Assessment of Quality Service Delivery in Electricity Distribution of Nigeria: A Case of Kaduna Electric Distribution Company

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Abstract

The study assessed quality service delivery in electricity distribution of Nigeria with particular reference to Kaduna electric distribution company. The study uses both primary and secondary data. Online questionnaire was administered to 399. Data collected was analyzed using both quantitative and qualitative methods. Content analysis was employed to analyze the qualitative data whereas regression was employed to analyze quantitative data. The results revealed that the coefficient of reliability (RLB) is -0.32. This means that reliability results have been found to have negative but significant influence on customer satisfaction with a p-value of 0.007. The coefficient of Assurance (0.832) revealed a positive impact on customer satisfaction of KEDCO. Responsiveness value was found to also reveal a negative impact on customer satisfaction as the coefficient is -0.215. Empathy coefficient (0.471) has been found to have positive influence on customer satisfaction. The study concludes that quality service delivery in electricity distribution in Kaduna state will increase customer satisfaction. The study recommends that electricity distribution firms should improve more on the services they render to their customers by supplying regular electricity to their customers consistently in order to create a high level of customer satisfaction and increased customer patronage

Keywords: Customer Satisfaction, Electricity Distribution, Quality Service
JEL Classification: D11, Q41,M20

Contribution/Originality:

This study is one of the few studies who assessed the quality service delivery in electricity distribution of Nigeria with particular reference to Kaduna electric Distribution Company using Content and regression analyses; and it is the first to use both content analysis and regression analysis in the assessment of quality service delivery in electricity distribution in Kaduna State. Thus, the study has contributed in terms of provision of quality service delivery in electricity and customer satisfaction.

1.0   Introduction

The core-basis of Economic development and industrial revolution globally, is basically driven by efficient and sustainable energy/power generation, transmission, distribution and maintenance (Adegoriola, & Agbanuji, 2020). The main interest of the consumer; be it private, corporate and public is the desire to have uninterrupted supply of electricity for the purpose of carrying out their daily activities geared towards accomplishing their set goals and objectives. Constant power supply is a major criterion for a nation's economic growth

(Fernando, & Gamage, 2018). To achieve sustainable and inclusive economic growth and development in Nigeria, adequate power must be generated, and transmitted to all parts of the country, and efficiently distributed to Nigerian business firms and citizens for business and personal consumption (Saad, et, al., 2022). Electricity service providers must do everything possible to make their customers happy, satisfied and ensure they get the best value for their money in order to experience the numerical and financial growth their business desires as well as contribute to the nation's economic growth (Oladejo, 2010).

Providing the customers with a quality service comes with a lot of benefits. First and most important is the fact that you can gain an enviable reputation and market advantage by delivering quality service. Secondly delivering quality service is the easiest and most cost effective way to enhancing the value of your product in the market. Thirdly it helps to develop loyal customers who are the actual foundation of a business model. Last but not the least is that customers will be willing to pay a premium for high quality service which satisfies all their expectations.

Quality in the electricity distribution and retail sectors spans a large number of technical and non-technical aspects. Commercial quality covers the quality of a number of services, such as the provision of a new connection (before the supply contract comes into force), as well as meter reading, billing, handling of customer requests and complaints (during the validity of the contract). A distinction between services provided by the distributor (network operator) and those provided by the retailer becomes strictly necessary as a country moves forward to full retail competition. For each of those services a quality dimension is identified (normally one per service): for instance, timing of the new connection or the accuracy in meter reading and billing.

Power generation in Nigeria according to historical antecedents' dates back to colonial administration in 1896, only in Marinna, Lagos Nigeria the then federal capital territory with an installation capacity of 60kilowatts (Cole, 2004), with the passage of time, enabling laws were instituted in 1950 naming the power generation establishment as Electricity Corporation of Nigeria (ECN), with the mandate to increase its capacity and connect other parts of the country to the national grid. Consequently, ECN was renamed National Electric Power Authority (NEPA) in 1972 backed up by Decree No. 24, NEPA eventually rechristened as the present Power Holding Company of Nigeria (PHCN) based on the reforms embarked by the government in 2005. Power generation in Nigeria is actually lagging behind compared to other nations of the world, the last figure of 7,000megawatts of electricity generation officially announced by the government in 2018 is a far cry compared to developed nation such as USA with a generating capacity of 813,000megawatss of electricity, in terms of per capita of energy consumption, Nigeria is 0.04 per capita energy consumption while that of USA is 3.2 per capita energy consumption (Rubogora, 2017). In 2021, power distribution averaged 4,094.09 megawatt (MW), despite available generation capacity of about 8,000 MW and Nigeria's available power generation capacity in the First Quarter of 2022 decreased to 4,712.34MW from 5,465.72MW in the Fourth Quarter of 2021 (NBS, 2023). In 2022, about 4,243 billion kilowatt-hours (kWh) (or about 4.24 trillion kWh) of electricity

were generated at utility-scale electricity generation facilities in the United States. About 60% of this electricity generation was from fossil fuels—coal, natural gas, petroleum, and other gases (Electric Power Annual, 2022). However, there is still so much to be done in this direction when compared to the massive need of power to drive the nation into its long awaited dream for economic growth and smooth industrial take off. One of the major problems that hindered the process of development in Nigeria is the state of poor infrastructural facilities such as electricity. This is reflected in almost all the sectors of the Nigeria economy and it is directly and indirectly affecting Global economy. Poor infrastructural facilities have systematically led to the present day under-development with the associated high unemployment level and poverty which has led to frustration and desperation in Nigeria and other developing countries. It also led to different kinds of criminalities and migration from Nigeria to other countries especially to countries in Southern Africa, Europe and America (Isah, 2021).

Poor, inadequate and inefficient power supply and distribution are problems affecting business firms and citizens for personal consumption in the country and Kaduna State in particular. In most locations in Nigeria, the distribution network, the voltage profile as well as the billing systems are very poor (Vincent & Yusuf, 2014), contributing to a great loss to the utilities. This is due to several challenges which include; low-quality distribution lines, inadequate and weak network coverage, overloading of transformers and inferior feeder pillars, inaccurate system of billing, illegal practices by employees and poor customer relations, power thefts, inadequate logistic facilities, and obsolete communication equipment, inadequate skilled staff and lack of regular training, and inefficient maintenance schemes (Amuta et al., 2018; Otuoze et al., 2019). Lack of proper and prompt maintenance of the existing distribution schemes is identified as the major cause for most of the challenges

It is against this background that the study seeks to assess the quality of service delivery in electricity distribution of Nigeria with focus on Kaduna electric distribution company. The rest of the paper is structured into, literature review, methodology; results and discussion while the last part of the paper draw conclusion and recommendations

2.0   Literature Review

2.1   Conceptual Issues

Quality Service: Quality service can be defined as how well a service delivers within or beyond customers' expectation. Optimum service delivery by any service provider lures customers not only to its services but also to keep patronizing the business and telling others about their consumption experience (Adeleke & Aminu, 2012).

2.2   Theoretical Review

2.2.1   Stakeholder Theory

The stakeholder theory as propounded by Freeman (1994) is seen as a competing theory for the dominant economic model of the firm, where managers act as agents of stockholders. Stakeholder theory posits that managers should put into consideration the interests of all its

stakeholders when making decisions to maximize value. An organization will maximize value for itself and the society at large successfully when it carefully considers the interests of its stakeholders along with its own interests. These stakeholders include employees, customers, owners and investors, and the community in general (Jensen, 2001). Customers want fair prices, quality goods and services, and friendly and courteous service. It is, therefore, the responsibility of the business to integrate and reconcile the needs of its stakeholders along with the needs of the organization in order to operate successfully (Enikanselu, 2008).

2.3   Empirical Review

Neto, Reis, Coimbra, Soares and Calixto (2022) assessed the measure of customer satisfaction in the residential electricity distribution service using Structural Equation Modeling. The sample used in the survey contained questionnaire responses from 86,175 individuals considering the period from 2014-2018. The study concludes by allows for the continuous improvement of services, and meeting, even if minimally, the expectations of its consumers. Zygiaris, Hameed, Alsubaie and Rehman (2022) examine the impact of service quality on customer satisfaction in the post pandemic world in auto care industry. Findings revealed that empathy, reliability, assurance, responsiveness, and tangibles have a significant positive relationship with customer satisfaction. Nyabundi, Aliata and Odondo (2021) also investigate tangibility on customer satisfaction among micro finance banks customers in Kisumu City. The findings indicated that tangibility is associated with customer satisfaction. The result also revealed that tangibility and customer satisfaction is significantly correlated. Libo-on (2021) assesses consumers' satisfaction and service quality of Iloilo II Electric Cooperative Inc. Philippine. The respondents of the study were randomly selected employees and consumers of the utility. Results show that that the employee is expecting that ILECO II is providing a very high satisfactory service quality but as perceived by the consumer it was only at the high satisfactory.

Supriyanto, Wiyono and Burhanuddin (2021) assess the effects of service quality and customer satisfaction on loyalty of bank customers. Results indicate that service quality did not have significant effects on customer loyalty, but it provided significant effects on customer satisfaction followed by influencing customer loyalty. Ewuim, Agbodike, Ukeje, Ogbulu, Onele and Ojogbane (2020) examined the quality service delivery and customers' satisfaction of Enugu Electricity Distribution Company (EEDC) in Abakaliki, Ebonyi State, Nigeria. The study revealed that factors such as fear of contract review/withdrawal and lack of job security after the probation period (2014-2018) due to change of government are also other challenges that affect the performance of electricity supply by EEDC in Abakaliki. Shukri, Yajid and Tham (2020) investigated the effect of tangibility, reliability and responsiveness on customer satisfaction in Malaysia. The findings showed that the tangibility, reliability, responsiveness and overall customer satisfaction in Malaysia were positive correlated.

3.0   Methodology

3.1   Research Design

This study adopted ex-post facto and cross-sectional survey research design to investigate quality service delivery of electricity distribution of Kaduna Electricity Distribution Company, Nigeria.

3.2   Population and Sample Size

The primary population for this study is the 92,649 consumers of Kaduna Electricity Distribution Company (KEDCO) with 18 Service Areas as presented in Table 1 below.

Table 1: Population

S/N	Service Area	Location	Population of Consumers
1	Barnawa	Kaduna	6,930
2	Doka	Kaduna	8,614
3	Gusau	Zamfara	5,837
4	Kafanchan	Kafachan	4,982
5	Kawo	Kaduna	6,015
6	Kebbi North	Kebbi	4,655
7	Kebbi South	Kebbi	3,873
8	Makera	Kaduna	5,003
9	Mando	Kaduna	4,873
10	Rigasa	Kaduna	4,911
11	Sabon Gari	Zaria	5,430
12	Samaru	Zaria	5,019
13	Sokoto Central	Sokoto	3,900
14	Sokoto North	Sokoto	4,010
15	Sokoto South	Sokoto	4,870
16	Talata Mafara	Sokoto	3,451
17	Tudun Wada	Kaduna	5,666
18	Zaria City	Zaria	4,610
	TOTAL		92,649

Source: Kaduna Electricity Distribution Company (KEDCO) 2023

3.3   Data and Sources

Primary data specifically cross-sectional data was used in gathering information for this study. Primary data was obtained through the use of the online questionnaire by distributing it to KEDCO customers who have been using power for at least more than one year. In addition, secondary data used in this study was collected from data collection sheets of KEDCO, articles in journals as well as from online. In this study, secondary data was particularly useful in buttressing the facts and findings from the analysis of primary data of KEDCO.

3.4   Sample Size of the Study

Using Yamane (1967) sample size determination approach, a total of 399 respondents were selected proportionally as presented in Table 2 below to maintain the distribution in the population.

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

Where:

N = Population Size; e = Level of Significance; 1 = Constant

Substituting the figures into a the formula gave

$$ n = \frac{93,649}{1 + 92,649(0.05)^2} $$
$$ = \frac{92,649}{1 + 92,649(0.0025)} $$
$$ = \frac{92,649}{1 + 232} $$
$$ = \frac{92,649}{233} $$
$$ \approx 398 $$

Table 2: Sample Size

S/N	Service Area	Population	Sample Size
1	Barnawa	6,930	$\frac{6,930}{92,649} \times \frac{399}{1} \times 30$
2	Doka	8,614	$\frac{8,614}{92,649} \times \frac{399}{1} \times 37$
3	Gusau	5,837	$\frac{5,837}{92,649} \times \frac{399}{1} \times 25$
4	Kafanchan	4,982	$\frac{4,982}{92,649} \times \frac{399}{1} \times 22$
5	Kawo	6,015	$\frac{6,015}{92,649} \times \frac{399}{1} \times 26$
6	Kebbi North	4,655	$\frac{4,655}{92,649} \times \frac{399}{1} \times 20$
7	Kebbi South	3,873	$\frac{3,873}{92,649} \times \frac{399}{1} \times 17$
8	Makera	5,003	$\frac{5,003}{92,649} \times \frac{399}{1} \times 22$
9	Mando	4,873	$\frac{4,873}{92,649} \times \frac{399}{1} \times 21$

			92,649		1		
10	Rigasa	4,911	$\frac{4,911}{92,649}$	×	$\frac{399}{1}$	×	21
11	Sabon Gari	5,430	$\frac{5,430}{92,649}$	×	$\frac{399}{1}$	×	23
12	Samaru	5,019	$\frac{5,019}{92,649}$	×	$\frac{399}{1}$	×	22
13	Sokoto Central	3,900	$\frac{3,900}{92,649}$	×	$\frac{399}{1}$	×	17
14	Sokoto North	4,010	$\frac{4,010}{92,649}$	×	$\frac{399}{1}$	×	17
15	Sokoto South	4,870	$\frac{4,870}{92,649}$	×	$\frac{399}{1}$	×	21
16	Talata Mafara	3,451	$\frac{3,451}{92,649}$	×	$\frac{399}{1}$	×	15
17	Tudun Wada	5,666	$\frac{5,666}{92,649}$	×	$\frac{399}{1}$	×	24
18	Zaria City	4,610	$\frac{4,610}{92,649}$	×	$\frac{399}{1}$	×	20
		92,649	399				

Source: Researcher's Computation 2023

3.5   Methods of Data Collection

Online questionnaire was used in collecting data used in this study. The questionnaire was distributed to KEDCO customers who have been using power for at least more than one year.

3.6   Model Specification

The dependent variable was regressed against four independent variables to determine the combined effect between the dependent variable on the independent variables. The equation is express thus:

$$CS = \beta_0 + \beta_1 RLB + \beta_2 RSP + \beta_3 ASSUR + \beta_4 EMPT + \varepsilon \tag{1}$$

Where;

CS= Customer Satisfaction; RLB= Reliability; (ability to perform service dependably and accurately); RSP= Responsiveness; (willingness to help and respond to customer need), ASSUR= Assurance; (ability of staff to inspire confidence and trust); EMPT= Empathy; (the extent to which caring individualized service is given); β_0 = Constant (coefficient of intercept), β_1- β_4 = Regression coefficient of four variables; ε = Error term;

3.7   Variable and their Measurement

In order to assess the *quality service delivery in electricity distribution of Nigeria with particular reference to Kaduna electric distribution company, the study used the following variables:* Customer Satisfaction (CS) as dependent variable while Reliability (RLB) ability to perform service dependably and accurately; Responsiveness (RSP) willingness to help and respond to customer need; Assurance (ASSUR) ability of staff to inspire confidence and trust and Empathy (EMPT) the extent to which caring individualized service is given were the explanatory variables of the study.

3.8   Method of Data Analysis

Data collected was analyzed using both quantitative and qualitative methods. Content analysis was employed to analyze the qualitative data whereas statistical methods, regression and analysis were utilized to analyze the quantitative data.

4.0   Results and Discussion

4.1   Descriptive Statistics

The descriptive statistics of the data collected for the study is presented and discussed in this section. The summary of the descriptive statistics of the data collected is presented in Table 3 as follows;

Table 3: Descriptive Statistics Result

Variables	N	Min	Max	Mean	Std. Dev.
CS	399	1	5	2.69	1.443
RLB	399	1	5	2.98	1.469
RSP	399	1	5	3.07	1.372
ASSUR	399	1	5	4.32	1.615
EMPT	399	1	5	2.97	1.459
Valid N	399				

Source: STATA Output 2023

Table 3 shows that the measure of customer satisfaction (CS) has a minimum value of 1 and 5 as the maximum value, this indicates that 1 is the lowest value in the data set while 5 is the highest value in the data set which signifies that there are no serious outlier issues in the data set. The average value of the CS is 2.69 with standard deviation of 1.443, signifies that the data deviate from both side of the mean value by 1.443 approximately. This implies that there is a bit dispersion of the data from the mean, because of the value of standard deviation which is close to the mean.

The results from the table also indicate that the minimum and maximum values of the reliability (RLB) are 1 and 5 respectively; this indicates non-existence of outliers' issues from the data set. The mean value of 2.98 and standard deviation of 1.469 in the data implies that there is dispersion from the mean value by approximately 1.47.

Furthermore, the descriptive result also revealed that responsiveness (RSP) has a minimum and maximum value 1 and 5 respectively; this indicates non-existence of outliers' issues from the data set. The mean value of 3.07 and standard deviation of 1.372 in the data implies that there is dispersion from the mean value.

The results from the table also indicate that the minimum and maximum values of the assurance (ASSUR) are 1 and 5 respectively; this indicates non-existence of outliers' issues from the data set. The mean value of 4.32 and standard deviation of 1.615 in the data implies that there is dispersion from the mean value by approximately 1.62.

The results from the table also indicate that the minimum and maximum values of the empathy (EMPT) are 1 and 5 respectively; this indicates non-existence of outliers' issues from the data set. The mean value of 2.97 and standard deviation of 1.459 in the data implies that there is dispersion from the mean value by approximately 1.46.

4.2   Regression Results

In this section, the regression results of the models of the study are presented and interpreted. The hypotheses formulated for the study are also tested from the results as presented in Table 4 below;

Table 4: Summary of Regression Result

Variables	Co-Efficient	T-Values	P-Values
Constant	1.233	1.434	0.159
RLB	-0.321	2.247	0.007
RSP	-0.215	-1.466	0.002
ASSUR	0.832	6.551	0.000
EMPT	0.471	3.349	0.201
R^2			0.308
Adjusted R^2			0.257
F-stat			6.079
F-sig			0.002

Source: STATA Output 2023

Cumulatively the R^2 (0.508) which is the combined coefficient of determination indicates the extent to which the independent variables (reliability, responsiveness, assurance and empathy) explain the total variation in the dependent variable (customer satisfaction) and the remaining 49% is explained by the other factors not captured by the model of this study. Thus, it signifies that 51% of the total variation in customer satisfaction is caused by reliability, responsiveness, assurance and empathy. This indicates that the explanatory variables are well selected and combined because the R^2 is positive and satisfies the minimum rule of thumb. Furthermore, the F-statistics of 6.079, which is significant at one per cent level of significance, indicates that the model of the study is fit. The value of F-statistics which is statistically significant at one per cent level of significance (0.002) means that there

is a 99 per cent probability of confidence that the association amongst the variables of the study is not just by chance.

4.3   Discussion of Major Findings

Reliability results have been found to have negative but significant influence on customer satisfaction with a p-value of 0.007. Looking at the nature of the variable, it should be understood that higher satisfaction tends to work well when there is high reliability on the service delivery of the company. Responsiveness value was found to also reveal a negative but significant impact on customer satisfaction with a p-value of 0.002. This is also in line with the researcher's prior expectation and what is obtainable in reality. When there is a prompt and swift response to customers' needs in terms of service delivery, it drives satisfaction of the customers.

Assurance value was found to reveal a positive and significant impact on customer satisfaction of KEDCO with a p-value of 0.000. This is in line with the researcher's prior expectation and what is obtainable in reality. When an individual do get and enjoyed promises as to service delivery, it could boast the customer's satisfaction. Finally, empathy has been found to have positive but insignificant influence on customer satisfaction with a p-value of 0.201. Bearing in mind the nature of the variable, it may not be enough to drive satisfaction by merely showing empathy without a corresponding quality service delivery.

5.0   Conclusions

From the findings of the study, it was concluded that service quality attracts customers to purchase products and services and make repeat purchases. Organizations that render quality services will increase the level of customer satisfaction in their business as well increase their market share because satisfied customers will keep buying their products and services and tell others about their experience with such products and services. The price charged by an organization influence customers' purchase decision to patronize its products and stick to such organization's products and services. Companies that set fair prices will expand their market coverage and generate more sales because they will retain their existing customers and also draw the attention of competitors' customers to their products and services. Customer service provided by business firms does not lead customers to keep making repeat purchases of such firms' products and services.

Based on the findings, the study recommends that electricity distribution firms should improve more on the services they render to their customers by supplying regular electricity to their customers continually in order to create a high level of customer satisfaction and increased customer patronage. Secondly, fair prices should be charged to customers based on what they consume during a specific period of time. Prepaid meters should be provided to all customers in order to ensure that customers are billed appropriately based on their consumption rate. This will bring about rapid market expansion and increased market share. Finally, customer service can be enhanced in electricity distribution firms through the provision of quick and accurate response to customers' complaints and suggestions. Provision of quick and accurate response to customers' complaints and suggestions will go a long way

in meeting and satisfying the needs of customers as well as retaining them for improved business performance.

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