

IMPACT OF DEFICIENT ELECTRICITY SUPPLY TO SMALL AND MEDIUM SCALE ENTERPRISES IN KANO-NIGERIA

IWEAMA VINCENT OKWUDILI, Ph.D

Department of Management Studies
Nigeria Police Academy, Wudil-Kano
Email: viweama@yahoo.com

IWEKA ANDREW NGOZI, Ph.D

Department of Marketing
Madonna University, Okija-Nigeria

ALFA HENSON

Department of Accounting Education
Federal College of Education (Tech) Bichi, Kano-Nigeria

Abstract

Electricity supply in Nigeria is often erratic. Consumers of electricity (residential, commercial and industrial consumers) suffer untold hardships as the Power Holding Company of Nigeria (PHCN) has been unable to supply reliable power. This is despite massive injections of funds by the federal government into the power sector over recent years. The failure has significantly impacted negatively on the operations of the business sector especially the small and medium scale enterprises that operates with little capital and are thus in most cases unable to afford a back-up facility to ensure un-interrupted power supply for their operations. The study therefore examined the impact of deficit electricity supply to small and medium scale enterprises in Kano-Nigeria. Population of the study is 1286 which is the number of registered small and medium scale enterprises in Kano, a sample size of 50 respondents was selected through the use of stratified random sampling to ensure effective representation of the population of small and medium scale enterprises in Kano-Nigeria. Results from data analysis indicates the severity of electricity supply outages and the costs imposed by power supply outages on the operation of small and medium scale enterprises. The paper therefore recommends the need for policy attention towards revitalizing the electricity sector of Nigeria for enhanced supply of electricity to the national economy. When this is achieved, the small and medium scale enterprises will be in a position to effectively lead in the drive towards industrializing the Nigerian economy

Keywords: Deficit Electricity Supply, Small and Medium Enterprises, Power Holding Company of Nigeria

Introduction

Background of the Study

Nigeria is hugely endowed with energy resources which include oil, natural gas, coal, biomass, solar, wind and hydro resources among others (Iwayemi,

2008; Onuoha, 2010). However despite this huge endowment Nigeria is also an energy deficient country whose economy suffers tremendously from the shortage of energy supply (Agbo, 2017). The shortage imposes huge cost on the economy and compels widespread private provision by different classes of energy users (Lee and Anas, 2012; Adenikinju, 2015). Additionally Nigerians often spend many productive hours queuing for petroleum products in the fuelling stations to buy fuel at government regulated prices because fuel supply scarcity has been a recurrent feature of the Nigerian energy market. Fuel scarcity in the economy and failing electricity supply create dual energy crisis to Nigeria (Iwayemi, 2008). Investment in back up generating facility is widespread and imposes significant costs on the economy. Small Scale businesses suffer the most from Nigeria's energy poverty as they spend a large proportion of their capital (about 20-25% of their investment) on back up generating facilities (Lee and Anas, 2011; Foster and Steinbuks, 2016). In fact Adeyemi, (2017) links most of the country's economic woes including its inability to industrialize to the dismal performance of the energy sector. However power supply outages are not peculiar to developing countries alone considering the recent black outs in California and other parts of north eastern United States of America. Though it has been the cardinal policy of government electricity policy and consumers desire to have power supply reliability, *keeping the light on* is an extremely difficult challenge (DOE, 2013) especially in a developing economy. Ukpong, (2003); Iyanda, (2012); Lee and Anas, (2011, 2012); Uchendu, (1993); Ajayi (2015), Adenikinju, (2015); Oseni and Pollit, (2013) have examined the cost of power outages and unreliable supply of electricity on firms and document firms survival strategies in Nigeria and Africa. This study builds on the previous studies by focusing on the small scale businesses in Kano - Nigeria for many reasons. First the small scale businesses have a lot of contributions to make towards the development of the Nigerian economy in terms of providing employment and income opportunities to the people. Based on experience, these types of businesses provide the surest path to industrialization. Additionally the choice of small scale business is informed by the fact they are the dominant businesses found in Nigeria. Finally like other parts of Nigeria, Kano also suffers from epileptic supply of electricity. The study is therefore expected to bring to the fore the challenges small scale businesses face due to unreliable supply of electricity in the region as a way of attracting the needed policy attention that could alleviate their plight. It is also expected to highlight on the investment potentials for electricity generation, transmission and distribution infrastructure that the private sector could take opportunity of in closing the prevailing deficit.

Statement of the Problem

In Nigeria, poor electricity supply is perhaps the greatest problem confronting the business sector. A typical Nigerian firm experiences power failure or voltage fluctuation about seven times per week each lasting for about two hours, without prior warning. This imposes huge cost on the firm arising from idle workers, spoil materials, lost output, damaged equipment and restart cost. The overall impact is to increase business uncertainty and lower returns on investment. For the aggregate economy, this has seriously undermined Nigeria's growth potential and the attractiveness of the economy to external investors (Adenikinju 2015).

In 2010, the World Bank estimated the economic loss to the country from PHCN's inefficiency at about ₦100billion. Firms respond to the inefficiency of PHCN through factor substitution, private provision of electricity, choice of business and output reduction. The most common responses among Nigerian firms have been through private provision of generator. They factor generator cost into the overall investment cost. This raises the setup cost of firms in the country. Incidentally, small and medium scale enterprises are worse affected (Adenikinju, 2015).

Lee and Anas (2011) reported that small scale enterprises spent as much as 25% of the initial investment on self-provision of a generator. This affects the profitability of investment, raises cost of production, and reduces cost competitiveness of local production and the general performance of small and medium scale enterprises. PHCN is able to supply electricity at much lower cost than private provision, yet many small and medium scale enterprises rely heavily on generator for their operations (Udeaja, 2016).

Research Questions

This study seeks to find answers to the following questions:

- i. What is the relationship between electricity supply and the performance of small and medium scale enterprises in Kano?
- ii. What is the implication of power failure on cost of production and output performance of small and medium scale enterprises in Kano?
- iii. Why do firms make provision for private power-generation despite the huge cost involved?

Objectives of the Study

The general objective of the study is to examine the impact of deficient electricity supply to small and medium scale enterprises in Kano-Nigeria. The specific objectives are as follows:

- i. To examine the relationship between electricity supply and the performance of small and medium scale enterprises in Kano.
- ii. To examine the implication of power failure on cost of production and output performance of small and medium scale enterprises in Kano.
- iii. To investigate why firms make provision for private power-generation despite the huge cost involved.

Research Hypotheses

$H_0: b=0$ There is no significant relationship between energy crisis and the performance of small and medium scale enterprise in Nigeria.

$H_1: b \neq 0$ There is significant relationship between energy crisis and the performance of small and medium scale enterprises in Nigeria.

Review of Related Literature

The State of Power Supply in Nigeria

The dismal performance of the Nigerian electricity supply industry is well noted (Adenikinju, 2015). Nigeria's quests for industrialization have been hampered by erratic and inadequate electric power supply (Olugbenga, Jumah and Phillips, 2013). This is largely due to inadequate generation, transmission and distribution infrastructure. Though a lot of resources have been expended to expand the industry's infrastructure, Nigerians still experience inadequate and unreliable electric power supply characterised by high voltage variations, recurrent black outs and pervasive reliance on self-generated electricity (Adenikinju, 2015).

Because of the pervasive dependence of the electricity consumers on generators, the Nigerian economy has being described as a generator economy (Ekpo, 2009) exemplified by high operational costs and poor competitiveness. Thus Nigeria's persistent electricity crises have hampered the industrialization process of the country due largely to production

stoppages and high operational cost. These have undoubtedly significantly undermined the growth and development process of the economy (Udah, 2010).

Consequently, power outages have become the norm in Nigeria. In fact in 2010, major manufacturing firms experienced 516 outages. This increased by 26% in 2011, followed by an explosive 43% increase between 2012 and 2013 (Oluronshola, 2014). Due to the incessant power supply challenges, in 2010 the Government promulgated more reforms of the industry by opening the sector for private investment especially in the generation segment of the market (FGN, 2014). The reform has however failed to enhance the quantum and reliability of power supply in Nigeria. The result is the frequent power supply failure that has made electric power supply to be very unreliable and inadequate

Electricity supply reliability has become an important public policy issue due to the enormous costs being born by electricity users due to unreliable and inadequate electric power supply. Ensuring electricity supply reliability has also occupied important space in private investment and operating decisions (DOE, (2013). Consumers of electricity require infrequent occurrence of outages or other power supply disturbances which usually interfere with their use of electrical appliances (for domestic consumers) or halt their production or operational activities. Even at macro level, unreliable power system poses serious challenges to the socioeconomic and political structure of an economy. Some of these challenges manifest in the loss of welfare, pressure on governance, and loss of output among others (Oseni and Pollit, 2013). Poor electricity supply in Nigeria and indeed the rest of Africa has posed the greatest challenge to productivity, investment growth and competitiveness (Renneika and Svenson, 2012; ADB, 2009). For example an average firm in Nigeria in 2007 experienced an outage of 8.2hours, 26.3 times in a typical month translating into about 216 hours on average every month (Oseni and Pollit, 2013). Business firms respond to unreliable supply of electricity in a variety of ways which include choice of business, choice of location, output reduction, factor substitution and self-generation.

However, self-generation has been the most widely adopted strategy (Abu-Elias, 2011; Adenikinju, 2015). Firms invest in back up capacity to generate their own electricity during power outage. Renneika and Svenson (2012) found that unreliable and inadequate electric power supply greatly reduces firms' investment and other productive activities. In Nigeria, it has been estimated that firms self-generate their electricity at a cost that ranges

between 16 to 30 times higher than the publicly provided electricity (World Bank, 2013). Thus the unreliable supply of electricity imposes enormous costs on the firm. Such costs include raw materials damages, equipments spoilage and lose of productive man-hours and forgone sales, disruption of production, reduced profits and management attention among others. As a strategy of mitigating the costs of unreliable or inadequate power supply, firms invest in back up facilities to generate owned electricity in house. As a result many firms are forced to maintain back-up generation capacity. However self-generation of electricity generally costs more than the grid supplied electricity. This cost differential limits the potentials of self-generation as a permanent substitute or solution to power supply unreliability.

The distribution of cost imposed by the frequent power outages is disproportionately high for the small scale businesses. Small scale businesses spend about 25% of their investment costs on back up generating plant (Lee and Anas, 2011). Even the large industrial concerns also suffer hugely from electricity supply shortages bedevilling the country. Yunusa, (2012) reports that the cost of generating power supply by Nigerian firms for production activity amounts to about 36% of firms' costs of production. Iwayemi, (2008) also estimated that 20% of investment in large industrial projects is usually allocated to alternative source of electricity supply. In fact it is reported that banks insist on provision of captive generating plants before any loan request is considered worthy of being granted (Ajayi, 2015).

The nation's difficult business environment largely been caused by inadequate power supply is aptly described by the World Bank (2014) report that 'manufacturing firms in Nigeria consider inadequate infrastructure particularly power supply as their most severe constrain...'

Epileptic Nature of Electricity Supply and its Consequences on SME's Performance in Nigeria

Industrialization, which is a deliberate and sustained application and combination of an appropriate technology, infrastructure, managerial expertise, and other important resources, has attracted considerable interest in development economies in recent times. This is because of the critical role industrialization plays in economic development. Industrialization acts as a catalyst that accelerates the pace of structural transformation and diversification of economies; enables a country to fully utilize its endowment and to depend less on foreign supply of finished goods or raw materials for

its economic growth, development and sustenance (Adeyemi, 2017; Okafor, 2017).

In recognition of the importance of industrialization to economic growth and development, Nigeria since independence has adopted various policies, incentives and schemes to promote industrialization. Some of these policies include the import substitution, indigenisation policy structural adjustment programme (SAP) of the late 1980s. In 2000, Bank of industry, and small and medium equity investment schemes was established to reduce credit constraints faced by entrepreneurs. In 2007, the Federal Government adopted the National Integrated Industrial Development (NIID) blueprint (Adegbamigbe, 2014, African Review of Business and Technology, 2016).

Despite these policies and incentives, available statistics indicate that the industrial sector seems to be experiencing sluggish growth. The survey by manufacturing association of Nigeria, the first quarter of 2006 painted a gloomy picture of the Nigerian crisis industrial sector. For instance, the survey showed that only 10 per cent of manufacturing concerns in Nigeria operate at 48.8 per cent of installed capacity. The survey also notes that about 60 per cent of the companies operating were barely able to cover their average variable costs, while 30 per cent had completely closed down. According to that report, most of the industrial areas around the country suffered an average of 14.5 hours of power outage per day as against 9.5 hours of supply, and the cost generating power supply by firms for production constitute about 36 per cent of total cost of production (Okafor, 2017; Adegbamigbe, 2014 and Udaejah, 2016). Indeed, Nigeria's electricity sector is in crisis.

The supply of electricity supply in Nigeria is bedevilled with consistent crisis as exemplified by such indicators as electricity blackouts and persistent on self-generating electricity. Indeed as noted by Ekpo (2009), Nigeria is running a generator economy with its adverse effect on cost of production. The country's electricity-market is dominated on supply side by a state owned monopoly — has been incapable of providing minimum acceptable international standards of electricity service that is reliable, accessible and available for the past decades.

Available statistics indicating the percentage utilization of the installed capacity of electricity and index of industrial production lends further credence to the nature of the electricity crisis. Example, in the decades of the 1970s, the installed capacity of electricity generation in megawatts is

1,097.79, while the average capacity utilization was 35.58 per cent. Installed capacity improved marginally to about 3,318.83 and only an average of 33.43 per cent was actually utilized in 1980s. The period from 1990 to 2003, saw average installed electricity generating capacity of about 6000MW, whereas the utilization rate was on the average below 40 per cent. In the 2007, installed electricity generation capacity was about 7,011MW, while actual utilization rate was 37.4 per cent (Okafor, 2017).

The low and unstable capacity utilization, evident in the average capacity utilization of less 40 per cent in more than three decades, shows the large gap between installed and actual operational capacity. This large gap clearly indicates the level of technical inefficiency in the power system. Nigeria's persistent electricity crises have weakened the industrialization process, resulting to production stoppages and high operational cost, and significantly undermined the efforts of government of Nigeria to achieve sustained economic growth and development (Adegbamigbe, 2014).

Empirical Review

The poor state of electricity supply in developing countries has a negative impact on their economic performance. For example, Lee and Anas (2011) reported that manufacturing establishments in Nigeria spend on average 9% of their variable costs on infrastructure, with electric power accounting for half of this share. Similarly, a study focusing on the effect of power outages in Pakistan estimated that the direct costs of load shedding, couple with the indirect multiplier effects on other sectors, resulted in a 1.8% reduction in GDP and a 4.2% reduction in the volume of manufactured exports. In India, a 2005 study concluded that power outages were a major factor in low capacity utilization in industry, and estimated the total production losses in 2003/04 at 1.5% of GDP (Abu-Elias, 2011). Also, power rationing in Columbia was estimated to reduce overall economic output by almost 1% of GDP in 2012.

Odell (2015) argued that for Columbia to industrialize, electricity supply and demand are important elements of the process. Iwayemi (2008) argued for the importance of energy sector in the socio-economic development of Nigeria. Okafor, (2017) used descriptive analysis to corroborate the views of these authors by arguing that poor and inefficient electricity supply has adverse implication for industrial development in Nigeria.

Oke (2016) attributed non-competitiveness of Nigeria's export goods to poor infrastructure especially electricity supply which drive the running cost of firms. Archibong (2015) argued that the positive side of Structural Adjustment Programme (SAP) could not be fully established due basically to numerous bottlenecks, rigidities and poor infrastructure specially electricity supply.

Ndebbio (2016) argued that electricity supply drives industrialization process. He submitted that one important indicator whether a country is industrialized or not is the megawatt of electricity consumed. He further argued that a country's electricity consumption per-capita in Kilowatt hours (KWH) is proportional to the state of industrialization of that country.

Ukpong (2003) established the existence of a positive relationship between electricity consumption and economic development. In addition, he submitted that the expansion of energy sector on the demand side is important factor in accelerating the growth of the industrial sector. Ekpo (2009) elaborated on the folly of running a generator economy and its adverse effects on investment. He strongly argued that for Nigeria to accelerate the pace of economic growth and development, the country should fix power supply problem. Ogipdede (2005) argued in his paper that fixing the energy sector is tantamount to shifting the production possibility curve of the country's economy.

Adenikinju (2015) provided a strong argument to support the importance of energy supply. He argued that the poor nature of electricity supply in Nigeria has imposed significant cost on the industrial sector of the economy. This result corroborates the survey of the Manufacturers Association of Nigeria (MAN) 2010 in that survey, MAN indicated that the cost of generating power constitute about 36 percent of production.

A 2010 survey of small enterprise in Ghana cited power outages as one of the four top problems affecting their performance. Electricity outage was ranked by very small firms as one of their constraints to expansion (Steel and Webster, 2011). Thus, the issue of electricity supply, its adequacy and reliability is very important for the overall performance of the business sector and deserves policy attention.

Obadote (2009) pointed out many technical problems and challenges facing the various divisions of the power sector. Some of them are as follows:

Hydropower

- i. The current infrastructure of the hydro plants is in dire need of rehabilitation and the actual energy output of the plants is far below their projected capacity.
- ii. The output of the hydro plants is highly oscillatory according to the seasonal droughts.
- iii. The trends of climate change have led to a continual loss of water. Since the power output of the hydro plants is dependent upon the flow of the river, with less water, there is less potential energy to harness.

Thermal

- i. Lack of gas supply.
- ii. Maintenance of gas pipelines.
- iii. Low gas pressure.

Transmission (The Grid Structure)

- i. Vandalization of power towers.
- ii. Huge transmission losses.
- iii. Power evacuation problems

Distribution

- i. Network problems (especially during rainy season)
- ii. Illegal electricity connection either to the national grid or the existing residential/industrial electricity outfit.
- iii. Overloaded transformers (results in very low voltages)
- iv. Over/under billing and payment via unscrupulous business collusion.
- v. Cash collection problems.
- vi. Illegal manipulation of installed meters.
- vii. Corrupt practices of distribution staff (e.g illegal sale of electricity metres to prospective consumers, vandalization of equipment, resold in most cases to public/private electricity institutions, etc).

These problems affect the performance of small and medium scale enterprise (Udejah, 2016; Adegbamigbe, 2014).

Table: Comparative Analysis of Consumption of electricity Worldwide

Country	Population	Power generation	Per capita consumption
United states	325.7 million	813,000MW	3.20KW
Cuba	11,484,636million	4,000MW	0.38KW
United Kingdom	66,181,585million	76,000 MW	1.33KW
Ukraine	44,222,947million	54,000MW	1.33KW
Iraq	38,274,618million	10,000MW	0.42KW
South Korea	50,982,212million	52,000MW	1.09KW
South Africa	56.52 million	45,000MW	1.015KW
Libya	6,374,616million	4,600MW	1.015KW
Egypt	97,553,151million	18,000MW	0.265KW
Nigeria	190,886,311million	4,000MW	0.03KW

Source: Agbo (2017).

Based on the table above, Libya for instance, with a population of only 6.3 million has generating capacity of 4,600 megawatts, approximately the same as Nigeria which has a population of about 190 million. South Africa with a population of only 56.5 million has a generating capacity of 45,000 megawatts, almost eleven times the generation capacity in Nigeria which has three times the population of South Africa (Agbo. 2017).

Studies and experiences have shown that power generation in the country has been dismal and unable to compare with what obtains in smaller African countries. A survey on power distribution to the industrial sector in Nigeria showed that average power outage in the industrial sector in Nigeria increased from 13.3 hours in January 2006 to 14.5 hours in March 2006. In a worsening experience the outage increased to 16.48 hours per day in June 2006. In other words, power distribution in the month of June 2006 to the industrial sector on the average, was 7.52 hours per day (Odiaka, 2016).

In sharada/Challawa industrial area in Kano, the outage increased from 15.4 hours in January 2006 to 17.6 hours in March of the same year. In Bompai area in Kano state, power outage increased from 10.3 hours in January to 13.0 hours in March, while in Enugu/Anambra zone. It increased from 17.2 hours to 18.5 hours within the same period. In Edo/Delta zone, the average power supply to industrial area is put at 4.4 hours per day. The Ikeja industrial area of Lagos enjoyed power supply for 12.5 hours per day, the

highest in the country. Industrial estates in Bauchi, Benue and plateau zone receive power supply for 4.5 hours per day (Nwaoshai, 2006).

Current Power Distribution Situation in Nigeria

In spite of the various efforts made by the government over the years to improve power supply in Nigeria, the energy sector is still in crisis. Some of the reasons are:

First, is the constant vandalization and attack on Escravos gas pipelines especially Chanomi Creek in Delta state by militant groups operating in the Niger Delta. The channel is feeding Egbi thermal station. Another pipeline, Escravos Lagos pipeline owned by the Nigeria Gas Company (NGC) which feeds Afam with gas has been vandalized several times over. This has brought power generation to all time low (Johansson, 2007; European Commission, 2017).

Second, PHCN is indebted to Nigeria Gas Company (NGC) in the sum of ₦7 billion for gas supplies. To recover their money, NGC several times had to halt supply of gas to the organization to recover the debts (Emeka, 2014; Atser, 2017).

Third, besides the low gas supply to the thermal stations, the worst and major cause is the activities and conduct of the PHCN personnel. This age long problem in the sector persists in the organization. For instance, those personnel in the marketing department hardly read the meter. Billing in such cases is largely by estimation. The result is often spurious bills. In some cases where bills are estimated instead of the actual consumption, most of the consumers are often hostile to the officials or personnel of the organization. Some even refuse outrightly to settle such bills, claiming that they cannot pay for services not rendered (Agbo, 2017; Onugu, 2015).

In a survey conducted by Oladimieji (2015) in Lagos Metropolis, one of the consumers complained that PHCN is an extortionist. Their bills are not certified bills but estimated bills. Moreso, power supply from PHCN is not regular. If it is regular, people will be better off in their businesses.

Further the problem of power supply is traceable to the usual gross inefficiency. Sabotage is also a significant factor. High tension lines and transmission and generating equipment components are stolen regularly. Revenue collection is poor and the greatest debtors are government

establishments and parastatals (Adegbamigbe, 2014). Another problem confronting PHCN is the low investment in power generation over the years. Most of the plants are very old. With these, it is pertinent to note that the power supply situation in the country has not improved in the last eight years despite huge investments government claimed to have made on it (Iyanda, 2012; Ikechukwu, 2015).

Research Methodology

The study adopted descriptive survey research as its research design. The population of the study comprised of 1,286 which is the registered number of small and medium scale enterprises in Kano-Nigeria (Kaccima, 2018). From the 50 randomly selected respondents, 43 questionnaires were correctly filled and used for data analysis. The tools of analysis employed are percentages and tables. Summary table was also used in the analysis. Chi-square test for goodness of fit and coefficient of simple correlation at 0.05 level of significant was used to compute obtained results from respondents.

The chi – square formula is given as follows:

$$\text{Chi-square } (x^2) = \sum \frac{(O - E)^2}{E}$$

Where;

O= Observed Frequency

E = Expected Frequency

$$\text{Chi-square } (x^2) = \sum \frac{(O - E)^2}{E}$$

The chi-square test result is useful in our analysis given the probability rule which states that the results obtained in samples do not always agree with theoretical results expected.

DATA PRESENTATION AND ANALYSIS

Data Presentation and Analysis

Table 4.1.1 Daily Frequency of Power Outage

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 hour	7	16.3	16.3	16.3
	1-5 hours	24	55.8	55.8	72.1
	Above 5 hours	12	27.9	27.9	100.0
	Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

The table 4.1.1: Above shows that 16.3% of SMEs within Kano State experience power outage for less than one hour in a day. 55.8% which is the highest, experience power outage within the range of 1 – 5 hours in a day, which 27.9% experience power outage above 5 hours in a day. This means that majority of SMEs within Kano experience power outage within the range of 1 – 5 hours in a day.

Table 4.1.2 Impact of Power Failure on Cost of Production

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Increases cost of production	35	81.4	81.4	81.4
	Decreases cost of production	7	16.3	16.3	97.7
	Cost of production is unaffected	1	2.3	2.3	100.0
Total		43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.2: Shows that 81.4% or 35 of the SMEs within Kano incur high cost of production due to power failure. While 7 or 16.3% benefit from power failure, in that their cost of production reduces. Only 2.3% are unaffected by power failure in that their cost of production is not affected.

Table 4.1.3 Impact of Power Failure on Business Efficiency

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Increases efficiency	1	2.3	2.3	2.3
	Decreases efficiency	36	83.7	83.7	86.0
	Efficiency is unaffected	6	14.0	14.0	100.0
Total		43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.3: Shows that power failure reduces efficiency of about 83.7% of SMEs within Kano State and increases the efficiency of only 2.3% of SMEs. 14% are unaffected by power failure. These suggest that power failure reduces the efficiency of most SMEs within Kano.

Table 4.1.4 Monthly Expenses on PHCN Supply

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 2000	15	34.9	34.9	34.9
	2000-5000	23	53.5	53.5	88.4
	Above 5,000	5	11.6	11.6	100.0
	Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.4: Shows that 34.9% of SMEs within Kano spend less than ₦2,000 on PHCN bill. 53.5% spend between ₦2,000 and ₦5,000. Only 11.6% spend above ₦5,000 on PHCN bill. This suggest that majority of SMEs within Kano State spend between ₦2,000 and ₦5,000 on PHCN bill.

Table 4.1.5 Monthly Expenditure on Generator

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 2,000	7	16.3	16.3	16.3
	2,000-5,000	19	44.2	44.2	60.5
	Above 5,000	17	39.5	39.5	100.0
	Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.5: Shows that only 16.3% of SMEs within Kano spend less than ₦2,000 on Generator. 44.2% spend between ₦2,000 and ₦5,000, while 39.5% spend above ₦5,000 on Generator. These suggest that most SMEs within Kano State spend a lot on Generator.

Table 4.1.6 Comparison of the Cheapness of the Power Sources

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PHCN	36	83.7	83.7	83.7
	Generator	2	4.7	4.7	88.4
	No difference	5	11.6	11.6	100.0
	Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.6 shows that 83.7% of SMEs in Kano consider PHCN bill to be cheaper compare to Generator. Only 4.7% consider generator cheaper compare to PHCN bill, while 11.6% saw no difference between PHCN bill and the cost of Generator.

Table 4.1.7 Comparison of Losses from Power Supply Sources

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	The losses from power failure is more than the cost of using generator	19	44.2	44.2	44.2
	The cost of using generator is more than the losses from power failure	16	37.2	37.2	81.4
	There is no difference	8	18.6	18.6	100.0
	Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

Table 4.1.7 shows that 44.2% of SMEs within Kano State consider the losses from power failure more than the cost of using generator. 37.2% consider the cost of using generator more than the losses from power failure while 18.6% see no difference between the losses from power failure and the cost of using generator.

Table 4.1.8 Ways of Improving the Power Sector

Description		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Avoiding corruption and Good management	12	27.9	27.9	27.9
	Privation of the sector and installation of reliable transformer	8	18.6	18.6	46.5
	Provision of adequate facilities in the sector and ensuring regular Power supply	8	18.6	18.6	65.1
	Building new energy plant and exploring other sources of renewable energy	3	7.0	7.0	72.1

Spending more capital on the sector and provision of meters for consumers	3	7.0	7.0	79.1
Public-private partnership and creating more hydro-electrical station	2	4.7	4.7	83.7
Others	6	14.0	14.0	97.7
No response	1	2.3	2.3	100.0
Total	43	100.0	100.0	

Source: Researcher's Field Survey, 2018.

In the table above, 27.9% of SMEs within Kano consider good management and avoidance of corruption as the way of improving the power sector. 18.6% consider privatization and installation of reliable transformers as the way of improving the power sector. 18.6% consider provision of adequate facilities in the sector and ensuring regular power supply as the way of improving the power sector. 7% considers building of new energy plants and exploring other sources of renewable energy as the way of improving the power sector. 7% consider spending more capital on the sector and provision of meters for consumers as the way of improving the power sector. 4.7% consider public private partnership and creation of more hydro electrical station as the way of improving the power sector. 14% gave other reasons such as evaluation of projects committed to the sector amongst others as the way of improving the power sector, while 2.3% do not respond to this question. These suggest that majority of the SMEs within Kano State consider good management and tackling corruption as the major way of improving the power sector.

Cross Tabulations 1**Table 4.2.1****Number of Employees * Willingness to pay for reliable PHCN supply Cross tabulation**

Count						
		Number of employees				
		Below 10 employees	10-20 employees	Above 20 employees	No response	Total
Willingness to pay Yes for reliable PHCN supply		40	1	1	1	43
Total		40	1	1	1	43

Source: Field Survey 2018 (SPSS)

Chi-Square Tests

	Value
Pearson Chi-Square	a
N of Valid Cases	43

a. No statistics are computed because Willingness to pay for reliable PHCN supply is a constant.

Cross tabulation of table 4.12 (willingness to pay for reliable PHCN supply) and table 4.1 (Number of employees) shows that SMEs that employ less than 10 employees are more willing to pay for reliable power supply than SMEs that employ 10-20 and above 20 employees.

Cross Tabulations 2**Table 4.2.2****Impact of power failure on cost of production * Daily frequency of power outage Cross tabulation**

Count					
		Daily frequency of power outage			Total

		Less than 1 hour	1-5 hours	Above 5 hours	
Impact of power failure on cost of production	Increases cost of production	6	20	9	35
	Decreases cost of production	1	4	2	7
	Cost of production is unaffected	0	0	1	1
	Total	7	24	12	43

Source: Field Survey 2018 (SPSS)

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.691 ^a	4	.611
Likelihood Ratio	2.662	4	.616
Linear-by-Linear Association	.955	1	.329
N of Valid Cases	43		

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is 16.

Cross tabulating daily frequency of power outage with impact of power failure on cost of production (table 4.4 VS 4.5) shows that 35 out of 43 SMEs within Kano State experience increase in their cost of s production. 6 experience frequent power outage for less than 1 hour in a day, 20 experience power outage within the range of 1-5 hours daily while 9 experience power outage above 5 hours daily.

Power failure reduces the cost of production of 7 SMEs out of which one experience power outage for less than 1 hour, 4 experience power outage between 1-5 hours daily while 2 experience power outage above 5 hours daily. Only one out of 43 SMEs within Kano State cost of production is unaffected by power failure. It experience power failure above 5 hours.

Moreover, 7 out of 43 SMEs experience frequent power outage for less than one hour daily, 24 experience power outage between 1-5 hours daily while 12 experience power outage above 5 hours daily.

Cross Tabulation 3

Table 4.2.3

Impact of power failure on business efficiency * Daily frequency of power outage Cross tabulation

Count					
		Daily frequency of power outage			
		Less than 1 hour	1-5 hours	Above 5 hours	Total
Impact of power failure on business efficiency	Increases efficiency	0	1	0	1
	Decreases efficiency	5	21	10	36
	Efficiency is unaffected	2	2	2	6
Total		7	24	12	43

Source: Field Survey 2018 (SPSS)

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.638 ^a	4	.620
Likelihood Ratio	2.855	4	.582
Linear-by-Linear Association	.120	1	.729
N of Valid Cases	43		

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is 16.

Cross tabulating impact of power failure on business efficiency (table 4.6) and Daily frequency of power outage (table 4.4) show that there is increase in efficiency of one out of 43 SMEs within Kano State, and the one experience power outage between 1-5 hours daily. Power failure decreases the efficiency of 36 out of 43 SMEs within Kano State. Out of the 36, 5

experience power outage for less than 1 hour, 21 experience power outage above 5 hours daily.

The efficiency of 6 out of 43 SMEs within Kano State is not affected by power failure. 2 out of the 6 experience power outage for less than 1 hour, 2 experience power outage between 1-5 hours daily while 2 experience power outage above 5 hours daily.

Moreover, seven (7) out of 43 SMEs within Kano State experience power outage for less than 1 hour, out of which it decreases the efficiency of 5 SMEs and 2 are unaffected. There is no increase in the efficiency of any SMEs among those that experience power outage for less than 1 hour daily.

Twenty-four (24) out of 43 SMEs experience power outage between 1 – 5 hours. The power outage increases the efficiency of one SME, decreases the efficiency of 21 and the efficiency of 2 is unaffected by power failure.

12 out of 43 SMEs within Kano State, experience power outage above 5 hours. The daily frequency of power outage decreases the efficiency of 10 SMEs while 2 are not affected by frequent power outage.

Test of Hypotheses

To test the hypothesis stated earlier in chapter one the chi-square value calculated is compared with the chi-square value tabulated at 0.05 level of significance.

	Calculated χ^2	Tabulated χ^2	Df
Cross tabulation 2	2.691	0.7107	4
Cross tabulation 3	2.638	0.7107	4

H_0 : $b=0$ There is no significant relationship between energy crisis and the performance of small and medium scale enterprises in Nigeria.

H_1 : $b \neq 0$ There is significant relationship between energy crisis and the performance of small and medium scale enterprise in Nigeria.

Decision Rule

1. If chi-square calculated is greater than chi-square (χ^2) tabulated, reject null hypothesis and accept alternative hypothesis.

2. If chi-square (χ^2) calculated is less than chi-square (χ^2) tabulated, accept the null hypothesis.

The chi-square value obtained from the cross tabulation are greater than the chi-square value tabulated. Therefore, we reject the null hypothesis and accept the alternative that there is significant relationship between energy crisis and the performance of small and medium scale enterprises in Nigeria.

Discussion of Results and Findings

The efforts all through the course of this study revolved around the theme “Electricity as a source of energy to small and medium scale enterprise in Kano ”. This guided the researchers in thier efforts in the literature review as well as the construction of questionnaire.

50 questionnaires were administered and 43 were successfully retrieved. The data presented and analysed was drawn from the answers of the respondents on whom the questionnaires were administered. The response to questionnaires shows that many SMEs rate the power sector in Nigeria inefficient, and this has a lot of implication on SMEs in terms of increases in cost of production, decrease in business efficiency, and other losses due to frequent power outage. To minimize the losses from power failure, they make provision for auto-generation in case of power failure even though at higher cost. They see improvement in the power sector as a way of promoting the efficient performance of their businesses. They indicate willingness to pay for a reliable power supply as a key factor that will help the growth of their businesses. They pointed out some ways of improving the power sector to ensure constant power supply. Some of the ways are as follows.

1. Building of new energy plant and upgrading old ones.
2. Exploring other sources of renewable energy such as solar, biogas etc.
3. Curbing corruption
4. Privatization of the sector
5. Provision of more facilities/equipment in the power sector
6. Public private partnership
7. Creation of more hydro electrical station
8. Proper management
9. Installation of reliable transformers.
10. Proper monitoring of whatever is commissioned in the power sector.

These, among others are ways SMEs in Kano consider for improving the power sector.

Conclusion

The findings from this study suggest that small and medium scale enterprises are very essential in the growth process of Nigeria in terms of employment generation, increased productivity and the general living standard of the people. The findings also suggest that power supply is very critical in the overall performance of small and medium scale enterprises in Nigeria, so for small and medium scale enterprise in Nigeria to perform to expectation, there is need for improvement in the power sector.

Recommendations

Considering the fact that small and medium scale enterprises are key enabler in the growth process of Nigeria and reliable power supply is very essential in the growth process of this sector, the following suggestions were made to improve the power sector so as to ensure constant power supply to promote the performance of small and medium scale enterprise in Nigeria.

1. Building of new energy plant and upgrading old ones.
2. Exploring other sources of renewable energy such as solar, biogas etc.
3. Curbing corruption in the power sector
4. Provision of more facilities/equipment in the power sector
5. Installation of reliable transformers
6. Proper management of the power sector
7. Public – private partnership.
8. Proper monitoring and evaluation of projects in the power sector

References

- Abu – Elias, B. (2011). "The Cost of Power Outages in the Business and Public Sectors in Israel: Revealed Preference vs. Subjective Valuation," *Energy Journal*, 18, 2, 39- 61.
- ADB, 2009, Annual Report 2009 as cited by Oseni M O and Pollit M, 2013. *Economic Costs of Unsupplied Electricity: Evidence from back up Generation among Firms in Africa*. EPRG Working Paper no 1326, 2013
- Adegbamigbe, A. (2014). Obasanjo's legacies, the news, Vol. 28 PP68-70.

- Adenikinju O.S (2015). "Analysis of the cost of infrastructure failure in a developing economy: The case of electricity sector in Nigeria" AERC Research paper 148; Kenya.
- Adeyemi, B. (2017). Eight years of Obasanjo: Foundation Laid for Industrial Revival. *The Guardian*, May 30, 2017 P.54.
- African Review of Business and Technology (2016). Investment Opportunities in the Nigerian Power Sector and Investors' Comforts guide. A publication of the Federal Ministry of Power, Abuja 2016.
- Agbo, A (2017). Ending the power nightmare. *Tell*, May, 2007 PP 28-31.
- Ajayi, G.A., (2015). Cost-Benefit Analysis of Captive Power Generation by Manufacturing Industries in Nigeria. Unpublished PhD thesis, Department of Economics, University of Ibadan, Ibadan
- Archibong, P.E (2015). The status of supporting infrastructural facilities and services for non-oil sector development", *CBN Economic and Financial Review*, Vol. 35, pp 23-42
- Atser, G. (2017). Power projects: stakeholders Fret over gas cuts. *The punch*, March 22, 2007 P 2
- DOE, (2013), A Framework and Review of Customer Outage Costs: Integration and Analysis of Electric Utility Outage Cost Surveys, US Department of Energy
- Ekpo, A.H. (2009), Government spending in a simple model of endogenous growth, *journal of political economy*, Vol. 98, pp 1321-1342
- Emeka, S. (2014). Nigeria; a Case Study in Power Shortages. Published in the *Punch Newspaper* April 10, 2014
- European Commission (2017), Third Annual Monetary Conference Proceedings on Growing the Nigerian Economy
- FGN, (2014). Roadmap to Power Sector Reform. Presidential Speech at the Unveiling of the Government Power Sector Reform Roadmap, held at the Eko Hotel and Suites Lagos August 2014
- Foster, V. and Steinbuks, J., (2016). Paying the Price of Unreliable Power Supplies; In- House Generation of Electricity in Africa. Africa Infrastructure Country Diagnostic Working Paper No 2
- Ikechukwu, O. (2015). Beyond service charters. *New age*, June 17, 2015 p.9
- Iwayemi, A. (2008). Energy sector development in Africa, A background paper prepared for the African development Bank.
- Iyanda, O., (2012). "Cost and Marketing Implications of Electric power Failures on high Income Households in Lagos". *The Nigerian Journal of Economic and Social Studies*, 24(2): 169– 84.
- Johansson, B. (2007). Odds against Yar'Adua. *The news*, May 21, 2007 Pp.18-23.

- Kaccima, E. N., (2018). Industrial Development, Electricity Crisis and Economic Performance in Nigeria. *European Journal of Economics, Finance and Administrative Sciences*. Issues 18
- Lee and Anas A. (2011). Manufacturer's responses of infrastructure deficiencies in Nigeria: Private alternatives and policy options: In Achibber and S. Fischer, eds, *Economic reform in sub-Saharan Africa*. A World Bank Symposium
- Lee, K.S. & A. Anas (2012). Impacts of infrastructure deficiencies on Nigeria manufacturing, Private Alternatives and policy options, Infrastructure and urban development department report No. 98. World Bank, infrastructure and urban development department, Washington, DC
- Ndebbio, J.EU. (2016). The Nigerian economy at the crossroads: Policies and their Effectiveness. University of Calabar Press, Calabar – Nigeria
- Nwaoshai, J. (2006). Healthy power sector will create jobs in the Jelecow Industry. *Vanguard*, October, 25, p.43.
- Obadote, D.J. (2009). Energy crisis in Nigeria: Technical issues and solutions. Principal manager (Performance Management) Jebba Hydro Power Business Unit.
- Odell, P.R (2015). "The Demand for energy in developing region: A case study of the Upper Anca Valley in Columbia. *Journal of Development Studies*, Vol. 3, Pp 23-254
- Odiaka, P. (2016). Power sector reforms: still a reign of blackout. the guardian, August 24. 2006 p.15.
- Ogipdede, O.B. (2005). Consumers expectations on service delivery of PHCN: A study in Lagos and Ibadan metropolis. MBA Thesis (Unpublished), Owerri: ImoStateUniversity.
- Okafor, E.O (2017). "Development crisis of the power supply and implication for industrial Sector in Nigeria", *Kamlarak. Journal*, Vol.6 Pp83-92.
- Oke, B. (2016). TUC rejects increase in electricity tariff. *The punchy* February 22, 2016 P.32.
- Oladimeji, T. (2015). More billing pains from PHCN. *New Age*, July 20, 2015 p. 12.
- Olugbenga, A., Jumah, M., and Phillips, A., (2013). Current and Future Challenges of Electricity Market in Nigeria in the face of Deregulation Process. *African Journal of Engineering Research* 1(2).
- Oluronshola, D. (2014). "The Cost of Power Interruptions in the Industrial Sector: Estimates Derived from Interruptible Service Programs," *Land Economics*, 68, 49- 61.

- Onuaha, K.C., (2010). The Electricity Industry in Nigeria: What are the Challenges and Options Available to Improve the Sector? Centre for Energy, Petroleum and Mineral Law and Policy – University of Dundee.
- Onugu B.A (2015). Small and medium enterprises in Nigeria: problem and prospects. ST Clements University.
- Oseni M O and Pollit M, (2013). Economic Costs of Unsupplied Electricity: Evidence from back up Generation among Firms in Africa. EPRG Working Paper no 1326, 2013.
- Renneika, O., &Svensen, A., (2012). Coping with Poor Public Capital. Journal of Development Economics, 69, 51 – 69.
- Steel W. & Webster M. (2011), Small enterprise under adjustment in Ghana World bank technical paper No.138, The World Bank, Washington, D.C
- Uchendu, O.A ., (1993). “The economic cost of electricity outages: Evidence from a sample study of industrial and commercial firms in the Lagos area of Nigeria”. CBN *Economic and Financial Review*, 31.
- Udah, E.B. (2010). Industrial development, electricity crisis and economic performance in Nigeria. European Journal of economics, Frances and administrative sciences.
- Udejah, G. (2016). “Industrial firms loss ₦38 billion to power outage in Nigeria”. The Guardian, August 29.
- Ukpong, I. (2003). An analysis of the cause of power shortage in Nigeria, the Nigerian Journal of economic and social Studies, Vol.18, pp 34 -49.
- Wikipedia, the Free Encyclopedia (2018): Kano States: Its Origin and Commercial Activities. Retrieved from www.wikipedia.com/kano_states_nigeria
- World Bank (2013). “Energy sector management assistance programme report on Nigeria” Washington D. C.
- World Bank (2014). Manufacturing and investment in the sub-Saharan Africa. Washington D.C: The World Bank publication.
- Yunusa, W. (2012). Industrial Development, Electricity Crisis and Economic Performance in Nigeria. European Journal of Economics, Finance and Administrative Sciences.