Effect of Power Outages on Micro and Small Businesses in South West Nigeria

By

AMUSHITAN, Michael Adeniran

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

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CHAPTER ONE

INTRODUCTION

Renewed interest in the critical relevance of a consistent supply of electrical power for the growth of micro and small businesses in Nigeria in recent times (Moyo 2012; Akuru & Okoro, 2014; Forkuoh & Li, 2015;Nurudeen et al., 2018). Nwanakwere (2019) gathered a wealth of data on the relationship of electrical power on 2676 MSMEs in Nigeria, concluding that insufficient electricity supply had a serious impact on MSMEs in the country, with MSMEs subjected to about 11.6 hours of power cuts daily. Businesses lose 15.6 times the annual sales owing to this low power supply, according to the assessment, and spend up to USD 2,126.93 (360.52 Naira per 1 US Dollar) on energy each year. Micro and small sized enterprises are widely acknowledged as engines of inclusive economic growth, job creation, poverty reduction, and income disparity reduction (Aremu & Adeyemi, 2011; SMEDAN, 2017).The role of the South Western region of Nigeria in the socioeconomic development of Nigeria is well documented. According to the NBS (2020), it accounted for 44.33 percent of national internally generated revenue in the first half of the year, owing to the 144,498 registered micro and small sized enterprises spread across 77,818 square kilometers of land. Addressing the growth needs of these businesses in this region can lead to improved socioeconomic activities in the region, other regions and large scale development in Nigeria.

Most academics concurred that power outages have an adverse influence on micro and small businesses (Aremu & Adeyemi, 2011; Moyo 2012; Oginni & Adesanya, 2013; Akuru & Okoro, 2014; Forkuoh & Li, 2015). However, there continues to be a debate about the resultant effect, if all other factors are accounted for. Cissokho and Seck (2013), in a study subject to criticism showed that power outages had a positive influence on the performance of small businesses. This study investigated the association between power interruptions and

SMEs' performance in Senegal through Envelopment Interpretation non-parametric technique (DEA). The results were ascribed to SMEs' ability to use strong management techniques to mitigate the consequences of Senegal's ongoing power outages. Based on certain studies, fixing power outage concerns does not ensure improved performance by micro and small sized enterprises because other, crucial issues to consider exist in business growth development (Bose et al., 2013). Also, previous research focused on the relationship between of power outages on MSMEs performance at the state and national level, but not at the regional level (six states make up a region). This research aims to add to our understanding of the regional impact of power outages on MSMEs in Nigeria's South West area by examining patterns, financial outcomes, and regional competitiveness

This study is aimed at examining the pattern of power outages in Nigeria's South Western region in order to determine its impact on the financial outcomes of MSMEs, their competitiveness and level of expenditure in the region.

Research Questions

In an attempt to advance the study's target, researchers will attempt to answer the following questions:

i. Is Return on Investment (ROI) of micro and small businesses in South West Nigeria influenced by the degree of power cuts?
ii. Is Return on Asset (ROA) of micro and small businesses in South West Nigeria influenced by the degree of power cuts?
iii. Is there a relationship between power outages and the cost of competitiveness of micro and small businesses in South West Nigeria?
iv. How is the expenditure pattern of micro and small enterprises in South West region with regards to the degree of power outages?

1.2 Examined Hypotheses

This study puts the listed hypotheses to the test.:

i. Power failures have a substantial impact on MSMEs' ROI in South West Nigeria.

ii. Power failures substantial effect on ROA of MSMEs in South West Nigeria;

iii. Power failures have substantial relationship on cost of effectiveness of MSMEs in South West Nigeria;

iv. There is a substantial relationship between the degree of power cuts and expenditure pattern of MSMEs in the study area.

The introduction, literature review, methodology, results discussion, and conclusions make up the first five sections of the paper.

CHAPTER TWO

LITERATURE REVIEW

From mid nineteenth century, scholars have interrogated the relationship between power outage and its impact on micro and small businesses, a vital ingredient for economic progress, but with varied outcomes. Yet, the energy crisis of the 1950s and 1960s fueled interest in the link, leading to an increase in scholarship on the role of power outages in MSME development and the implications for industrial sector and the entire economy (Jiang, Chen, and Zhou, 2011). Available research also includes studies for East Asian and Pacific countries (EAP) estimates on the economic and environmental impact of electricity shortages (Fisher-Vanden et al, 2015).Power failures are a developmental issue in most developing countries, particularly in Sub-Saharan Africa, because they slow down the engines of economic growth and inclusive development. (Moyo, 2012; Kaseke and Hosking, 2013; Akuru & Okoro, 2014; Forkuoh & Li, 2015; Abeberese 2017; Grainger and Zhang, 2019).The impact in Nigeria is not an exception (Ogbuagu et al., 2010;Moyo 2012;Akuru & Okoro, 2014; Nyansu 2016 ; Nurudeen et al., 2018; Nwanakwere, 2019).

Nyansu (2016), utilizing the Ordinary Least Square (OLS) technique and the chi square investigated the useful electrical power supply to the country's MSMEs. The scholar noticed that regular power failure had forced the adoption of alternative source of generating electrical power in order to overcome the limited national grid supply of electrical energy to their firms. According to the article, this has resulted in higher costs of goods and services, as well as lost revenue. The study posits that the government should do all possible to ensure that the industrial sector has adequate electricity supplies. Similarly, using descriptive and OLS analysis, another study examined the variables influencing electrical energy supply and capacity utilization in Nigeria, and showed that epileptic power supply hampered manufacturing sector efficiency (Ogbuagu et al., 2010).

Years of neglect has seen the power sector suffer, affecting other major sectors, like the MSME sector that is crucial to the economy of Nigeria because the 41.54 million MSME's contribute 59.6 million jobs ,48.5% of the GDP and 7.27% of exported goods (SMEDAN,2017).

In another strand of literature scholars argue that the effect of power outage is not so much as crucial, if other institutional factors for business development are intact. In some cases even a favourable effect of power outage on MSME performance was found (Cissokho and Seck, 2013; Bose et al., 2013).

Previous studies considered individual state and countrywide impact of power outages on SME's but not as regions (six states make up a region). This paper therefore attempts to contribute to our knowledge on regional influence of power failure on MSME's in the South West region of Nigeria, analyzing patterns, financial performance and competitiveness at the regional level.

In general, scholars observed the power outage effect on a combination more than one from a set of variables such as sale's growth rate, employment growth rate, the cost of operations, the cost of staying competitive, profitability, ROI, ROA, customer goodwill, labor productivity growth rate as measures of firm performance (Moyo, 2012; Kaseke and Hosking, 2013; Cissokho and Seck, 2013; Akuru & Okoro, 2014; Forkuoh & Li, 2015; Abeberese 2017; Grainger and Zhang, 2019).

In recent decades, Nigerian enterprises have begun to relocate elsewhere, particularly to neighboring countries, where power is stable and affordable .Some large corporations that have relocated or shuttered their operations include (Mayah ,2010).

Nigerian enterprises are burdened with high costs of infrastructure installation and maintenance. Based on a report by Mayah (2010), 820 manufacturing enterprises shut down

between 2000 and 2008. In January 2010, the Manufacturing Association of Nigeria (MAN) conducted another poll, and Adeloye (2010) revealed that 834 manufacturing firms closed their doors in 2009. This rise is worrisome because it surpassed the combined figure of the previous eight years, from 2000 to 2008, in just one year (2009). This poll, which usually contains five industrial domains by which the nation is categorized in terms of manufacturing operations from the country's six geopolitical areas, From the data of manufacturing enterprises closing their doors in Nigeria, deeper examination reveals a broader overflow of economic implications. Mayah (2010), reported that the manufacturing sector's 5 percent share of the country's GDP in 1999 had reduced to 4.9 percent by 2000. Furthermore, the large number of closed manufacturing enterprises in recent years has exacerbated Nigeria's rising jobless rate. According to Adeloye (2010), when a company winds up, its employees become victims in the frontline. For example, in the 834 enterprises reported by MAN to have closed in 2009 alone, it is estimated that 83,400 jobs were lost.

As a consequence of the inadequate power supply condition, practically all manufacturing enterprises that have continued to operate have to run private power plants at a high cost, as seen by the amount spent on power generator importation into Nigeria. According to the England African Review of Business and Technology, Nigeria has leads the pack of generator-importing nations for the third time in a row, outpacing any other country since 2002. Recently, an increasing number of international firms operating in Nigeria have improved their own power generation capabilities through Independent Power Projects (IPPs).Despite this, some of these businesses have continued to make tremendous profits and meet their shareholders' commitments. However, such output reflects the fact that an increasing proportion of manufacturing costs are being passed on to final consumers, the majority of whom have seen their disposable incomes steadily decline due to inflation caused by the government's destructive policies.

World Bank's severe assessment of the electricity sector's performance best encapsulates the implications on Nigeria's MSME's sector. Manufacturing enterprises in Nigeria regard inadequate infrastructure, notably electricity supply, to be their most crucial constraint, according to Mayah (2010), who also mentions the country's harsh investment climate. Addressing the insufficient power and other infrastructure issues consumes more management time than any other business issue.

CHAPTER THREE

METHODOLOGY

Solving the research problems, it is essential to adopt a number of sociological strategies for data collection. This section presents how the work has been carried out. It includes the research design and the study area, population of the study, sample size, sample drawing techniques, data collection, presentation, and analytical techniques. The study design chosen enables the researcher to investigate the why and how of decision making, as well as the where, what, and when in the study area.

3.1 Research Design

This evaluation was conducted to unravel the pattern of power outages in South West, Nigeria and its influence on the financial outcomes of business in the region, with specific attention on MSMEs only. Research design is the general plan and approach on addressing identified research questions. It outlined steps on how to answer questions raised in research (Saunders et al, 2009). The purpose of a research and its problem are critical factors to be considered when adopting a research design. There are varieties of research designs available for researchers depending on the nature of the evaluation. This study will adopt a descriptive research design, which describes the behaviour of a study population using original data (Hocking, Bain, Channing, Fleming, & Wilson 2003). Studies that are descriptive in nature adopt non-experimental designs. In addition, studies that are exploratory, comparative, correlational and developmental in nature also adopt non-experimental designs (Davis, 2003).

3.2 Rationale for the method chosen

Descriptive research design take the form of either longitudinal or cross-sectional designs .Longitudinal designs are used to study a specific population over time. It could take the form of trend, cohort, or panel studies. Hence, data collection is carried at different intervals over the specified period. The later type of descriptive designs, which is adopted for

this present study, studies a particular population at one point in time. This type of design was based picked on the characteristics of the study population, MSMEs owners. The probability of meeting the same set of MSMEs owners more than once is very low. Hence, the adoption of descriptive research design (cross sectional) by the present study.

3.3 Study Area

The research will take place in Nigeria's South-West.. The area was chosen because of the presence of a high number of registered MSMEs and economic importance. The South West consists of six states which are Ondo, Ogun, Osun, Ekiti, Lagos and Oyo states. The region covers a land area of 1,479,389 kilometers, with all the states located entirely within the tropics. Despite the fact that many dialects exist within the same state, Yoruba native speakers dominate the region. The rainy season (March to November) and the dry season (December to February) in Nigeria have different meteorological conditions (November - February).

3.4 Population of the Study

The owners of registered MSMEs operating in Nigeria's South Western states comprise the study's population. The study adopted the MSME classification of SMEDAN (2017) as shown below;

S/n	Size category	Staff count	Turnover(N Million)
1	Micro-micro enterprise	1-2	Less than 3
2	Micro enterprise	3-9	3- 25
3	Small enterprise	10-49	25+ but less than 100
4	Medium Enterprise	50- 199	100+but less than 1000

Micro businesses are further divided into Micro enterprises and Micro-micro enterprises.

Table 1 Population of the Study

	States	**Registered SMEs**
1	Ogun	25,273
2	Ondo	12,213
3	Osun	18,358
4	Oyo	15,008
5	Lagos	53,156
6	Ekiti	20,490
	Total	**144,498**

3.5 Sampling Technique and Sample Size

The participants, who are mostly MSME owners, were chosen using convenience sampling, a non-probability sampling technique that does not include a game of chance in sample selection from the community. Convenience sampling involves the collection of data from sample elements (MSME owners) located by the researcher. Researchers adopt this method of sampling in situations when getting responses and feedback from the study respondents selected at random could be difficult (Sekaran, 2000). This is essential because most micro and small business owners could not be physically located by the researchers, necessitating the use of an online survey method to supplement the physical distribution of questionnaires. The respondents were drawn from the region's MSMEs, as defined by SMEDAN (2017), as well as residents of the study area (South West, Nigeria). Respondents in this category are familiar with the frequency of power outages in the region, therefore should be aware of impacts of power outages on their businesses.

Jemain, Al-Omari, and Ibrahim (2007) asserts that getting responses from a whole population seems to be unachievable, hence sampling is required. Sampling is using a small representation in a given study population to draw a conclusion on the entire population. A sample size of 399 was derived for survey respondents for this study using Yamane (1973) sample size formula with 95% confidence level.

$$n = \frac{N}{[1+N(e)^2}$$

n = sample size; N = study population; e = margin error (5%)

$$n = \frac{144498}{[1 + 144498\ (0.05)^2]}.$$

$$n = \frac{144498}{[1 + 361.25]}. = \frac{144498}{362.25}.$$

n = 399 respondents

3.6 Research Instrument

This study collected primary data from the selected respondents via a survey questionnaire. The survey questionnaires were self-administered to the owners of the selected MSMEs. Data relating to power outages and how it influences the respondents' financial performance of their businesses. In testing the reliability of the research instrument, Cronbach Alpha was adopted as a measure of its internal consistency. In addition, before questionnaire administration on the study respondents, the research supervisor validated the content of the questionnaire. A digital version of the questionnaire was also created for respondents who couldn't be found physically. The primary data, which are data to be obtained directly from the study respondents through the use of a structured questionnaire. Items identified during literature review were used in developing the constructs for achieving research objectives. The questionnaire was designed to elicit information on socio-demography of respondents,

their return on assets, return on investment, and cost of competitiveness. The type of data involved and their description are as presented in Table 3b below,

Research Objectives	Method of Data Analysis	Type of Data
One	Linear regression	Quantitative
Two	Linear regression	Quantitative
Three	Linear regression	Quantitative
Four	Linear regression	Quantitative

In this study, Return on Assets (ROA) is the profitability ratio that provides how much profit a business is able to generate from its assets. It measures how efficient the owner of a business is generating income from business assets.

Return on Investment (ROI) is a business performance measure used to evaluate the profitability of a business' investment. It directly measures the amount of return on a particular investment that a business made when compared to the amount invested.

The cost of Staying Competitive (COS) is a business's ability to remain relevant in the market. It includes business actions and plans made to persist relevant in the industry despite the environmental, economic, or political change.

To validate the research instrument, the study requested the help of experienced MSME experts and senior academic scholars in the field of study to make inputs to the research instrument. This was to ensure that the research instrument was adequate for the collection of data that eventually led to the achievement of the research objectives. In addition to questionnaire usage, in collecting primary data, the study used an online survey, which is an electronic version of the research instrument.

The internal consistency of a group of elements grouped into a construct or single scale is measured using a reliability test. It is a metric for determining the homogeneity of the scale. Cronbach's Alpha will be used to evaluate the reliability of the questionnaire's items. Cronbach's Alpha could be anywhere between 0.0 and +1.0. The greater the internal consistency of items in that form the construct, the closer the Alpha value is to +1. Because of the sensitivity of alpha value to number of items, an alpha value greater than 0.7 is considered acceptable in an ideal situation when there are a sufficient number of items making up a variable (George & Mallery, 2003).

3.7 Methods of Data Analysis

Data collected were analyzed and presented using statistical tools such as tables, frequency, cross tabulation, percentage distribution, and Mean ranking. Econometric tools such as regression analysis were also employed in testing of the research hypotheses.

CHAPTER FOUR

RESULTS AND DISCUSSION

Table 2 shows the staff strength of each of sampled micro and small firms in the study area. The results show that a majority (60.7%) of the sampled micro and small businesses had less than 5 employees at a time. Also, Table 2 shows that about 24.2% of the micro and small businesses had between 5 and 10 staff at a time while very few (1.5%) had more than 10 employees. About 13.6% of the respondents do not respond to this question. This result confirms that sampled businesses can be categorized as a micro and small business. Furthermore, Table 3 shows the age of the micro and small businesses sampled. The results show that about 11.8% of the respondents indicated that their businesses have been in operation for less than 2 years, while a majority (74.3%) of the respondents stated that their businesses have been in operation between 2 and 5 years. About 9.3% of the respondents stated that their businesses had been in operation for about 6 to 10 years, while 3.5% stated that their businesses had been in operation for more than 10 years. However, 1% of the valid responses failed to answer this question. These results infer that most micro and small businesses in the study area do not operate beyond five years after their startup. They mostly collapse in their first five years, due to various reasons such as bad economy, poor infrastructure, inability to access low-interest funding, and bad governance and policies.

Table 2 Number of Staff

Number of Staff	Frequency	Percentage
Less than 5 Staff	241	60.7
5 - 10 Staff	96	24.2
More than 10 Staff	6	1.5
No Response	54	13.6
Total	397	100.0

Table 3 Age of Business

Age	Frequency	Percentage
Less than 2 Years	47	11.8
2 - 5 Years	295	74.3
6 - 10 Years	37	9.3
More than 10 Years	14	3.5
No Response	4	1.0
Total	397	100.0

Table 4 Dependability of Business on Power Supply

Response	Frequency	Percentage
Not at All	47	11.8
Very Rare	41	10.3
Often	83	20.9
Sometimes	128	32.2
Always	94	23.7
No Response	4	1.0
Total	397	100.0

Table 5 Frequency of Power Outage per Day

Frequency of Power Outage	Frequency	Percentage
Fewer than 2 times	69	17.4
Between 2 and 4 times	199	50.1
More than 4 times	129	32.5
Total	397	100.0

Table 4 shows level of dependability of the sampled micro and small businesses on power supply. Most businesses, especially micro and small-scale enterprises depend on power supply for their day-to-day operations. These businesses need power supply for their production processes, services rendering and revenue generation. About 23.7% of the respondents indicated that their day-to-day business operations always depend on power for its survival. Without power supply, they cannot survive. Also, 32.2% of the respondents stated that their business sometimes depends on power supply for their survival. About 20.9% and 10.3% of the respondents respectively stated that their businesses often and rarely depend on power survival for its revenue generation. However, 11.8% of the respondents confirmed that their businesses do not depend on power supply at all for their survival and daily operations.

Table 5 relates to the level of instability of power supply in the study area. The results affirmed the level of erratic power supply as 32.5% of the respondents stated that they experience power outages for more than four times daily, while half (50.1%) of the respondents confirmed that they experience power outages between 2 and 4 times daily. However, about 17.4% of the respondents stated that they experience power outages less than twice in a day. Results shown on Table 6 reveal that 61.2% of the respondents experienced more than 1 hour power outage on a daily basis. About 25.2% of the respondents reported that they experience power outage between 10 minutes to 1 hour daily, while 13.6% recorded power outage for less than 10 minutes daily. This result infers that the level of power supply in the study area is very low and could affect businesses whose operations depends solely on the national power grid, without alternative power supply. The frequency and duration of power outages are regarded to be high and not suitable for micro and small businesses' growth.

Table 6 Duration of Power Outage Per Day

Duration of Power Outage	Frequency	Percent
Less than 10 times	54	13.6
From 10 to 1 hour	100	25.2
More than 1 hour	243	61.2
Total	397	100.0

Table 7 Ownership of a Generating Set

Ownership of a Generating Set	Frequency	Percentage
No	172	43.3
Yes	217	54.7
No Response	8	2.0
Total	397	100.0

Table 8 Average monthly expenditure on generator

Average monthly expenditure on generator	Frequency	Percentage
Less 5,000 Naira	60	15.1
5,000 - 10,000 Naira	143	36.0
10,001 - 20,000 Naira	66	16.6
20,001 - 30,000 Naira	31	7.8
30,001 - 40,000 Naira	1	0.3
Above 40,000 Naira	11	2.8
No Response	85	21.4
Total	397	100.0
Mean	30,808.01	

Table 7 shows the statistic of the respondents owning a generating set, in order to cushion the effects of power outages on their businesses. The results show that more than half (54.7%) of the total respondents own a generating set, used for their businesses' day-to-day operations. About 43.3% of the respondents indicated that they do not own a generating set while 2% failed to disclose information. In addition, Table 8 shows the average monthly expenditure on generators by study respondents. About 15.1% of the respondents spend less than 5,000 naira (USD9.09) on a monthly basis while 36% of the respondents spend between 5,000 naira (USD9.09) and 10,000 naira (USD18.18) on a monthly basis servicing their power generating set. Cumulatively, about 27.5% of the total respondents spend more than 10,000 naira (USD18.18) running a generator on a monthly basis. These results show that the cost implication of running a power generating by micro and small businesses is significant, when summed up at the end of each accounting period. Also, Table 9 shows that 31.7% of the respondents spend less than 5,000 naira (USD9.09) on electricity bill from the national power distribution companies while 28.7% of the respondents spend between 5,000 naira (USD9.09) and 10,000 naira (USD18.18) on a monthly basis paying power distribution companies. When compared, the study found that the respondents spend more using their generators than what they pay to power distribution companies as shown by means values of 30,808.01 naira (USD56.01) and 12,291.59 naira (USD22.35) respectively.

Table 9 Average monthly expenditure on national power grid

Average monthly expenditure on national power grid	Frequency	Percentage
Less 5,000 Naira	126	31.7
5,000 - 10,000 Naira	114	28.7
10,001 - 20,000 Naira	61	15.4
20,001 - 30,000 Naira	32	8.1
30,001 - 40,000 Naira	11	2.8
Above 40,000 Naira	13	3.3
No Response	40	10.1
Total	397	100.0
Mean	12,291.59	

Effects of Power Outage on Return on Investments (ROI)

The number of employees and the age of the micro and small firms sampled were used to examine the association between power cuts and return on investments using linear regression analysis.. The regression results showed that the independent variable(power outage) does not significantly predict return on investments among micro and small business when controlled for age of business and number of employees in the South West, Nigeria as shown on Table 10. The F calculated, 6.00 at 95% confidence level and degrees of freedom of (3, 338). Based on these findings, R squared value of 0.0476 means that the severity of power outages experienced by the firm during trading hours determines 4.76 percent of the overall variation in ROI of micro and small businesses, regardless of their staff size or age.. This also suggests that other variables not included in this analysis accounts for the other 95.24% variation experienced by micro and small business in terms of the return on their investment.

The results further imply that power outages experienced by businesses significantly affects the profits generated on the amount invested in the business, either in terms of cost of materials or manpower hours. In addition, the number of employees and age of business, when kept constant, the estimated coefficient (0.1146) between power outage and return on investment is not significant, however positive.

The results also showed that the regression model does not accurately predict the dependent variable. at $p < 0.05$. In testing the hypothesis, the value ($p = 0.440$) indicates that the hypothesis, power outage has a no significant effect on return on investment of micro and small businesses in South West Nigeria when controlled for age and number of employees. From the coefficient table, the regression equation is;

$Y = B0 + B1X1 + B2X2 + B3X3 + e$

Where Y = Return on Investments (Dependent variable)

B0 = Intercept or Constant

X1 = Power outage

B1 = Coefficient of the power outage

X2 = Age of business

B2 = Coefficient of age of business

X3 = Number of employees

B3 = Coefficient of a number of employees

e = Error term

Table 10 Regression Results of the Effect of Power Outages on the ROI of Micro and Small Enterprises

Linear regression

Number of obs	= 342
F(3, 338)	= 6.00
Prob > F	= 0.0005
R-squared	= 0.0476
Root MSE	= 1.0257

roi	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
degree_power2	.1146388	.1482835	0.77	0.440	-.1770359	.4063136
Age_of_Business	.0455156	.0123747	3.68	0.000	.0211745	.0698567
No_of_employees	-.0570301	.0232581	-2.45	0.015	-.102779	-.0112813
_cons	2.521027	.3539216	7.12	0.000	1.824861	3.217193

In the table below, the study removed the control variables and the following was obtained

. reg degree_power2 roi

Source	SS	df	MS		
Model	1.92351718	1	1.92351718	Number of obs	= 397
Residual	92.0168473	395	.232954044	F(1, 395)	= 8.26
				Prob > F	= 0.0043
Total	93.9403644	396	.237223143	R-squared	= 0.0205
				Adj R-squared	= 0.0180
				Root MSE	= .48265

degree_pow~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
roi	-.0613864	.0213629	-2.87	0.004	-.1033855	-.0193873
_cons	2.426576	.0659538	36.79	0.000	2.296911	2.55624

The result shows a significant negative influence on ROI if the control variables are not involved.

Effects of Power Outages on Return on Assets (ROA)

The research assessed the effect of power outage on return on assets (ROA) of micro and small businesses in South West, Nigeria. Power outages have been accounted to affect operations of small businesses, especially, in developing nations like Nigeria. Neglect of the power sector has accumulative results with rapidly increasing deterioration of the micro and small business sector in the country. Table 11 shows the regression coefficients of the influence of power failure on ROA of micro and small businesses in the study area using the age of business and number of employees as control variables.

Furthermore, the findings reveal that, when the control variables are held constant, power cuts have a negative impact on the amount of money micro and small firms make from their assets, however, it's not significant. The estimated coefficient value of -0.0623 and a non-significant value of 0.664 demonstrate this. Power outages could have a negative effect on the micro and small companies in the research area, according to a negative estimated coefficient value of -0.0623. The results of the questionnaire survey confirmed the views of this study and indicated that small businesses, who are drivers of the economy, might have developed means to overcome power failures, if they must utilize the assets procured to run their businesses.

In overall, the linear regression results revealed that regardless of the age of the business and numbers of employees, power outages have no effect on the dependent variable (ROA) going by p value of 0.2206. Table 10 shows that the independent variables contribute about 1.25% (R Square = 0.0125) to the dependent variable. Also, this contribution is quite low and not significant at 95% confidence level (Sig value = 0.2206) as shown on Table 11. Hence, the

hypothesis, H_1: power outage has significant effect on return on assets of micro and small businesses in South West Nigeria, is rejected.

The coefficient table was extracted from the regression analysis. From the coefficient table, the regression equation is;

$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + e$

Where Y = Return on assets (Dependent variable)

B_0 = Intercept or Constant

X_1 = Power outage

B_1 = Coefficient of the power outage

X_2 = Age of business

B_2 = Coefficient of age of business

X_3 = Number of employees

B_3 = Coefficient of a number of employees

e = Error term

Table 11 Regression Results of the Effect of Power Outages on the Return on Assets (ROA) of Micro and Small Enterprises

Linear regression

Number of obs	342
F(3, 338)	1.48
Prob > F	0.2206
R-squared	0.0125
Root MSE	1.0993

roa	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
degree_power2	-.0623296	.1431731	-0.44	0.664	-.3439521	.2192928
Age_of_Business	.0156759	.0114506	1.37	0.172	-.0068476	.0381993
No_of_employees	-.0388546	.0308103	-1.26	0.208	-.0994587	.0217495
_cons	3.009128	.3349217	8.98	0.000	2.350334	3.667921

However when the control variables age of firm and number of employees are removed there is a significant negative influence by power failure on ROA as shown in the table below

. reg degree_power2 roa

Source	SS	df	MS
Model	2.42417887	1	2.42417887
Residual	91.5161856	395	.231686546
Total	93.9403644	396	.237223143

Number of obs	397
F(1, 395)	10.46
Prob > F	0.0013
R-squared	0.0258
Adj R-squared	0.0233
Root MSE	.48134

degree_pow~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
roa	-.068085	.0210484	-3.23	0.001	-.1094659	-.0267041
_cons	2.446154	.0651887	37.52	0.000	2.317994	2.574314

Effects of Power Outages on Cost of Staying Competitive

A linear regression was used to determine the influence of the causal association between power outages and the cost of remaining competitive for micro and small businesses, which was controlled by the number of employees and the age of the firm.. The linear regression results show that power outage will not significantly predict the cost of staying competitive among micro and small businesses, regardless of their employee size and age. This is shown by the F (1, 395) calculated at 4.16 and a significant value of 0.633 as shown on Table 12.

The regression results showed that the independent variables do not significantly predict cost of staying competitive of the micro and small business in south west, Nigeria as shown on Table 12. The results indicated that R squared value of 0.0267 imply that 2.67% of the total variation in the cost of staying competitive of the micro and small business is determined by the power outages experienced by the business during operating hours, regardless of their employee size and age. This also suggests that other variables not included in this analysis accounts for the other 97.33% variation experienced by micro and small business in terms of their ability to stay relevant in the market.

When the control variables are kept constant, there is a non-significant relationship negative correlation between power outage and cost of staying competitive of the micro and small businesses as shown by estimated coefficient (-0.072, $p > 0.05$). From the statistical results, the regression equation is;

$Y = B0 + B1X1 + B2X2 + B3X3 + e$

Where Y = Cost of staying competitive (Dependent variable)

B0 = Intercept or Constant

X1 = Power outages

B1 = Coefficient of the power outages

X2 = Age of business

B2 = Coefficient of age of business

X3 = Number of employees

B3 = Coefficient of the number of employees

e = Error term

Table 12 Regression results of the Effect of Power Outages on the Cost of Staying Competitive (COS) of micro and small Enterprises

```
Linear regression                               Number of obs =     342
                                                F(  3,   338) =    4.16
                                                Prob > F      =  0.0065
                                                R-squared     =  0.0267
                                                Root MSE      =   1.008
```

cos	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
degree_power2	-.0721277	.1511344	-0.48	0.633	-.3694102	.2251548
Age_of_Business	-.0032079	.0107109	-0.30	0.765	-.0242763	.0178604
No_of_employees	-.05077	.0152186	-3.34	0.001	-.0807051	-.020835
_cons	2.969543	.3551655	8.36	0.000	2.27093	3.668157

However, when the study removed the control variables a significant negative influence was observed as shown in the table below;

```
. reg degree_power2 cos
```

Source	SS	df	MS	Number of obs	=	397
				F(1, 395)	=	17.03
Model	3.88242094	1	3.88242094	Prob > F	=	0.0000
Residual	90.0579435	395	.227994794	R-squared	=	0.0413
				Adj R-squared	=	0.0389
Total	93.9403644	396	.237223143	Root MSE	=	.47749

degree_pow~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
cos	-.0896311	.0217205	-4.13	0.000	-.1323334	-.0469289
_cons	2.493458	.0636112	39.20	0.000	2.368399	2.618517

Expenditure pattern of micro and small enterprises and the degree of power outages in the South West region

The study examined the relationship between the expenditure pattern of micro and small enterprises and the degree of power outages in the South West region. This relationship was analysed using Pearson Product Moment Correlation. The correlation table shows that there is significant positive relationship between expenditure on national power grid and other alternative source of power, the generating set (r = 0.833). Furthermore, a positive and significant relationship was discovered between the duration of power outages and the frequency of power outages (r = 0.371). Also, the relationship between expenses on national electrical energy supply and frequency of power outage, and duration of power outage were found to be significant and positive. This implies that regardless of expenses incurred by micro and small businesses in the study area do not translate to reduction in the duration and frequency of power outage. Investments in the power sector have been found not to be effective, as the level of power scarcity do not improve, regardless of the level of investment.

Correlations					
		Average monthly expenditure on generator	Average monthly expenditure on thecnational power grid	Duration of Power Outage	Frequency of Power Outage
Average monthly expenditure on generator	Pearson Correlation	1	.833**	.058	.033
	Sig. (2-tailed)		.000	.306	.560
	N	312	305	312	312
Average monthly expenditure on national power grid	Pearson Correlation	.833**	1	.111*	.149**
	Sig. (2-tailed)	.000		.036	.005
	N	305	357	357	357
Duration of Power Outage	Pearson Correlation	.058	.111*	1	.371**
	Sig. (2-tailed)	.306	.036		.000
	N	312	357	397	397
Frequency of Power Outage	Pearson Correlation	.033	.149**	.371**	1

	Sig. (2-tailed)	.560	.005	.000	
	N	312	357	397	397
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

CHAPTER FIVE

CONCLUSION

It can be deduced from this study that power failure might not be the sole determinant on MSME's ROI, ROA, and competitiveness in South West Nigeria as controlling for (or not) age of business and number of employees in the study . The investigation was in agreement with findings of some researchers (Cissokho and Seck, 2013; Bose et al., 2013).

Micro and small firms are the main engines of poverty reduction, job creation and sustainable inclusive growth in any society, thus, solving the concerns of this sector is crucial to the development of the country Nigeria.

Due to how vital this issue is, this paper recommends the following:

1. Government as a matter of priority re-organizes and re-strategizes MSME support organizations at regional state and national levels so as to ameliorate the hidden issues affecting firm performance.

2. That all Industrial Development Centres (IDC's) in the country, which accommodate some micro and small businesses be revitalized with top priority direct lines to the main power grid as well as provision of alternative stand-alone energy sources such as solar panels, biomass digestion to electrical power facilities as human waste could be turned to electrical energy.

3. State governments in this region could co-fund power generation in turns for micro and small business in each other's state to lessen the financial burden on a single state providing electrical power infrastructures.

4. The use of prepaid meters in the measurement, distribution of power by Distribution Companies (DISCOS) should be made compulsory, while licensing and re-licensing of DISCOS should be recurrent so as to monitor and evaluate the distribution of power supply.

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