DISTORTED ELECTRICITY SUPPLY AND THE PROFITABILITY OF SMALL AND MEDIUM SCALE ENTERPRISES: A SURVEY OF SELECTED INHABITANTS IN SOUTHWEST NIGERIAN STATES

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ABSTRACT
Electricity is a significant component of virtually all enterprise production processes. Hence, distorted or uncertain electricity supply has potential effects on the economic activities of firms, directly or indirectly; as it hinders business growth and development. This study examined the effect of distorted electricity supply on the profitability of small and medium scale enterprises in southwest, Nigeria. The population of the study consisted of two hundred and eighty five (285) employees and owners of nine (9) different enterprises in southwest Nigeria. A ramdom sampling technique was used to select 277 respondents for the study. The correlation coefficient and simple regression analysis techniques were used to analyze the responses from the respondents. Findings from the study showed that effective power supply (EPS) exhibited a significant positive impact on the profitability of business enterprises and the cost of maintaining mechanical generators (KHZ) as an alternative source of power has a negative effect on the profitability of the enterprises. The study concluded that power supply has a significant influence on the profitability of SMEs in Nigeria. It recommended that government at all levels should formulate policies that would encourage effective power supply in other to boost productivity of the SMEs and increase profitability.

Keywords: Power Supply, Effective Power Supply, Profitability, Epileptic Power Supply, Energy Consumption.
JEL CLASSIFICATION CODES: M13, M38, Q42.

1. INTRODUCTION
Electricity has been the major driving force for business sustainability in today's competitive business environments. However, distorted or uncertainty in the supply of electricity in

Nigeria has become an impediment to the survival and profitability of small and medium scale enterprises. Availability of a reliable electricity supply is germane for the survival and profitability of small and medium scale enterprises. This would lead to high productivity, consumer satisfaction, workers satisfaction, high investment and most importantly, high profitability and hence overall economic growth (Mensah, 2004).

Electricity is a significant component of virtually any production process, be it large or small. Consequently, regular or limited supply of electricity has the potential effect on the economic activities of firms, either directly or indirectly. The measure of the profitability index associated with effective supply of electricity has always been of great concern to business owners (Mensah, 2004). Epileptic supply of electricity is one of the major factors affecting the profitability and well being of business enterprises in Nigeria today. This has resulted in slow rate of development of SMEs due to low profitability.

According to Abubakar and Olusegun (2019), the contribution of SMEs to economic growth in Nigeria has been at a very low rate despite the numerous roles they play in national development.

The performance of SMEs in Nigeria are faced with different challenges ranging from low capacity utilization, persistent hike in the cost of doing business, intense competition with international concerns, distorted electricity supply, etc (Abubakar & Olusegun 2019).

Ugwuhi (2009) emphasised that a stable power supply is cost effective and hence, boost the operations of the SMEs, increases profits and enhances growth. Over the years, the Nigerian economy has undergone a major crisis in the electricity sector due to failed privatization policy, corruption, bad governance and inconsistency in government policies (Okereke, 2010). This has undoubtedly affected economic activities particularly the profitability of the small scale enterprises. Azubuike, (2013) opined that a distorted power supply mars the efficient production channels, which invariably results to extra costs to firms because they often have to rely on alternative sources of energy, creates the rush to meet deadlines due to anticipated power outages, spoiled inventories, or malfunctioning machines and uncertainty. According to Yakaka, Murtala and Babagana (2017), the epileptic electricity supply in Nigeria has made a lot of households switched to the use of alternative energy sources through the use of power generating plants and other means.

Load shedding and rationing has become the order of the day in the Nigeria Electricity Regulatory Commission (NERC). This scenerio has made electricity supply uncertain for business consumption. A lot of money is spent by business owners to purchase fuel and maintain personal generators to run their businesses. This results in high cost of production and hence, low profitability. The high cost of providing back-up energy for business enterprises is three times the cost of publicly supplied electricity (Mambula, 2002).

Government at all levels in Nigeria has formulated several policies to enhance growth and development of small and medium scale enterprises because of the significant contribution

they make to the Gross Domestic Product (GDP) of the nation. However, this objective has not been realized due to inefficient power supply.

A critical review of the profitability of small and medium scale enterprises in Nigeria has shown that past policies put in place by the government in relation to electricity supply has made no signifcant positive impact on this sector. It is on this note that the study examined the effect of distorted electricity supply on the profitability of small and medium scale enterprises among inhabitants of southwest Nigerian states.

2. Review of the Literature

Researchers all over the world have conducted studies on the effect of power irregularity on the performance and productivity of SMEs. Mchopa, Kazungu and Moshi (2014) conducted a study in Moshi metropolis of Tanzania on the effect of power rationing on the productivity of Small and Medium Enterprises (SMEs). Finding from the study revealed that power rationing reduced the productivity of SMEs and consequently resulted in loss of income among SMEs. In a related development, Cissokho and Seck (2013) in their study of the effect of power outage on productivity of SMEs found that power outage duration had a negative significant impact on cost and productivity efficiencies of business enterprises.
Udah, (2010) found in his study on the effect of electricity supply on industrial development in Nigeria, that the eratic performance of the electricity sector has contributed to the retarding ability and development of the industrial sector of Nigeria. As a result of this, he concluded that fixing the electricity sector is central to the realization of industrial growth and development in Nigeria.

Chibuzor and Micheal (2012) conducted a quantitative research in Kumasi where their own work revealed that blackouts lasted for about 10.3 hours in a day on average making 44% of the 320 SMEs surveyed idled within the periods while the remaining 56% that had alternative sources spent Ghc 15.5 per day on average apparently increased the cost of production, reduced their effectiveness and the profitability of the business enterprises. Adebayo, Olanrewaju and Oluwayinka (2014) coducted a study on the economic consequences of power outage on household, commercial and industrial consumers in Nigeria. They used Vector Autoregressive in their analysis. It was found that there were significant negative consequences of power outages on the consumers' income, industrial output and commercial activities in Nigeria.

The study by Nwuzor (2010) analyzed the impact of power outage on the economic growth of Nigeria using Ordinary Least Square (OLS) technique. She used Gross Domestic Product (GDP) as her dependent variable against energy consumption, her independent variable. It was found that power outage in Nigeria had a serious impact on the economic growth of Nigeria. She therefore concluded that the major problem facing the Nigerian economy was power outage which according to her could be resolved by thorough infrastructural investment by the government on the power sector.

Ndebbio (2006) argued that electricity supply drove industrialization processes. In his work, he concluded that one important indicator whether a country is industrialized or not is the megawatt of electricity consumed and added that a country's electricity consumed in kilowatt hours (kWh) is proportional to the state of industrialization of that country. Maleko, (2005) examined the effect of poor electricity supply on business growth in rural areas. This was viewed from the angle of micro enterprises in rural areas around Kilimanjaro region. It was found that electricity supply in the rural areas supported the development of micro enterprises but at a lower rate because of the low rate of availability of electricity supply.

Adenikinju (2005) conducted an analysis on the economic costs of power outages in Nigeria using the revealed preference approach. In his own work, he estimated that the marginal cost of power outages to businesses in Nigeria was calculated to be in the range of $0.94 to $3.13 per kWh of lost electricity per day. Reinikka and Svensson (2004) carried out their own work on the impact of poor provision of infrastructure on performance of business enterprises in Uganda using a discrete choice model data. It was found that unreliable power supply caused enterprises to backup with generators as a response to deficient public power supply. The study concluded that excessive complementary public power supply significantly reduced private investment.

Akinbami (2001) conducted a study on manufacturing company's responses to infrastructural deficiencies in Nigeria. Four different patterns of responses adopted by the companies were used, which include self sufficiency (here, the company provided all its infrastructure needs alone); standby private supplement (the company has its own facilities to use when public supply went off); public supply as standby (the company relied on own facilities and switch to public supply when supply improved) and captivity (here, the company relied fully on public supply whether good or bad). The study emphasised the reasons for self-generation of electricity by manufacturing firms in Nigeria. The study found that Indonesia and Thailand larger businesses enjoyed economies of scale for being able to generate electricity internally on their own while small scale businesses were at disadvantage and therefore suffered more from unreliable electricity supply than larger ones.

Iwayemi (2009) argued for the importance of energy sector in the socio-economic development of Nigeria. He concluded that strong demand and increased supply would improve on our income as well as raising the standard of living of the people.

3. Methodology

The study employed a descriptive research design. The population of the study was 285 employees of nine (9) selected business enterprises and owners of various small businesses in Southwest, Nigeria. The selected enterprises included Chicken Republic, Okelewo, Abeokuta, Ogun State; NAO Supermarket, Akure, Ondo State; Uren Water, Ikotun, Lagos State; TRIOS Water, Ado Ekiti, Ekiti State; FCMB, Iwo Road Branch, Ibadan, Oyo State and Abiola

Electrical Engineering Company, Osogbo, Osun State. Others included 15 selected owners of viable barbing saloons in Ibadan, Oyo State; 15 standard hair dressing saloons in Abeokuta, Ogun State and 10 functioning welding centres in Osogbo, Osun State.

Table 1: List of Companies Sampled in Southwest, Nigeria

S/N	Name of Firm	City Located	State	No Selected
1.	Chicken Republic	Okelewo, Abeokuta	Ogun	41
2.	NAO Supermarket	Akure	Ondo	51
3.	Uren Water,	Lagos	Lagos	45
4.	TRIOS Water	Ado Ekiti	Ekiti	45
5.	First City Molument Bank (FCMB)	Iwo Road Branch, Ibadan	Oyo	45
6.	Abiola Electrical Engineering Company	Osogbo	Osun	18
7.	Barbing Saloos	Ibadan	Oyo	15
8.	Hair Dressing Saloon	Abeokuta	Ogun	15
9.	Welding Centres	Osogbo	Osun	10
			TOTAL	**285**

Source: Researcher's Field Survey (2020)

Simple random sampling technique which is a procedure of giving every subject in a population an equal chance of being selected was adopted in administering the 285 copies of questionnaire out of which 277 copies representing 97.1% were retrieved and analysed. The statistical tool of analysis employed in the study included frequency tables, percentages, means, standard deviation, correlation coefficient and simple regression.The data obtained from respondents through the administration of questionnaire were analysed with the use of E-View 9.5 statistical software package.

4. RESULTS AND DISCUSSION OF FINDINGS

Table 3: Descriptive Statistics

Statistical Tool	PROF	EPS	KHZ	GTD	FAC
Mean	3.850000	3.790000	3.590000	3.150000	3.390000
Median	4.000000	4.000000	4.000000	4.000000	4.000000
Maximum	4.000000	4.000000	4.000000	4.000000	4.000000
Minimum	2.000000	2.000000	2.000000	2.000000	2.000000
Std. Dev.	0.519810	0.607944	0.779731	0.988571	
Skewness	-0.225467	-0.576323	-0.457794	-0.303421	-0.846654
Kurtosis	2.23821	2.710113	2.252284	3.102638	2.760072

Jarque-Bera	477.1484	203.0622	35.68456	16.53433	18.35296
Probability	0.000000	0.000000	0.000000	0.000257	0.000103
Sum	385.0000	379.0000	359.0000	315.0000	339.0000
Sum Sq. Dev.	26.75000	36.59000	60.19000	96.75000	81.79000
Observations	**277**	**277**	**277**	**277**	**277**

Source: Researcher's computation (2020)

The statistical analysis in Table 3 revealed that the mean scores of the data displayed the level of consistency as they fell within the minimum and maximum scores. Thus, the profitability (PROF), effective power supply (EPS), cost of generator supply (KHZ), generation/transmission /distribution companies (GTD) and other factors (FAC) stood at a mean value of 3.85, 3.79, 3.59, 3.15 and 3.59 respectively.

The data in Table 3 were normally and evenly distributed based on the descriptive statistics of the effect of effective power supply on the profitability of the selected enterprises in Nigeria. The skewness and kurtosis statistics were within the limit of ±1.96 and ±3, except for generation, transmission and distribution companies (GTD) whose kurtosis statistics were above ±3. The results showed that the series are within the acceptable limit of normally distributed data in line with Haniffa and Hudaib (2006). In addition, the Jarque-Bera (JB) statistics showed that all the variables were normally distributed based on their respective probabilities that were less than 0.05 for all the variables under the study.

Table 4: Correlation Analysis for the Effect of Distorted Electricity Supply on Profitability

VARIABLES	PROF	EPS	KHZ	GTD	FAC
PROF	1.000000				
EPS	0.358225	1.000000			
KHZ	0.494380	0.411497	1.000000		
GTD	0.339080	0.405892	0.617866	1.000000	
FAC	0.445753	0.533584	0.312244	0.588591	1.000000

*Correlation is significant at 0.05 level of significance

Source: Researcher's computation (2020)

Correlation analysis was carried out to detect any autocorrelation between distorted power supply and profitability. Correlation coefficients were used to examine the required relationships in order to allow for the non-normality of the variable in question. In addition, correlation coefficients were intended to check for multicollinearity. The correlation matrix was shown in the table 4. Table 4 shows the Pearson correlation matrix for the variables as contained in the analysis. The significant relationship was at 95% confidence level. The whole relationships between the variables were tested at 5% significant level. Results

demonstrated a significant negative relationship between distorted electricity supply and profitability. The correlation coefficients demonstrated a negative relationship between profitability; distorted power supply; cost of generator power supply; generation, transmission and distribution companies and other factors.

Table 5: Variance Inflation Factor (VIF) of Distorted Electricity Supply and Profitability

Variables	VIF	Tolerance 1/VIF
Effective Power Supply	2.05	0.49
Cost of Generator Power Supply	4.32	0.23
Generation, Transmission, Distribution	2.66	0.38
Other Factors	4.86	0.21
Mean VIF	**3.47**	

Source: Researcher's computation (2020)

Multicollinearity suggests the existence of a linear relationship between two or more independent variables. The existence of multicollinearity was tested on the basis of the correlation matrix that incorporated all the independent variables. The correlation matrix result showed the existence of multicollinearity as the coefficients of correlation were less than 0.8, showing the correlation percentage limit usually suggested by prior studies (Amposah, 2018). These findings suggested that there was no problem with regard to correlation.

The computation of variance inflation factor (VIF) further tested the presence of multicollinearity. Accordingly, Amposah (2018) found no problem with multicollinearity provided the VIF of all the independent variables were less than 10 and the tolerance coefficients greater than 0.10. Table 5 shows the result of the VIF and tolerance coefficients of the independent variables. The table displayed the highest VIF as 4.86 and the mean VIF as 3.47. In addition, the least tolerance coefficient was 0.21. Hence, the results of VIF and tolerance coefficients showed an acceptable level of multicollinearity among the variables. This indicated that there was no problem about the correlation between the independent variables.

Table 6: Results of Regression Analysis for the Effect of Distorted Power Supply on Profitability

Variables	Coefficients	Std Error	t-stat.	Prob.
EPS	0.7543	0.0644	11.7143	0.0000
KHZ	-0.0255	0.0729	-0.3499	0.7272
GTD	-0.0002	0.0451	-0.0053	0.9958
FAC	0.0937	0.0663	0.0558	0.0356
C	1.0710	0.1738	6.1627	0.0000

R-squared 0.7371

Durbin-Watson stat 2.0464

Source: Researcher's computation (2020)

The results from Table 6 showed that effective power supply (EPS) exhibited a significant positive impact on the profitability of business enterprises among Nigerian States. However, the cost of running generator (KHZ) as an alternative to electricity supply has a negative significant effect on the profitability of the selected enterprises. Similarly, generation, transmission and distribution companies (GTD) exhibited no significant effect on the profitability of business enterprises. The result further showed that there were other factors affecting the profitability of the selected business enterprises in Nigeria as depicted by the regression output.

Furthermore, th simple regression output was also fit with 73.71% R^2. This indicated that the coefficient of determination R^2 of 0.7371 showed that effective power supply (EPS, KHZ, GTD and FAC) account for 73.71% of their profitability. The remaining 26.29% was uncounted for by other factors included in the disturbance term. In a related development, the presence of unit root in the residual series usually drives Durbin-Watson test towards zero, but the value of this statistic for panel OLS (2.046) of above 2, was within the acceptable limit for zero autocorrelation and it reinforced the acceptance of the null hypothesis of no serial correlation in the residual model.

5. Conclusion and Policy Recommendations

The broad objective of this paper was to investigate empirically the effect of distorted electricity supply on the profitability of small and medium scale enterprises among selected inhabitants in southwest Nigerian states. The correlation coefficient and simple regression analysis techniques were used to establish the relationship between effective electricity supply and profitability of the SMEs in the region. The analysis showed that the effect of distorted or uncertain electricity supply was statistically significant in relation to the profitability of the selected business enterprises in Nigeria. The finding agreed with the study by Nwuzor (2010) where it was found that power outage had a serious impact on the profitability of business enterprises and the economic growth of Nigeria

It was also found in the study that the cost of using mechanical generator as an alternative source of power supply to irregular electricity supply demonstrated a strong negative correlation on the profitability of the selected SMEs. Hence, there exists a statistical significant effect of using mechanical generators as alternative source of electricity on the profits of the SMEs. The finding is supported by the outcome of the study by Reinikka and Svensson (2004) that unreliable power supply caused enterprises to backup their operations with generators as a response to deficient public power supply which significantly reduced private investment.

The study also found that electricity generation; transmission and distributions companies do not influence the profitability of small and medium scale enterprises in Nigeria. Hence, it concluded that electricity generation; transmission and distributions companies have no

significant effect on the profitability of the selected enterprises in southwest Nigeria. The finding was in support of the outcome of the study by Maleko, (2005) that electricity supply in the rural areas enhances the development of micro enterprises but at a lower rate because of the low rate of availability of electricity supply. The study also found that other factors (such as Technology, year of experience, etc) showed significant positive effect on the profitability of small and medium scale enterprises in the selected Nigerian states. This implies that distorted electricity supply was not the only factor that negatively affects the profitability of the selected SMEs in southwest Nigeria.

Based on the foregoing, it was recommended that government at all levels should formulate policies that would encourage effective power supply in other to boost productivity and profitability of the SMEs; that business enterprises should employ the use of new technology like solar, inverter etc in addition to electricity in order to ensure adequate power supply at all times to boost the profitability of their ventures; that adequate training should be provided to the employees of SMEs in order to key into new technology to ensure improved productivity and profitability and that government should ensure a regular supply of electricity in order to enhance the profitability of the SMEs thereby creating more jobs opportunities and hence, improve the standard of living of the inhabitants of these states.

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