliability, procedure of data collection, measurements of variables and data analysis.

3.2 Research Design

A research design is the conceptual structure within which research is conducted and constitutes the blue-print for the measurement of variables collection and analysis of data Amin, (2005). The study utilized a cross sectional survey design. According to Amin, (2005) cross sectional survey is perhaps the most commonly used research method in social research. The study was cross sectional because information about the cause and effect that was gathered, represented what was going on at only one point in time and usually the simplest, less costly alternative and allowed the researcher to analyse the data in detail. It was supplemented with mixed approach including the quantitative and qualitative approaches.

3.3 Study Population

The target population of the manufacturing of paper products and printing businesses in Kampala central division i.e. Business proprietors, Top managers and other SMME staff is over 805 employees (UBOS/COBE, 2010/11). However, the researcher drew an accessible population of 260 respondents. Amin (2005) stresses that a sampled or accessible population on the other hand is the population from which the sample is actually drawn.

3.3 Sample Size and Selection

This study adopted the central limit theorem for sample size selection which states that if a random sample of n observations is selected from a population (any population), then when n is sufficiently large, the sampling distribution of \bar{x} is approximately normal. It adds that the larger the sample size, the better was the normal approximation to the sampling distribution of \bar{x} . When we selected simple random samples of size n , the sample means we find vary from sample to sample. For the purpose of applying the central limit theorem, we considered a sample size to be large when $n > 30$. Basing on the number business establishments in Kampala central division featuring paper products and printing establishments in Kampala central division. The study selected 162 respondents with the help from the Krejcie and Morgan's (1970) Table for sample size selection (see Appendix IV).

Table 3.1: Accessible population, Sample size and techniques

Target population	Accessible Population	Sample size	Sample methods
Business Proprietors	9	9	Purposive sampling
Top managers	10	9	
Other SMME staff	241	144	Simple Random sampling
Total	260	162	

Source: UBOS census of business establishments (2010/2011) and determined based on the Krejcie, and Morgan, 1970

3.4 Sampling Techniques and Procedures

For purposes of this study, both the simple random and purposive sampling techniques were used. The purposive sampling was used to select respondents who were knowledgeable and experienced in how power rationing affected the performance of paper products and printing businesses hence Small Medium Manufacturing Enterprises. According to Amin, (2005) the judgement of the researcher in selecting the respondents is more useful than the

representation of the sample. The technique was used to select the business proprietors and top managers. The researcher selected a sample based on experience of knowledge of the group that was sampled and bore in mind that the respondents had the information that was required for the study. In addition, the sample random sampling method, a method used to equally select a sample to form a sample was used to select other SMMEs staff. The choice for this instrument was it covers a large number of the population, it instrument was easier to administer, it was cost effective and less time was required to ensure the selection of the members to form a sample.

3.5 Data Collection Methods

In the study, three data collection methods were used in eliciting for information including the questionnaire survey, interview and documentary review methods as indicated below:

3.5.1 Questionnaire Survey

The questionnaire method is a method which permits the collection of both quantified and non-quantified information from a wider range of respondents (Brehob, 2001). Further, the method allowed the getting of unified information required by the researcher about power rationing and SMMEs performance (Amin, 2005). The methods allowed the administering of questionnaires on other SMME staff. Additionally, the method allowed respondents to make choice from a number of closed ended questions based on a five likert scale. The method seemed an affordable method, it permitted easy conduction and consumption of less time.

3.5.2 Interview

This method allowed the conduction of face to face sessions held between the key informant and researcher (Amin, 2005). The method allowed the researcher conduct face to face interactions and obtain primary data on power rationing and SMMEs performance. The

Interviews were held for a duration between 0 -25 minutes each and involved the researcher loudly reading the open ended questions while conversation were recorded in book and later used to complement on the quantified information from the questionnaire.

3.5.3 Documentary review method

Saunders et al (2012) argued that documentary review method involved the researcher reviewing a number of secondary sources for information. In addition, a number of books were reviewed including: The Enactment of the Uganda Electricity Act (1999), Paper and Products Business Plans (2009-2013), Uganda Electricity Regulatory Authority Newsletter (2012) and UBOS census of business establishments (2010/2011).

3.6 Data Collection Instruments

In the study, three data collection instruments were used in eliciting for information including the Self-Administered Questionnaire (SAQ), Interview and documentary review checklist as indicated below:

3.6.1 Self-administered Questionnaire

A SAQ entails a number of open ended questions linked to power ration and performance of SMMEs used in search for more valuable quantified information (Mouton, 2001). All designed questions were based on a five item likert- scale including (5) SA (Strongly Agree), (4) A (Agree), (3) UD (Undecided), (2) D (Disagree) and (1) SD (Strongly disagree). (See attached, appendix I)

3.6.2 Interview

This instrument was designed with open ended questions on power rationing and SMMEs performance. The exercise helped the researcher read a number of open ended questions linked to power rationing and SMMEs (Mugenda and Mugenda, 1999). This instrument

enabled the collection of data from top managers and proprietors. The choice for this instrument is that it served as a suggestive reference or prompter during interviews. Furthermore, it contained mainly open ended questions in order to collect in-depth information from key informants. Scholars including Marshall and Rossman, (2010) suggest that interview guide allowed the researcher clarify ambiguous answers appropriately, sought follow-up information. The interview guide served as a basic checklist during the interview to respondents who could not read and write, and respondents with less time (See, Appendix II)

3.6.3 Documentary review checklist

The research was reviewed on a number of secondary sources for information. Some of such documents or secondary material revealed include: Uganda Electricity Act (1999), Paper and Products Business Plans (2009-2013), Uganda Electricity Regulatory Authority Newsletter (2012) and UBOS census of business establishments (2010/2011). (See attached, appendix III)

3.7 Quality Control

For the better of the instruments, both validity and reliability techniques were used to ensure quality control of the instruments for the study as detailed below.

3.7.1 Validity

Validity is the ability to produce findings that are in agreement with the conceptual values in other words to produce accurate results and to measure what is supposed to be measured (Amin, 2005). The researcher used judges to establish a validity index for each item from content validity. This was carried out in a pilot study involving two experts knowledgeable about the main theme of the study (Electrical Engineer and SMME expert). Below is the validity formulae that was used to realise this quality control:

$$\text{Content Validity Index (CVI)} = \frac{\text{Number of questions in the instrument deemed valid}}{\text{Total number of items in the instrument}}$$

$$\text{CVI} = \frac{27}{35}$$

$$\text{CVI} = 0.77$$

The validity result of 0.77 obtained above reveal that the instrument was valid. For the instrument to be accepted as valid the content validity index should be 0.7 or above, (Amin, 2005).

3.7.2 Reliability

Reliability is dependability or trustworthiness and in the context of a measuring instrument, it is the degree to which the instrument consistently measures whatever it is measuring (Amin, 2005). An instrument is reliable if it produces the same results whenever it is repeatedly used to measure trait or concept from the same respondents even by other researchers. For this study however, the reliability of questionnaires was tested based on using the Cronbach Alpha method of internal consistency.

Table 3.2: Reliability results for Power rationing and performer for SMMEs

Variable	Cronbach score	Number of Questions
Not Right First Time measure	.829	7
Stock return	.567	8
Overall effective use of equipment	.407	5
Performance of SMMEs	.650	6

Source: primary data

Table 3.2 comprises of variables, cronbach score and number of questions. To obtain the reliability results, an average score of the study variables were summed hence the cronbach

scores (\sum alpha) and divided by the number of variables (n). Thus $(2.453 / 4) = 0.613$. The score of 0.613 reveals that the tool was reliable as supported by Amin (2005) who asserts that for an instrument to be reliable, its reliability score should be equal or above 0.5

3.8 Data Collection Procedure

After proposal, the researcher proceeded to UMI, School of Management Science and presented to the chairperson of SMMIs in the division and it helped in securing permission to proceed with the research. Rapport was established with the respondents to assure them of the purpose of study and confidentiality of the responses. The researcher then collected the field data. The questionnaires were administered to the intended respondents and appointments sought for face to face interviews. The exercise took 2 month.

3.9 Data Management and Analysis

Data used in the study was managed and analysed both qualitatively and quantitatively as indicated below.

3.9.1 Quantitative Data analysis

Quantified data obtained from the questionnaires was managed through sorting, coding, entering, and cleaning. Thereafter, analysis was applied where descriptive statistics including percentages, frequencies, mean score and standard deviation were run to derive meaningfulness. The purpose of descriptive statistic is to enable the researcher to meaningfully describe a distribution of measurements using a few statistics-percentages (Mugenda and Mugenda, 2003). On the other hand, inferential statistics were obtained through running a number of extracts on data. This was used for purposes of infer including establishing relationship whether positive or negative tagged to the -1 to +1 score range where the negative score reveals a negative score and a positive revealing a positive

relationship (Product Moment Correlation) and regression technique, a second measure was applied to determine the variance that power rationing as an independent variable had on performance of SMMEs as the dependent variable. A combination of these were displayed in form of tabular and graphics.

3.9.2 Qualitative Analysis

Qualitative data obtained from the questionnaires was analyzed using content analysis. Content analysis has been defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Weber, 1990). For qualitative data analysis, information collected from the interview and documentary reviews was sorted and grouped into themes. Numbers and labels were used to capture the ideas in each content. Responses from key informants were coded and presented in form of quotas to supplement on the quantified data from questionnaire.

3.10 Measurement of variables

For purposes of this study, both the ordinal and nominal scales were used to measure key variables. The respondents filled out a self-administered questionnaire, ideally they graded each statement in the questionnaire using a likert scale (Barnett, 1991) with a five response scale whereby were given response choices of 5- Strongly Agree, 4- Agree, 3- Neutral, 2 – Disagree and 1- Strongly Disagree were made available for any of them to choose the most appropriate answer or choice. The ordinal scale was applied on key variables including power rationing and performance of SMMEs while nominal scale a non-numeric data scale was applied to all background variables.

CHAPTRE FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1 Introduction

The chapter presents, analyses and interprets results obtained based on the specific objectives of the study. It comprises of the response rate, background information about respondents and empirical findings and ends with answering the hypothesis statements.

4.2 Response rate

The study used both the interview guide and self-administered questionnaires to obtain information from key respondents. The findings are presented in the Table below

Table 4.1: Response rate (Questionnaire administered and Interviews held)

Instrument	Planned (Administered and Interviews)	Actual (Administered and Interviews)	Percentage (%)
Interviews	19	12	63%
Self-Administered Questionnaire	144	136	94%
Total	160	148	

Source: primary data

The study planned to conduct 19 interviews of these only 12 sessions were held constituting (63.%) while 144 SAQs were administered of these 136 were returned fully completed constituting (65%). These were responses per instrument used. However, the overall response rate obtained was 91.0% ($148/162 \times 100\%$). This response rate suggests that it was representative of survey population as it was above 50% as recommended by Amin 2005

4.3 Background Information

This section required that the respondents gave bio data about themselves. The essence behind this request was to establish where such information has a bearing on power rationing

and performance of SMMEs specifically, manufacturing of paper products and printing businesses in Uganda.

4.3.1 Do you use Electricity?

Respondents were asked to indicate whether they had used electricity. The reason to this effect was to determine whether the manufacturing of paper products and printing businesses needed power as the major source of energy in supporting their operations. The results that were obtained are presented in the illustration below.

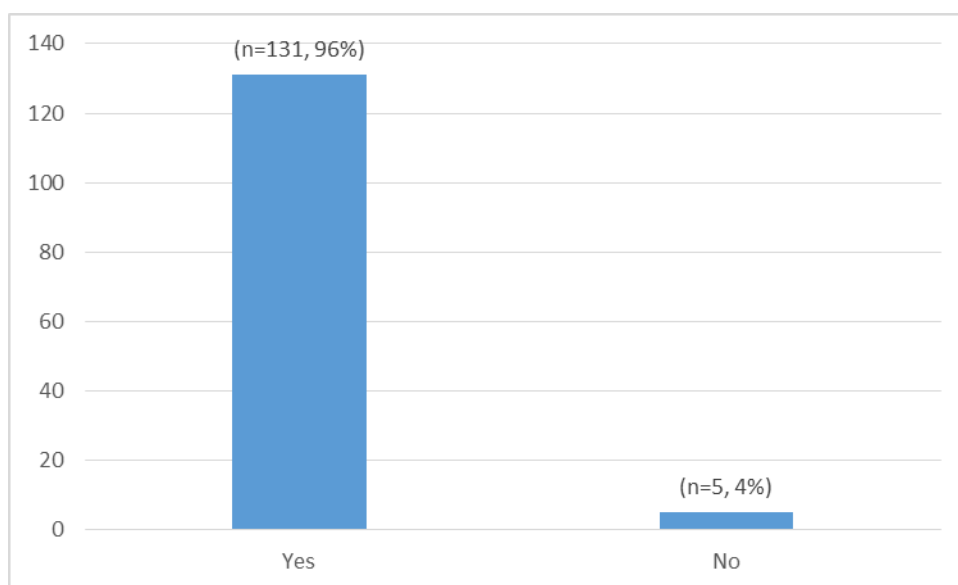


Figure 4.1: Results on use of Electricity

The figure above reveals that majority of the respondents (96%, n=131) had used electricity as compared with (4%, n=5) who disagreed to the statement. The results suggest that most manufacturing of paper products and printing businesses as some of the SMMEs in Uganda used electricity as the majority source of power. In addition, it can be argued that power was a necessity to most businesses and it was required as a means of energy to boost the production of goods and boost the provision of services including papers products including scholastic materials say plain reams, books, manila paper, ruled paper, book covers etc and

printing of banners, posters and cards among others and any attempt to periodically load shed electricity could result into no or low production for such hence no or reduced performance.

4.3.2 Gender of the respondents

The respondents in this study were asked to indicate their gender with the intent to establish whether SMMEs were dominated by either male or female respondents

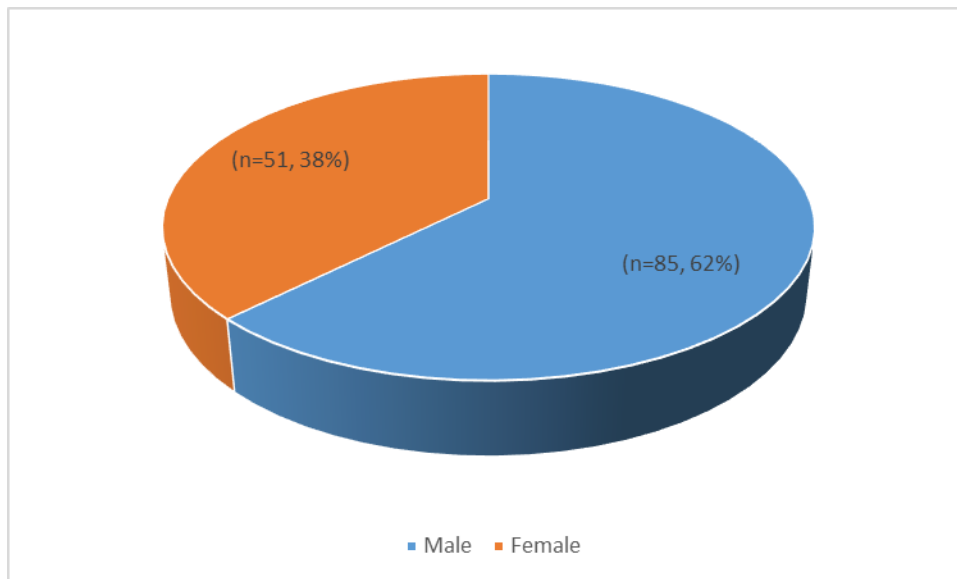


Figure 4.2: Gender distribution of respondents

Figure 4.2 above provides statistics on the gender distribution of the respondents. The results obtained reveal that the male (63%, n=85) formed the majority as compared to their female counterparts (27%, n=51). Based on the results obtained, it can be suggested that men were more dominate in the manufacturing of paper products and printing businesses where the work involved running heavy machinery, controlling their operations, maintenance and servicing, with loads of heavy work involved including lifting etc done at all times of day (and night) when the demand was high seemed to favour men over their female counterparts. On the other hand, the female were found to support in the provision of administrative support work to the clients and fellow staff. Finally, it was to the advantage of the researcher

as equally distributed views on power rationing and performance of SMMEs were obtained from both respondents and used as valuable information for the study.

4.3.3 Age Category of the Respondents

The respondents in this study fell in varying age categories. The reason to establishing the age of the respondents, was to determine the age category of that was responsible for running paper products and printing businesses in most of these SMMEs in Kampala, Uganda with the results presented below reflecting the results that were obtained.

Table 4.2: Age distribution of respondents

Age category of respondents	Frequency (N)	Percent (%)
15 - 25 years	35	26.0
26 - 35 years	50	37.0
36 - 45 years	35	26.0
46 - 55 years	14	10.0
56 - 65 years	2	1.0
Total	136	100.0

Source: primary data

Findings as presented in Table 4.2 above reveal that majority of the respondents (63%, n=85) fell below 35 years while 26.0%, n=35 were between 36-45 years and (11.0%, n=16) were 46 years and above meaning that most of the manufacturing of paper products and printing businesses or SMMEs were dominated by the energetic youth, followed by the middle aged staff and fewer staff in the advanced age. The energetic youth seemed to be entrusted with manning paper printing equipment, packaging and lifting of papers and other products as the middle aged seemed more experienced performing marketing and mainly supervisory roles. On the other hand, the respondents in advanced age seemed to provide strategic planning

roles for such SMMEs, all intended to better their performance. Lastly, these were old enough to understand and relate the matters pertaining the management of paper products and printing businesses and hence provide answers about how power rationing affected their performance and businesses in general.

4.3.4 Is the Company private or publicly held and Type of Power connection?

A cross tabulation was used to determine the status of the company where the respondents worked and the type of power connection that they had with the corresponding interviews provided in the table below.

Table 4.3: Cross Tabulation results for Company and Type of power connection

		Type of Power connection			Total
		Domestic	Commercial single phase	Commercial three phase	
Is the company private or Public held?	Private	18	105	6	128 (94%)
	Public	0	4	3	7 (6%)
Total		18 (13%)	109 (80%)	9 (7%)	136 (100%)

Source: Primary data

Table 4.3 reveals that most of the respondents who consumed power were in the private sector with (94%, n=128) using it as compared with 6%, n=7) that were in the public sector. In addition, results obtained about the type of power consumed indicated that 80%, n= 109 consumed commercial phase one, followed by (13%, n=18) were domestic consumers and 7%, n=9) respondents consumed three phase power. The results suggest that the commercial single phase consumers formed the majority, followed by the domestic consumption and lastly three phase connections. The reason to this effect was that these SMMEs had purchased, installed and owned single phphase machinery that supported their production. In addition, it can be said that most of these SMMEs were characterized by limited capital

investments thus only purchase simple production machinery that was affordable and these used mainly domestic and single phase power supply. On the other hand, there were bigger firms with large capital investments that had installed heavy machinery that used three phase power supply to run their production.

4.3.5 Number of employees in firm?

The research established the number of respondents that the SMMEs held as businesses or companies. The essence was to establish whether had as staff with the results presented in the Table below reflecting the status.

Table 4.4: Number of employees in Firm

Number of employees in Firm	Frequency (N)	Percent (%)
1-5 employees	68	50.0
6 - 20 employees	36	26.5
21-100 employees	21	15.4
101 - 250 employees	10	7.4
> 251 employees	1	.7
Total	136	100.0

Source: primary data

The results obtained and reflected in above table reveal that majority of the SMMEs had employed 20 employees and below (76.5%, n=104), while employees between 21 – 100 employees formed (15.4%, n=21) and those who employed more than 101 employees formed the least with (8.1%, n=11). Based on the results obtained, it can be suggested the size of the manufacturing of paper products and printing businesses helped them to clearly identify the number of staff that were required to effectively support their businesses operations. Each of these businesses had a minimal number of employees ranging from 1-5 employees, 6-20

employees, 21-100 employees and those above 100 employees indicating that these clearly defined the status of these industries as small and medium depending on the number of employees that were employed. Furthermore, it can be said that respondents were in position to provide valuable information about the performance of these paper products and printing businesses to the researcher obtained during the course of the study.

4.3.6 Types of Products your Firm/Company deal

There was interest in establishing the type or nature of products that their companies or firms dealt with and how they worked to produce the products with the results that were obtained presented in the Table 4.5 below.

Table 4.5: Results for Types or Nature of products

Type or nature of products	Frequency	Percent
Raw materials	34	25.0
Semi processed products	12	8.8
Finished products	85	62.5
All the above	5	3.7
Total	136	100.0

Source: Primary data

Table 4.5 above shows the types of products that the manufacturing of paper products and printing businesses produced. From the results presented above, it can be said that most SMMEs produced were finished products with (62.5%, n=85) obtained. Some of the products included scholastic materials for example, duplicating papers, printing papers, manila papers, receipts, brochures, and flyers among others. This was followed by raw materials (25%, n=34) for instance paper rolls, colors and metallic paper plates etc while semi processed

products including weeding cards, stickers and others with 8.8%, n=12 and lastly, (3.7%, n=5) combined all the products. Based on the results obtained, it can be said that most of the manufacturing of paper products and printing businesses found it ideal to produce a final product (finished) given the nature of their business and power fluctuations that were in place during that time and be in position to remain in business needed to produce finished products ready for consumption by the consumer as this would translate into more sales and better on their performance.

4.3.7 Years spent in Business?

Similarly, respondents were requested to indicate the period in years of when they had been in operation.

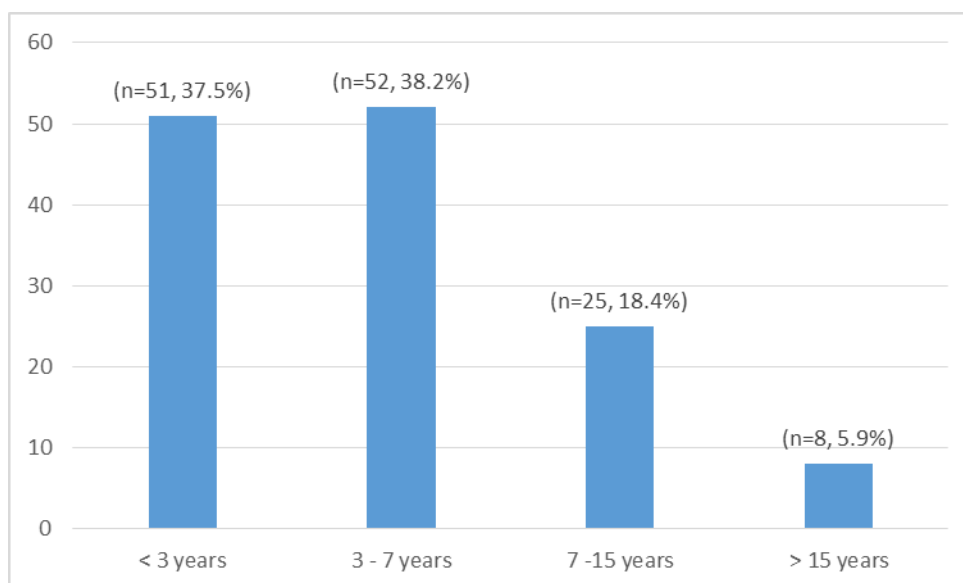


Figure 4.3: Years in Business

From the above illustration, it can be said that majority of the respondents had worked between 0 – 7 years with (75.7%, n=103), while (18.4%, n=25) indicated that their firms had stayed in business between 7 – 15 years and the least 5.9%, n=8 had stayed for a period of over 15 years in business meaning that most of the respondents in the manufacturing of paper

products and printing businesses had stayed longer enough to experience business inconveniences including reduced performance linked to the issue of power rationing and therefore were able to provide valuable information (opinions) to the study as was required by the researcher.

4.4 Power rationing and Not Right First Time measure of SMMEs

The first objective of the study was to establish the effect of power rationing on the Not Right First Time measure of these Small Medium Manufacturing Enterprises in Kampala central division. A number of questions were asked about not the right first time measure with the opinions that were obtained presented in the Table below.

Table 4.6: Results for Not Right First Time Measure

Statements on Not Right First Time Measure	Percentage Responses (%)			Mean
	D	UD	A	
I have ever lost equipment due to power on/off	17% (23)	9% (12)	74% (101)	3.65
My equipment got damaged due to power rationing	13% (18)	9% (12)	78% (106)	3.88
I have incurred heavy restart costs due to power rationing	8% (11)	10% (13)	82% (112)	3.98
My business incurs high costs due to power rationing	11% (15)	7% (9)	82% (112)	3.96
Machinery break down is mainly due to power rationing	13% (17)	4% (6)	83% (113)	3.93
Generally power rationing has destructed my equipment	13% (18)	0% (0)	87% (118)	3.90
Power on/off leads to production of defective units	14% (19)	6% (8)	80% (109)	3.89
My production capacity is always affected by power rationing	10% (14)	7% (9)	83% (113)	3.97

Source: primary data

Key: A=Agree UD=Undecided D=Disagree

For clarification purposes, the scores presented above have been grouped for instance both agree and strongly agreed denote respondents who agreed while disagreed and strongly

disagreed scores denote respondents who disagreed and undecided scores are not grouped. Furthermore, the mean score above three divulge agreement while the scores below three divulge disagreement. Findings obtained reveal that the majority (mean=3.65, 74%, n=101) agreed that they had ever lost equipment due to power on/off while (17%, n=23) disagreed and (9%, n=12) reserved their opinion. In addition, (78%, n=106) of the respondents agreed that their equipment had got damaged due to power rationing, however, (13%, n=18) disagreed and (9%, n=12) neither agreed nor disagreed meaning that the respondents on realizing power rationing issues had sought and applied business continuity measures including power back-ups among other to ensure the safety or damaging of the paper products and printing businesses equipment.

In addition, it can be said that to remain operational and competitive in such a business or better their output or performance, loss of equipment due to power on/off or damage needed a quick solution which they provided. To complement on the findings above was a statement where one top manager observed that, *“Power rationing have affected the effectiveness of the equipment. Some of these spare parts required to support good equipment operations are ordered and purchased from abroad, all these have financial constraints on our businesses or companies”*

Further still, on whether the users have ever had incurred heavy restart costs due to power rationing had (82%, n=112) of the respondents that agreed, (8%, n=11) of the respondents disagreed and (10%, n=13) of the respondents were neutral. Similarly, (82%, n=112) of the respondents agreed that their business had incurred high costs due to power rationing, with (11%, n=15) disagreeing and (7%, n=9) were not sure. The results can be linked to the fact that costs including restart had been incurred by some of the manufacturing of paper products and printing businesses as a result of power rationing. These had a negative financial

implication on such businesses as costs incurred seemed an expense specifically with purchasing spare replacement, maintenance and services as a result of power inconsistency. This has a negative bearing on their performance. To support the findings was a statement made by an Proprietor on the heavy costs due to power rationing that, *“Power rationing has had a negative cost implication on the business as it affects the effectiveness of our equipment where production is delayed. This all power rationing issue is a threat to our existence in business”*

Another respondent commented that, *“Power rationing has affected the quality of the printed and paper products as power interruptions suddenly affect processing machinery which translates into defective products”*

Additionally, (87%, n=118) of the respondents forming the majority agreed that machinery broke down mainly due to power rationing and (13%, n=18) disagreed. More still, (83%, n=113) of the respondents indicated that generally power rationing had destructed their equipment, (13%, n=17) disagreed and (4%, n=6) were neutral. These results can be attributed to the fact that power fluctuations caused sudden raise in power levels as well as drop in power yet most used equipment required a predefined output to operate. Therefore the sudden increase or decrease in power negatively affected the performance of the machinery hence it broke down despite the continuity measures available. The failure of such machinery to run meant that they business could not coup with the increased demand for paper products hence loss of business and reduced performance. This is in line with a respondent who had a thought,

“Power rationing means no printing and paper business. Over the years in business, we have experienced several equipment malfunctioning cases including damages resulting from power

surges attributing to power rationing these have been translated into business losses”

In addition, a top manager said,

“A lot of support including financial and administrative are required to realise production or otherwise survival may not be possible. The business environment is dynamic. Assume a situation where customers or clients express their dissatisfaction through several complaints to the changes that come as a result of power rationing”

Lastly, (80%, n=109) of the respondents agreed that power on/off leads to production of defective units while (14%, n=19) disagreed and (6%, n=8) were reserved. Similarly, (83%, n=113) of the respondents agreed that production capacity was affected by power rationing, (10%, n=14) disagreed and (7%, n=9) neither agreed nor disagreed. The result meant that the sudden power ratios suddenly stopped the machinery from running and hence caused several papers rejects or defects. In addition, the failure of machinery to receive required power loads meant that they could not run which translated into failure to maintain the planned output hence reduced production capacity and loss of revenue to the SMMEs. In one of the interviews held, one respondent said, *“The paper and printing SMMEs have resorted to other means or sources of energy including use of diesel generators in order to leverage with fellow competitors in the Market affected by the power rationing”*.

Another of the interviewees gave an interesting comment about power rationing and stock returns that, *“The relationship between power rationing and sales of products including finished, semi-finished and other is that No power! means no work and drop in business”*

4.4.1 Bivariate correlation results

Inferentially, a relationship between Power rationing and Not Right First Time Measure was determined using the Pearson's product moment correlation coefficient index with the results obtained, presented in Table 4.7 below

Table 4.7: Results for Power rationing and Not right first time measure

		Power Rationing	Not Right First Time Measure
Power Rationing	Pearson Correlation	1	.504**
	Sig. (2-tailed)		.000
	N	00	136
Not Right first time	Pearson Correlation	.504**	1
	Sig. (2-tailed)	.000	
	N	136	136

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

Source: Primary data

Table 4.7 shows that a moderate positive and statistically significant relationship exists. This analysis shows that ($r=0.504^{**}$; $p<0.05$, .000). This analysis shows that a unit increase in Power rationing, decrease Not Right First Time Measure by 50.4%. However, this analysis is not final hence the need to go further and compare the coefficient of determination.

4.4.2 Linear regression results

There was need to compare the coefficient of determination to determine the predictor variable that influences not right first time measure. The response that was obtained is presented in Table 4.8 below

Table 4.8: Linear regression results (Power rationing and Not right first time measure)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504 ^a	.254	.249	.68963

a. Predictors: (Constant), Power rationing

Table 4.8 entails regression with scores including R as .504 R squared as .254, Adjusted R square as .249 and standard error of the estimate of (.68963) using the predictor; Power rationing. The adjusted R^2 value of (.249) explains up to 24.9% (.249 x 100%) variance that power rationing had on not right first time measure. However, there are other factors that affect Not right first time measure than power rationing as reflected by the (75.1%).

4.4.3 Hypothesis one

After testing and obtaining positive inferential statistics between power rationing and not right first time measure, hypothesis statement one that, “*Power rationing has big effect on the Not Right First Time measure of small medium manufacturing enterprises in Kampala central division*” was accepted (H1).

4.5 Power rationing and the Stock returns of SMMEs

Objective two of the study was to establish the effect of power rationing on the stock turns of Small Medium Manufacturing Enterprises in Kampala central division. Several questions were asked about stock returns with the results obtained presented in the Table 4.9 below.

Table 4.9: Results for Stock returns of SMMEs

Statements on Stock returns of SMMEs	Percentage Responses (%)			Mean
	D	UD	A	
There are losses in sales from my business due to power rationing	11% (14)	5% (7)	84% (115)	4.02
I incur very high expenditures after power rationing has occurred	6% (8)	8% (12)	86% (116)	4.10
The business losses good will of customers due to power rationing	11% (15)	7% (10)	82% (111)	4.01
Use of generators has led to increased costs	8% (10)	0% (0)	92% (126)	4.35
I always switch to alternative energy and therefore high costs of production	8% (12)	1% (2)	91% (122)	3.90
When power goes, I just shut down the machine and this affects my revenues	20% (27)	11% (15)	69% (94)	3.64
I work early mornings to avoid power rationing	36% (49)	10% (13)	54% (74)	3.24
It is afternoon when I work to avoid power rationing	35% (47)	11% (15)	54% (74)	3.30

Source: primary data

Key: A=Agree UD=Undecided D=Disagree

For clarification purposes, the scores presented above have been grouped for instance both agree and strongly agreed denote respondents who agreed while disagreed and strongly disagreed scores denote respondents who disagreed and undecided scores are not grouped. Furthermore, the mean score above three divulge agreement while the scores below three divulge disagreement.

Item one was on whether there were losses in sales from their business due to power rationing with (mean =4.02, 84%, n=115) agreeing, (5%, n=7) reserved their choice of answer and (11%, n=14) disagreed respectively. Similarly, item two had (mean =4.10, 86%, n=116) of

the respondents indicated that they incurred high expenditures after power rationing had occurred, however, (6%, n=8) disagreed and (8%, n=12) were not sure and item three revealed that (82%, n=111) of the respondents indicated that their business losses good will of customers due to power rationing while (11%, n=15) disagreed and (7%, n=10) were neutral. Based on the results obtained earlier, most of the manufacturing of paper products and printing businesses had specialised in producing raw materials, semi processed products and finished products for their clients including themselves meaning these needed electricity as a source of power to enable them realise such products. In order to realise production of products, these companies had to choose other alternative types of energy including using generators to better their actual output and failure to do so resulted into financial loss to the businesses hence reduction in performance. In one of the interview held, a respondents stressed, *“The issue of switching off power during power blackouts affects our production process. This is a business stand off and set back”*. Based on this phrase, it can be argued that power blackouts completely affects an attempts to produce goods and services and overall business performance.

Another respondent observed that, *“In case power went off during the production process, we remain none operational until power is restored. The products pending in the machinery, some is labelled as deficit while others are left until power was restored”*

Item four that use of generators has led to increased costs had the following scores obtained with (92%, n=126) that agreed and (8%, n=10) disagreed. In addition, (91%, n=122) of the respondents indicated positively that they always switched to alternative energy and therefore high costs of production while (8%, n=12) disagreed and (1%, n=2) were neutral. These revelations can be attributed to the fact that any other energy alternative including generators meant extra costs as fuel needed to be purchase, frequent maintenance and servicing was

required among others. These incurred costs would drain the existing financial resources of such manufacturing of paper products and printing businesses hence an obstacle to their better performance. To support this finding was a statement made on use of other power alternatives that,

“We often experience power black outs. Such black outs or power rationing happen twice a week during our working area. These put all operation processes (including paper and printing) on halt. At times we power generators if products are urgently demanded by the clients, however, it’s not cost effective”

When power went, they just shut down the machine and this affected their revenues had the following responses including (69%, n=94) that agreed, (11%, n=15) that were neutral and (20%, n=27) disagreed. A proportion of respondents (54%, n=74) indicated that they had worked early mornings to avoid power rationing with (36%, n=49) disagreed and (10%, n=13) who reserved their choice of answer. Lastly, (54%, n=74) of the respondents indicated that they worked in the afternoon to avoid power rationing, (11%, n=15) were neutral and (35%, n=47) disagreed to the statement. These statistics can be attributed to the fact that absence of power means no operation translated to no business and no sales hence poor performance. In addition, business owns seemed to have worked both in the morning and later in the afternoon as a way of compensating the would have been lost time to stay in manufacturing of paper products and printing businesses or otherwise it would result into closure of the business as the business was dependent on power as a source of energy to the operation of this machinery. In one of the interviews held, one interview said, *“Running printing and paper businesses requires a lot of patient especially with prevailing situations. The situation has been friendly at all, we are trying to weigh out a number of alternatives including solar to support our operations”*

Another interviewee observed that, “Power rationing affects the production lines and deadlines. This issue of switching off or power blackout is a business nuisance. Our hands are tied down yet taxes, rent and other expenses should be met.”

4.5.1 Bivariate correlation results

Inferentially, a relationship between Power rationing and Stock returns of SMMEs was determined using the Pearson’s product moment correlation coefficient index with the results obtained, presented in Table 4.10 below

Table 4.10: Results for Power rationing and Stock returns of SMMEs

		Power Rationing	Stock returns of SMMEs
Power Rationing	Pearson Correlation	1	.465**
	Sig. (2-tailed)		.000
	N	136	136
Stock returns of SMMEs	Pearson Correlation	.465**	1
	Sig. (2-tailed)	.000	
	N	136	136

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

Source: Primary data

Table 4.10 shows that a moderate positive and statistically significant relationship exists. This analysis shows that ($r=0.465^{**}$; $p<0.05$, .000). This analysis shows that a unit increase in Power rationing, decreased Stock returns of SMMEs by 46.5%. However, this analysis is not final hence the need to go further and compare the coefficient of determination.

4.5.2 Linear regression results

There was need to compare the coefficient of determination to determine the predictor variable that influences Stock returns of SMMEs. The response that was obtained is presented in Table 4.11 below

Table 4.11: linear regression results (Power rationing and Stock returns of SMMEs)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.465 ^a	.216	.210	.70726

a) Predictors: (Constant), Power rationing

Table 4.11 entails regression with scores including R as .465, R squared as .216, Adjusted R square as .210 and standard error of the estimate of (.70726) using the predictor; Power rationing. The adjusted R^2 value of (.210) explains up to 21% (.210 x 100%) variance that power rationing had on Stock returns of SMMEs. However, there are other factors that affect Stock returns of SMMEs than power rationing as reflected by the (79%).

4.5.3 Hypothesis two

After testing and obtaining positive inferential statistics between power rationing and stock returns, hypothesis statement two, “*Power rationing does not affect the stock turns of small medium manufacturing enterprises in Kampala central division*” was rejected (H0) and the alternate (H1) accepted.

4.6 Power rationing and Overall Equipment Effectiveness of SMMEs

Objective three of the study was to establish the effect of power rationing on Overall Equipment Effectiveness of small medium manufacturing enterprises in Kampala central division. Several questions were asked about overall equipment effectiveness of SMMEs with the results obtained presented in the Table 4.12 below.

Table 4.12: Results for overall equipment effectiveness of SMMEs

Statements on Overall equipment effectiveness of SMMEs	Percentage Responses (%)			Mean
	D	UD	A	
Power rationing makes my equipment to be idle	17% (23)	8% (11)	77% (102)	3.61
Power rationing makes our production to become none competitive	17% (24)	0% (0)	83% (112)	3.72
It adds to the capital and operating costs of doing business	21% (29)	0% (0)	79% (107)	3.58
Power rationing raises production costs	6% (9)	0% (0)	94% (127)	4.33
We cannot meet our demand due to power rationing	18% (25)	0% (0)	72% (111)	3.68

Source: primary data

Key: A=Agree UD=Undecided D=Disagree

For clarification purposes, the scores presented above have been grouped for instance both agree and strongly agreed denote respondents who agreed while disagreed and strongly disagreed scores denote respondents who disagreed and undecided scores are not grouped. Furthermore, the mean score above three divulge agreement while the scores below three divulge disagreement.

Findings are presented in the Table above reveal that (77%, n=102) of the respondents agreed that power rationing made their equipment idle compared with (17%, n=23) that disagreed and (8%, n=11) that were neutral meaning that without electricity as a source of energy and production activities were in vain. In addition, no machinery would run hence a performance issues.

While (83%, n=112) of the respondents agreed that power rationing made their production to become none competitive and (17%, n=24) disagreed to the statement and none were neutral. Similarly, asked whether the power rationing raised production costs; (94%, n=127) agreed, while none were not sure and (6%, n=9) disagreed respectively. The results can be attributed to the fact that the manufacturing of paper products and printing businesses incurred extra costs linked to the manufacturing good or producing services. These businesses seemed to have incurred extra production costs combining raw material and labor. In one of the interviews held, a respondents said, *“The paper and printing businesses has continuously stalled as a result of power rationing. This limitation has resulted into our businesses incurring extra operation and other costs as to remain in production”*.

Another responding Proprietor voiced that, *“Un expected power cuts are not friendly at all as they affect the performance of our companies. They stall most business activities yet clients need their products and services. This is not good at all”*

In addition, (Mean = 3.58, 79%, n=107) of the respondents indicated positively that power rationing only added to the capital and operating costs of doing business with (21%, n=29) disagreeing to the statement meaning that costs incurred as capital costs including expenses for tangible goods such as the machinery did not reflect value for money since these equipment was not working because of power rationing. In addition, the businesses operating costs seen as expenses related to the operation of a business, or piece of equipment or facility and cost of resources used by the businesses to maintain its existence were soaring and could result into stalling of the business and eventual closure hence poor performance.

While another observed that,

“Much as efforts have been put in place to close the power rationing problem, some of our employees are left idle as a result. The management has no option other than ensuring that this labour in case of production stoppage are assigned other jobs completely not in their job description, all this involves spending”

Lastly, (72%, n=111) of the respondents agreed that they could not meet their demand due to power rationing, (18%, n=25) disagreed and none were reserved meaning that the manufacturing of paper products and printing businesses fell short of supply as they could not there produce to ream the increasing demand thus might have failed to meet the required output hence failed performance. In a related interview, one Proprietor said,

“As a way of attracting and retaining our traditional customers, a number of stringent business measures have been adopted including after sales services for instance transporting products to their sites or places of work has been adopted however, the clients are running away”

4.6.1 Bivariate correlation results

Inferentially, a relationship between Power rationing and overall equipment effectiveness of SMMEs was determined using the Pearson’s product moment correlation coefficient index with the results obtained, presented in Table 4.13 below

Table 4.13: Results for Power rationing and overall equipment effectiveness of SMMEs

		Power Rationing	overall equipment effectiveness of SMMEs
Power Rationing	Pearson Correlation	1	.703**
	Sig. (2-tailed)		.000
	N	136	136
Equipment effectiveness	Pearson Correlation	.703**	1
	Sig. (2-tailed)	.000	
	N	136	136

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

Source: Primary data

Table 4.13 shows that a positive statistically significant relationship exists. This analysis shows that ($r=0.703^{**}$; $p<0.05$, .000). This analysis shows that a unit increase in Power rationing, decrease overall equipment effectiveness of SMMEs by 70.3%. However, this analysis is not final hence the need to go further and compare the coefficient of determination.

4.6.2 Linear regression results

There was need to compare the coefficient of determination to determine the predictor variable that influences overall equipment effectiveness of SMMEs. The response that was obtained is presented in Table 4.14 below

Table 4.14: Linear regression results (Power rationing and overall equipment effectiveness of SMMEs)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.703 ^a	.494	.491	.55695

a) Predictors: (Constant), Power rationing

Table 4.14 entails regression with scores including R as .703 R squared as .494, Adjusted R square as .491 and standard error of the estimate of (.55695) using the predictor; Power rationing. The adjusted R^2 value of (.491) explains up to 49.1% (.491 x %) variance that power rationing had on overall equipment effectiveness of SMMEs. However, there are other factors that affect overall equipment effectiveness of SMMEs than power rationing as reflected by the (50.9%).

4.6.3 Hypothesis Three

After testing and obtaining positive results between power rationing and overall equipment effectiveness of SMMEs, hypothesis statement three that, “*Power rationing has a causal-effect on the Overall Equipment Effectiveness of Small Medium Manufacturing Enterprises in Kampala central division*” can be accepted.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises of the summary, discussion, conclusion and recommendations for the study. In addition, are sections including limitations of the study and finalises with the area for further studies.

5.2 Summary of the findings

This section provides a summary of the findings based on the specific objectives of the study.

5.2.1 Power rationing and Not right first time measure of SMMEs

The findings held a positive relationship (.504**) between power rationing and first time measure. Based on this, it can be said that that a unit increase in power rationing, decreased Not Right First Time Measure by 50.4% with the following summarised including 74% of the responses obtained indicated that they had lost equipment as a result of power off and on while 82% agreed that their paper and printing equipment got damaged due to power rationing. In addition, 83% cited power rationing as major source of machinery break down and 80% agreed that power rationing affected their production.

5.2.2 Power rationing and the Stock return of SMMEs

Numeric findings presented in chapter four reveal a positive result between power rationing and stock return of SMMEs reflected by the .465** correlation co-efficient obtained with the following concluded presence of power as a source of energy boasted revenue for the paper and printing businesses among the SMMEs, miscellaneous expenses were common as a result of power rationing reflected by 86%, generators for power that supported paper and printing

businesses with a 92%, failure to have power negatively affected production of paper and printing businesses shown by 69%.

5.2.3 Power rationing and Overall Equipment Effectiveness of SMMEs

Based on the analysis held earlier, results shows that a unit increase in power rationing, decreased overall equipment effectiveness of SMMEs by 70.3%, the following can be summarised including lack of power to run the machinery made it idle, power rationing negatively affected production by 94% hence low production was realised with 83%

5.3 Discussions of the findings

This section provides a detailed account of the findings and gap therein based on the specific objectives of the study.

5.3.1 Power rationing and Not right first time measure of SMMEs

Power rationing and not right first time measure were found to positively relate with one another. This statement can be linked to the positive results that were obtained from the questionnaires where for instance many of the respondents indicated that their production capacity had been affected by power rationing. This is in line with scholars including Musiliu and Osini, (2012) who in their study on power outages, indicated that power outages causes huge damage to production material and equipment where by long power outage that occur in manufacturing production process may cause molten ore in electronically heated ovens to harden, and this may damage the ovens, destroying the materials and also resulting in huge restart costs. The reduction in production capacity by SMMEs may translate into failure by such business to meet their clients demands remain non-operational and making them less competitive. Furthermore, their failure to remain in production may be linked to non-performance and increased costs of machine maintenance, paying idle labour and increase on

wastage of raw materials among others. This may prove a financial constraint; this constraint might result into poor business performance and if persistent might lead to business closure.

Finally, results obtained revealed that majority of the respondents agreed that machinery broke down due to the power rationing. This finding can be supported by Braimah and Amponsah *ibid* who asserted that about 28% and 15% of the wood processors had repaired their machinery once and twice during data collection in May, 2009. The affected wood processors argued that the frequent machinery breakdowns were the results of the frequent and unannounced blackouts in the area. Similarly, Corwin and Miles (1978) identified destruction of plant and equipment as one of the numerous economic effects of the 1977 New York City blackout. This was also documented to have resulted into production of defective units. The researcher agrees to the fact that any machinery breakdown calls for either maintenance or change of a spare part (s) which are attributed to use of funds to purchase such parts or pay off the technicians hence a financial constraint to the business. In addition SMMEs seemed to have employed cheap casual labourer with less technical skills for instance machine operators and some of these were not acquainted with the safety precautionary measures (switching off and on of equipment during load shedding), operational guidelines and procedures, thus having a negative operational effect on the machinery hence subjecting it to damage. This in turn affected production and performance of such SMMEs.

5.3.2 Power rationing and the Stock return of SMMEs

In the discussion to be held below, it can be said that results obtained reveal that a unit increase in power rationing, decreased stock returns by 46.5% thus a problem to better performance of SMMEs. This statement can be supported by a number of opinions recorded in the previous chapter where respondents constituting 84% agreed that there were losses in

sales from their businesses due to power rationing. This statement can be supported by Rahman and Ram (2010) in their Study in Dhaka, Bangladesh where they found that power rationing was an imminent problem affecting the service sector. This led to both losses in sales and increased expenditures of production. They further added that scholars indicated that direct impact of power rationing were lost sales/services while the indirect impact was goodwill loss and the health problem faced was general ill-feeling. In addition, they indicated that it would be preferable for the businesses to shift production activities during early morning and noon hours when service sector has low demand for electricity. The researcher agrees to the above findings as losses in sales by any a business translates into low performance and any attempts to close such a gap come with unexpected financial cost. However, the 16% disagreement might have refuted the fact that losses in sales were caused by other factors other than power rationing. Some of these losses might have been caused by the higher power tariffs.

In addition, was another question posed on whether that when power went, the businesses shut down the machine and this affected their revenues. This statement was appreciated with a 69% agreement score. To complement on the findings was Rahman (2010) who argued that inability to meet investment plans was experienced by 42.67 percent of overall sectors with Hotel and Restaurant facing the highest at 48 percent. Some of the other indirect problems included not completing the syllabus or targeted orders from customers, higher costs of production and inability to pay worker's salaries on time. On the other hand, lack of backup systems to sustain the presence of power to support the operations of the machinery and the cost of acquiring generators, fuel prices and maintenance has made it hard for SMMEs as they were characterised by limited capital investment.

While interesting results obtained reveal that 82% of the respondents agreed that the business losses good will of customers was due to power rationing. This is in line with Musiliu (2012) who laments that electricity plays an important role in storing finished goods ahead of demand, which storage of finished goods leads to consumer satisfaction as it assists in making finished goods available to consumers whenever needed. The implies that power outages will affects goods storage leading to cause of defective products, and any failure by firms to supply consumers on time and good quality goods definitely affects the firm's reputation as consumers demands may not be met on time. Such constraints hamper the development and growth of SMMEs firms. Normally planning including having a matrix of customer delivery and production schedules makes business activities quiet easier and most SMMEs seemed to lack business planning skills due to insufficient training in business management leading to laxity in predicting or valuing time as a resource, a combination of which might have negatively affected SMME performances as more potential and existing clients left for bigger businesses with an established business management systems.

Lastly, results obtained on the working schedule where for instance 54% of the respondents agreed that they worked early morning to avoid power rationing while a similar score 54% indicated positively that they preferred to work in the afternoons so as to avoid power rationing. These revelations concur with Alcott (2014) who in a study on the effect of electricity shortages, pointed out that managers have ability to predict when there will be more electricity on a scheduled power holiday, and when they expect more electricity they call in more workers and produce more. This highlights that the effects of scheduled power rationing on production depends on the severity of the underlying shortage that power rationing is designed to address. Nonetheless, a portion of respondents disagreed to the statement noting inconsistence. The inconsistencies might have been linked to the fact that

these SMMEs seemed not to be aware of any prior power rationing communication or schedule from the Power regulatory authorities so as to enable them plan their production and this negatively affected their business performance.

5.3.3 Power rationing and Overall Equipment Effectiveness of SMMEs

Power rationing and overall equipment effectiveness of SMMEs were found to relate with one another. This can be supported by the positive responses that were obtained during the course of the study where for instance 77% of the respondents agreed that power rationing made their equipment idle and 83% of the respondents who indicated positively that power rationing made production none competitive. These findings can be linked to Karekezi and Kimani (2002) who stressed that power rationing affected business activities in manufacturing plant in many ways. First, it affected the firm's productivity as in many cases as other inputs would be idle when there was no electricity to power them. The researcher agrees with the findings as presented above as idle equipment translates into no production then the business loses its competitive advantage and clients hence failed performance and eventually stagnation in growth of the business. However, 23% of the respondents disagreed with the statement that power rationing made their equipment idle and the 17% disagreed scores on power rationing causing none production meaning that the fewer business were in position to run on alternative sources of power during power blackout. This reveals an indifference in their working capital hence a problem with their performance.

Furthermore, findings obtained from chapter four reveal that the majority of the respondents 79% agreed that power rationing led to an increment in the capital and operating costs of doing business. This can be supported by scholars including Steinbuks and Foster (2009) who argued that some of the installations where production costs become non-competitive because of self-generation faced with closure of their businesses. This was because self-generated

electricity was generally more expensive than electricity from the public grid which limits its potential as a permanent substitute for unreliable public supply, as it added to the capital and operating costs of doing business. The researcher agrees to the fact that any increase in production and operating costs has a negative bearing on the existing business funds. This bearing can be attributed to the fact that prices of such products are increased making them less competitive and less returns realised among others hence threat to closure of the business.

Lastly, a portion of respondents thus 72% agreed that they could not meet client demand for product due to power rationing. The findings can be complemented by Frederick (2014) in his study of the effect of electric power fluctuation on the profitability and competitiveness of SMEs in Ghana who stated that the high cost by the firms in acquiring alternative power generation would not enable them enjoy the economies of scale advantage by public power. Despite the effect on high price of good product, produced this had led to high importation of foreign good to meet excess domestic demand. This led to wide closure of firms, unemployment and price instability. Power rationing tends to limit business firms to producing goods and services based on demand. Meeting the demands of clients in a given market calls for ensuring that production deadline for goods and services are met. The above statement can be attributed to the fact that power rationing truly affects production as equipment used in paper and printing runs on electricity. In addition, most SMMEs with no alternative power backup stop production when there is power blackout and normally fail to deliver the products and services at a schedule as demanded by their clients hence affecting SMMEs performances as clients tend to shift to bigger manufacturing firms that can run on alternative power sources in case of power blackout.

5.4 Conclusion of the findings

This section provides conclusions drawn from the study based on the specific objectives of the study as indicated below.

5.4.1 Power rationing and Not right first time measure of SMMEs

The following are concluded that absence of power left paper and printing business equipment idle, none competitive and raised production, capital and operating costs of doing business with low deliveries or supplies made.

5.4.2 Power rationing and the Stock return of SMMEs

Power rationing was found to reduce on the stock return of SMMEs. The following can be said that, printing and paper businesses made losses as a result of power rationing. Power was the major source of energy to support the running of paper and printing machinery while the use of generators only increased operation and production costs.

5.4.3 Power rationing and Overall Equipment Effectiveness of SMMEs

Earlier findings obtained reveal power rationing on the Not Right First Time measure as negatively affected the performance of SMMEs including the paper and printing businesses in Kampala. Additionally, frequent power rationing raised paper and print business restart costs, repairs and maintenance. Finally, operation costs and machinery breakdown rose as a result of power rationing.

5.5 Recommendations of the findings

This section provides recommendations to a number of gaps identified in the discussion based on the specific objectives of the study.

5.5.1 Power rationing and Not right first time measure of SMMEs

Power rationing and Not right first time measure of SMMEs discussion identifies key areas of weakness and based on these, are the recommendations made below including:

- The researcher recommends that SMME should budget, purchase and install uninterrupted systems for instance power stabilizers, converters so as to avoid machine damage due to power surge as a result of power rationing. This will reduce on the maintenance costs reducing on possible production expenditures and help these businesses to maintain a better financial position which can avail funds that could be used to invest in better and efficient technology (s) hence improvement in their business performance.
- The researcher recommends that SMMEs management through binding contracts with their technical employees should provide funds to enable them train in customised as this will improve on the machinery handling capabilities and avoid the break-down of various equipment used in the production process. This will in return lead to the growth of SMMEs, increase on the number of skilled labour that can couple with new technological development in machinery and put such businesses in position to better their production performance and remain competitive with bigger firms.

5.5.2 Power rationing and the Stock return of SMMEs

The following below are some of the stock return of SMMEs recommendations made to support close the gaps identified.

- The SMMEs through their Umbrella bodies including UMA, UIA and USSIA among other should liaise with ERA to devise means to ensure that power tariffs are reviewed so as to avoid an increase in cost of production due to high power tariffs. This can enable

SMMEs reduce on the cost of production thus investing more funds in other areas of production such power backup systems like generators improve on their business performance.

- The researcher recommends that the power regulation and distribution companies should give priority to uninterrupted electricity supply and design shorter outage durations if unavoidable as these would lower the cost of losses brought about by production shut down due to power rationing affecting SMMEs and work on ensuring that longer outages are avoided in the business areas all around the country as this will lead improved SMMEs performance and growth also leading to increased employment opportunities one of Uganda's millennium development goals, thus contributing towards Uganda's economic development.
- The researcher recommends that all SMMEs managements under their umbrella bodies work with Government agencies in the energy sector to devise ways of setting up a power backup plan for SMMEs , this can be through reducing on the taxes on fuel and generator so as to make them affordable to even small firms with limited capital investments as this will ensure less interruptions in production due to use of backup generator during power rationing thus leading to improved performance of SMMEs, improving on consumer confidence and enable small firms to compete favourably in the production market.
- The research recommends that SMMEs umbrella bodies like UIA, USSIA and UMA should work with the electricity distribution companies to have a power rationing schedule be availed ahead of time. This can be of much help to SMMEs as they can plan for labour ahead of time. Thus increasing labour when there is power for production and reducing labour size whenever there is power rationing as this is intended to reduce on

losses incurred by the SMMEs due to power rationing thus improving on the performance of the SMMEs sector that rely on power.

- The researcher recommends that SMMEs umbrella bodies such as USSIA, UIA and UMA together with Government should work on extending business and management training programmes to SMMEs intended to enhance their management skills, improve their competence and widen their knowledge as this will be translated into better performance

5.5.3 Power rationing and Overall Equipment Effectiveness of SMMEs

The following were the recommendations made for overall equipment effectiveness of SMMEs:

- The researcher recommends that the management of the printing and paper businesses work with financial institution for commercial banks to be able to access financial support for instance short term loans which will help them invest in other alternative sources of power for instance generator and be able to improve their performance.
- The researcher recommends that all SMMEs through their body blessed by their leadership should formally dialogue with GoU and forge a way forward on how best to increase in Investment in Energy sector geared towards reliable electricity supply as this will ensure reduced power rationing and support these SMMEs better their performance.
- The researcher recommends that SMMEs for instance paper and printing businesses or firms should work on forming business partnerships with well-established firms that can ensure production at all times. This will ensure that sub contracts are made amongst such partners thus enabling them to meet client demands and timely delivery of products.

5.6 Limitation of the study

The following comprise some of the limitations that affected the researcher from generalised the research findings including:

- 1) First, the study variables were based on a five item likert scale yet most of the interpretations held were dependent on the majority responses (agreed) while the not sure or disagreed scores were less explained. Based on this explanation, responses could have been biased hence affecting the generalisation of the results.
- 2) Secondly, the expected response rate was supposed to be 100% however, the actual overall response rate obtained was 61% hence failing short of the planned response although according to scholars including Amin (2005) and Sekeran (2003), any response rate above 50% are representative of a survey population. Based on this, the results could not be generalised.
- 3) The content scope was limited to power rationing and performance of SMME with specific interest around Not right first time measure of SMMEs, stock return and the overall equipment effectiveness. However, there are other factors that are affected rather than these factors identified thus results could not be generalized.

5.7 Areas for further studies

The following below represent key areas for further studies as identified by the research.

Some of these include:

- The Effect of Power rationing on the Performance of Employees in Uganda's SMMEs
- Lastly, the researcher recommends that research be held on the Effect of Government Investment in the Energy Sector and Performance of SMMEs

REFERENCES

- Abeberese, A. B. (2013). Electricity cost and firm performance: Evidence from India. *Available at SSRN 2273729*.
- Adenikinju, A. F. (2003). Electric infrastructure failures in Nigeria: a survey-based analysis of the costs and adjustment responses. *Energy policy*, 31(14), 1519-1530.
- Administrator (2013, October 14) Manufacturing sector poised for success but challenges linger on. The independent, retrieved from <http://www.independent.co.ug>
- Allcott, H., Collard-Wexler, A., and O'Connell, S. D. (2014). *How do electricity shortages affect productivity? evidence from india* (No. w19977). National Bureau of Economic Research.
- Arinaitwe, J. K., (2006). *Factors Constraining the Growth and Survival of Small Scale Businesses. A Developing Countries Analysis. Journal of American Academy of Business, Cambridge*, 8(2): 167-178.
- Augustine,R. (2013, April 26). As Uganda increases electricity tariffs, Kenya reduces power costs. The Daily Monitor, Retrieved from <http://www.monitor.co..ug>
- Balducci P, Roop J, Schienbein L and Desteese J. Electric power interruption cost Estimates for Individual Industries, Sectors, and the U.S.Economy.
- Balikuddembe J. (2012 January 17). Wakiso, Kampala residents demonstrate over load-shedding. The New Vision, retrieved from <http://www.newvision.co.ug>
- Biryabarema E.(2011 December 2). Uganda power cuts provoke riots, threaten economy. Reuters, retrieved from <http://www.reuters.com>.

Braimah, I and Amponsah, O. (2012). Sustainable development: *Causes and Effects of Frequent and Unannounced Electricity Blackouts on the Operations of Micro and Small Scale Industries in Kumasi*

Burlando, A. (2010). The Impact of Electricity on Work and Health: Evidence from a Blackout in Zanziba.

Corwin, J. L., and Miles, W. T. (1978). *Impact assessment of the 1977 New York City blackout. Final report* (No. HCP/T5103-01). System Control, Inc., Arlington, VA (USA).

DugDale, D., and Jones, T. C. (1998). Throughput accounting: transforming practices?. *The British Accounting Review*, 30(3), 203-220.

Dunning, R. A., and Richert, T. M. (2002). Applying lessons from lean production theory to transit planning. *Boeing Commercial Airplane Company*.

Electral Regulatory Authourity (2011). Sector update, news letter issue 6. December 2011

Electricity Parliamentary Report. On the energy (released in October 2012).

Electricity Regulatory authority (2011). Electricity Sector Performance Report july – December 2011.

Electricity Regulatory Authority (ERA) in the financial year 2012/13. The report provides information about the performance of ERA during this period

Esther, K. I., and Robert, K. (2008). Business constraints and Growth potential of Micro and Small Manufacturing Enterprises in Uganda. GIGA Working Papers. Available: <http://www.giga-hamburg.de/workingpapers/>

Ezor, Z. (2009). Power to the People: rural electrification in Uganda. *ISP Collection*, 673.

- Foster, V., and Steinbuks, J. (2009). Paying the price for unreliable power supplies: in-house generation of electricity by firms in Africa. *World Bank Policy Research Working Paper Series, Vol.*
- Frederick, D., and Selase, A. E. The Effect of Electric Power Fluctuations on the Profitability and Competitiveness of SMEs: A Study of SMEs within the Accra Business District of Ghana.
- Gauthier, B. (2001). Productivity and exports. *Uganda's Recovery, the Role of Farms, Firms, and Government.*
- Goldratt, E. M. (1990). *Theory of constraints*. Croton-on-Hudson, NY: North River.
- Iwayemi, A. (2008). Investment in electricity generation and transmission in nigeria: issues and options. *International Association for Energy Economics*, 37-42.
- Jafarian, H., Mashhadi, M. R., and Javidi, M. H. (2011). Proposing a New Market based Approach for Restoration of Power Systems. *Journal of Mathematics*.
- Kahigwa, J. (2013, April 12). Regulating Umeme power tariffs. The Independent, Retrieved from [Http://www.independent.co.ug](http://www.independent.co.ug)
- Karekezi, S., and Kimani, J. (2002). Status of power sector reform in Africa: impact on the poor. *Energy Policy*, 30(11), 923-945.
- Kerin, U., Dermeli, A., and Papic, I. (2007, May). Consequences of inadequate power quality for industrial consumers in Slovenia. In *19th International Conference on Electricity Distribution* (pp. 21-24).
- Krejcie, R. V., and Morgan, D. W. (1970). Determining sample size for research activities. *Educ Psychol Meas.*
- Mabasa, L. (2007). "As the power supply in Zimbabwe becomes unreliable, families, industry and the economies all suffer", International Magazine: The WIP

- Marshall, C., and Rossman, G. B. (2010). *Designing qualitative research*. Sage publications.
- Ministry of Energy and Mineral Development (2012). Renewable Energy Investment Guide
- Obura, O. C., Minishi-Majanja, M. K., Cloete, L., and Ikoja-Odongo, J. R. (2007). Assessment of Business Information Access Problems in Uganda.
- Oseni, M. O. (2012). Power outages and the costs of unsupplied electricity: evidence from backup generation among firms in Africa. *Paper for PhD thesis. Cambridge University*.
- Rahman, S. U. (2002). The theory of constraints' thinking process approach to developing strategies in supply chains. *International Journal of Physical Distribution and Logistics Management*, 32(10), 809-828.
- Reinikka, R., and Svensson, J. (2001). Confronting Competition: Investment, Profit and Risk. In Reinikka, R/ Collier, P. Uganda's Recovery: The Role of Farms, Firms, and Government, Kampala.
- Reinikka, R., and Svensson, J. (2002). Coping with Poor Public Capital, *Journal of Development Economics*.
- Rugumayo, A. (2006). The Electricity Supply Situation in Uganda and Future Direction. Ministry of Energy and Mineral Development.
- Ryan, T. P. (2007). First-time-right Ratio: Measuring the Measurers. *JOURNAL OF PERFORMANCE MEASUREMENT*, 11(3), 8.
- Sherazi, S. K., Iqbal, M. Z., Asif, M., Rehman, K., and Shah, S. S. H. (2013). Obstacles to Small and Medium Enterprises in Pakistan. Principal Component Analysis Approach. *Middle-East Journal of Scientific Research*, ISSN 1990, 9233, 1325-1334.
- Sing'andu, N. (2012). An assessment of the impact of ZESCO's power rationing on firm productivity and profitability: a case of selected Lusaka based manufacturing firms.

Susan, R., (2008). Investing in Small and Medium Sized Enterprises in Uganda. A Bid Equity Service Guide for Investors. Available at: www.bidnetwork.org

Tushabomwe-Kazooba, C. (2006). Causes of small business failure in Uganda: a case study from Bushenyi and Mbarara Towns. *African Studies Quarterly*, 8(4), 1-13.

Uganda Investment Authority (UIA) Baseline Survey of Small and Medium Enterprises in Uganda. Draft Final Report of February (2011).

Wadiri P. (2006, April 27). Uganda: *High Power Tariffs chocking SMEs*. The Monitor, retrieved from. <http://www.monitor.co.ug>

Wijayatunga, P. D., and Jayalath, M. S. (2004). Assessment of economic impact of electricity supply interruptions in the Sri Lanka industrial sector. *Energy conversion and management*, 45(2), 235-247.

World Bank.(2006).Enterprise Survey

APPENDIX

Appendix I: Questionnaire for Other SMMEs staff

QUESTIONNAIRE

TOPIC: Power rationing and performance of small medium manufacturing enterprises (MSMMESs) in Uganda: a case study of Kampala district

PURPOSE OF THE STUDY:

The main purpose of the study is to collect information on how power rationing in Uganda affects the performance of small medium manufacturing enterprises. Basing on the findings from the study, recommendations are given.

The information obtained in this questionnaire is treated with **STRICT CONFIDENTIALITY**.

SECTION A: Background Information

This section requires that the respondents give data and other background information.

1. Do you use electricity?

Yes ☐

No ☐

2. Gender of the respondents

Male ☐

Female ☐

3. Age bracket

15 – 25 years ☐ 26 – 35 years ☐ 36 – 45 years ☐ 46 – 55 years ☐ 56 – 65 years

66 – 75 years ☐

4. Is the company private or publicly held?

Private ☐

Public ☐

5. What is your type of power connection?

Domestic ☐

Commercial single phase ☐

Commercial three phase ☐

6. Please estimate the number of employees in the firm.

1-5 Employees ☐ 6-20 Employees ☐ 21-100 Employees ☐ 101-250 Employees ☐

251 or more Employees ☐

7. What is the type of products does your firm/ company deal in?

Raw materials ☐

Semi processed products ☐

Finished products ☐

All the above ☐

8. How many years has your firm been in business?

Less than 3 year's ☐ 3 -7 years ☐ 7- 15 years ☐ More than 15 years ☐

5. Your job position in the firm:

Owner manager ☐

Manager ☐

Supervisor ☐

Employee ☐

Section B: Power rationing and Performance of SMMEs

Tick the appropriate box from the alternatives given (Key: 1=SD, 2=D, 3=UD, 4=A and SA=5)

Power rationing and not right first time of SMMEs	1	2	3	4	5
I have ever lost equipment due to power on/off					
My equipment got damaged due to power rationing					
I have incurred heavy restart costs due to power rationing					
My business incurs high costs due to power rationing					
Machinery break down is mainly due to power rationing					
Generally power rationing has destructed my equipment					
Power on/off leads to production of defective units					
My production capacity is always affected by power rationing					

Power rationing and stock turns	1	2	3	4	5
There are losses in sales from my business due to power rationing					
I incur very high expenditures after power rationing has occurred					
My business losses good will of customers due to power rationing					
Use of generators has led to increased costs					
I always switch to alternative energy and therefore high costs of production					
When power goes, I just shut down the machine and this affects my revenues					
I work early mornings to avoid power rationing					
It is afternoon when I work to avoid power rationing					

Power rationing and overall effectiveness	1	2	3	4	5
Power rationing makes my equipment to be idle					
Power rationing makes our production to become none competitive					
It adds to the capital and operating costs of doing business					
Power rationing raises production costs					
We cannot meet our demand due to power rationing					

Performance of SMMEs	1	2	3	4	5
I wait till power is back then start to work					
I normally wait and work at periods when demand is low					
I just switch off my machines					
I have a generator					
When power goes, I switch on my generator					
I have other alternatives sources of energy to encounter power rationing					

Appendix II: Interview Guide for Proprietors and Top Managers

INTERVIEW GUIDE

TOPIC: SMALL MEDIUM MANUFACTURING ENTERPRISES PROPRIETORS AND ADMINISTRATORS.

1. What is the nature of your company? Private or public?
2. What type of products does your company or firm deal in?
3. What prompted you to start this business?
4. What do you have to say about electric power situation in the country today?
5. Do you experience power rationing in your area?
6. In situations of unannounced power rationing (blackout) what do you do?

Power rationing and switching off

1. How does switching off power during power blackouts affect your production process?
2. In case power goes off during production, how do you deal with the products still in the production process?
3. What happens when power comes back?
4. How often does power rationing happen in your working area?
5. What would be your word of wisdom to:
 - I. SMMES affected by power rationing?
 - II. Power regulatory bodies?
 - III. Government bodies responsible?
 - IV. Someone who wants to startup an SMMES

Power rationing and stock turns

1. What is the estimate of your company annual sales?
2. What is the relationship between power rationing and your sale of finished products?
3. What happens when power goes off while processing goods on a standing order?
4. How do customer / clients respond to changes that come as a result of power rationing?

5. What do you do to have leverage with fellow competitors in the market who are not affected by power rationing?
6. What would you do different if you had all the resources you need to compete favourably in the market?

Power rationing and overall effectiveness

- 1) Where do you get the machines, plants, spare parts that you use in your company?
- 2) In situations power rationing what happens to your production equipment?
- 3) In what ways does power rationing affect your machines effectiveness?
- 4) What is the highest academic qualification of the members of your Management Team?
- 5) How does your management deal with labour in case production has stopped due to power rationing?
- 6) In your own views what are the key factors that affecting your company's performance?
- 7) In your own opinion, what do you think are the key factors that affect the performance of SMME in Uganda?
- 8) What can be done to improve the performance of SMMEs in Uganda to enable them play a major role in economic development?

THANK YOU FOR YOUR COOPERATION!

Appendix III: Documentary Review Checklist

The following secondary sources were reviewed for information

- 1) Uganda Electricity Act (1999)
- 2) Paper and Products Business Plans (2009-2013)
- 3) Uganda Electricity Regulatory Authority Newsletter (2012)
- 4) UBOS census of business establishments (2010/2011)

Appendix IV: Krejcie and Morgan (1970) Population Table

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

N= Population

S= Sample size