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Pricing Variables and Consumers' Perception of Electricity Distribution Companies Performance in Nigeria.

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ABSTRACT

This study attempt to barometerised consumers' perception of the services of electricity distribution companies (DisCoys) using pricelist or what NERC call MYOT models of tariffs as benchmark pricing strategy in Nigeria. The total population for the study is 200 staff of PHED, Port Harcourt. The investigation used both opinionnaire and questionnaire as the instrument for the data collection. Survey research design understudy 133 respondents from marketers, human resource managers, senior and junior staff and customers of PHED. The data collated were presented in tables and analyzed using simple percentages, frequencies, and chi-square statistics.

Keywords: Pricing variables, consumers' perception, electricity, DisCoys or distribution companies, performance index, etc.

1.1 Background of the study

Electricity markets offers flat tariff structure to consumers. Implementation of dynamic pricing of electricity is mostly restricted to block pricing in which the per unit rate of electricity increases or sometimes decreases after the consumption of a certain amount of electricity. Electricity prices typically do not experience the full effects of market forces in Nigeria. Hence, do not reflect the investible costs of generation and distribution. Peak load profiles are a result of unregulated demand, and huge capacity addition is required to meet peak load. Although flat rates offer uncertainty. Dynamic tariff structures have the potential to flatten demand profiles and thus help power suppliers to reduce expenditure on capacity additions and efficiently plan electricity generation and distribution. Dynamic tariffs model provides each consumer with an opportunity to reduce electricity bills at a constant consumption level just by shifting load Knowledge about the demand and price relationship for electricity supply. Consumers' willingness to pay for electricity and demand forecasts are necessary for suppliers to plan their consumption pricelist. Effective scheduling of electrical load can help consumers to reduce their electricity bills by increasing consumption when prices are low and reducing consumption when prices are high. Demand patterns and elasticity of demand vary from consumer to consumer and thus segmentation of the electricity market can prove to be helpful. Suppliers can offer suitable pricing schemes in properly segmented markets to boost their revenue. Supporting technologies can further bridge the demand-supply gaps in electricity markets.

1.2 STATEMENT OF THE PROBLEM

Nigeria has tremendous energy resources. Nigeria's energy-mix include gas, coal, solar, water and other mineral resources. Yet, it is highly energy deficient if not poor. Comparatively, per-capita electricity consumption is about 136 KWh to other neighboring West African countries, such as Ghana and Ivory Coast, which are not endowed with such resources, with per-capita electricity consumption of 309 KWh and 174 KWh respectively. That Nigeria has not harness the benefits of the country's rich energy wealth is a classic developmental paradox. News dailies are awashed with reports of billions of Dollars and trillions of Naira pumped into power generation all over the country, yet nothing seems to power the country.

1.3 OBJECTIVE OF THE STUDY

The specific objectives include

i To determine how consumers perceive electricity prices

ii To determine whether electricity distribution companies have provided sufficient quality electricity supply to consumers.

iii To determine whether customers are satisfied with the performance of DisCoys.

RESEARCH HYPOTHESES

H_{01}: There is no significant relationship between consumers' price perception and electricity prices.

$H0_{2}$: There is no significant relationship between performance of electricity DisCoys and customer satisfaction.

1.4 SIGNIFICANCE OF THE STUDY

This study will be significant to students, ministry of power and the public because the study gives a clear insight on determinant of electricity tariffs and consumer perception of electricity market in Nigeria. The study will also add to the body of knowledge in the power industry in Nigeria.

1.5 LIMITATION OF THE STUDY

The scope of the study covers tariffs and consumer perception of electricity marketing in Nigeria. The researcher encounter staff too afraid to grant interview. Snubbing questionnaire administration, non-response and outright refusal to accept the instrument, among others.

Literature review

2 Theoretical Framework

2.1.1 Nigeria's Electricity Sector

With only 3800 MW against an estimated demand of 10,000-12,500 MW, Nigeria has considerable unmet demand of electricity supply-demand www.infoguidenigeria.com).

About 40% of Nigeria's population has access to electricity with the rest of around 90 million people living in the dark. According to 2018 World Bank report, the country faced a long bout of underinvestment and poor planning in electricity infrastructure from 1981-99. Only 19 out of 79 generation units were operational in 1999, and the average daily generation was only 1,750 MW. No new infrastructure was built in the country for over a decade (1989-99), and the youngest power plant built was in 1990. Less than 2% of the Transmission Development Plan (1995 – 2005) was implemented, with the last transmission line built in 1987. As a result, the existing power infrastructure is mostly in a dysfunctional state. In its response to this grim situation, the administration, in 1999 embarked on an ambitious program to improve the generation, transmission and distribution capacity in the country.

The salient features of this program were as follows:

(a) Increase in generation capacity, through the rehabilitation of existing plants and building of new plants (new PHCN4 or NIPP5 plant, or third-party licensed IPPs).

(b) Reinforcement of transmission network, through the rehabilitation of existing system and building of new grid stations and transmission lines.

(c) Rehabilitation and extension of the distribution system, initiation of pilot demonstration projects and expanding rural electrification schemes.

(d) Initiation of sector reforms, including enactment of enabling legislation, restructuring of the monolithic utility NEPA, establishment of the independent regulator, and solicitation of private-sector investments. Hence, investments in the power sector over the last three decades have followed an irregular pattern. While there was substantial investments in the years following the oil price shocks of the seventies, there was a period of neglect, which resulted in a crisis like situation in the nineties. It was in 2001, that the power sector received growing attention from FGN, even though the bulk of the results are yet to materialize, (www.usaid.gov/powerafrica).

Modest but no concerted attempt to sustain the steady improvements witnessed during 2000-2005 for a variety of reasons. The vandalization of gas pipelines feeding major power plants brought a major reduction in overall electricity generation. Reforms in the power sector, from the new Electric Power Sector Reform legislation in 2005, resulted in unbundling of the Power Holding Company of Nigeria (PHCN) into 18 companies (6 generating, 1 transmission, and 11 distribution companies). The revenue growth in the sector has been improve from about N80 billion in 2003 to about N110 billion in 2007. This is because collection mechanism improved, (NPC, 2015). Both distribution and transmission losses have steadily declined over the last few years, with investment in advanced technology. However, retail electricity prices have not traditionally kept pace with inflation in Nigeria and were last adjusted in 2002. As a result, the Nigerian electricity sector is going through a financial crisis, which is causing great inconvenience to the population.

The retail electricity prices in Nigeria consists of three elements.

(a) Energy Charge - for variable costs recovery,

(b) Demand Charge - for applied pressure (load amount) on the system, and (c) Fixed Charge - for capital costs recovery. They are six categories of electricity consumers in Nigeria namely, residential, commercial, industrial, street lighting, customers on special tariff, and International Customers. Each of the groups is sub- divided into classes resulting in 19 classes of customers.

The residential share of the customer base is about 60% of the total revenue share. However, in terms of revenue collected, the share of residential customers is not proportionately as high due to two reasons.

- ❖ First, there is a differential tariff structure for commercial and residential customers and residential customers have a lower tariff level.
- ❖ Second and more importantly, a large part of residential customer supply is unmetered, and is only billed based on average consumption. In the absence of proper metering, therefore, the amount billed is, at best, an estimation. Unpaid bills are substantial as evident from the high accounts receivable (595 days of sales equivalence). These accounts receivables accumulated year after year, with no effective policy to discharge them and poor handling of bad debts. According to Etim, Oyebode and Adeniran, (2019),

about two-third of the receivables is from the private consumers' category that includes residential consumers. As of today, the tariff for the Nigerian electricity market is one of the lowest in the world. The current average tariff level in Nigeria is about N6.31/KWh or $0.02 US cents/KWh current exchange rate, which has remained constant since 2002. With increasing costs, the current tariff level has not been sufficient to meet either operating/overheads cost or capital investment costs of the unbundled companies along with the gas supply payment and the IPP payments. Other major reasons for this deficiency are the high technical loss levels and low collection efficiencies. These two factors together, account for almost 50% of the potential revenue loss. As a result, there is a yearly revenue gap, which has been historically met by the Government through ad hoc transfers. The recent multi-year tariff order by the regulator is an attempt to remedy the situation, where the government seek to plug gap of a mix of government subsidies and tariff increases.

2.1.2 Tariff Design

The next challenge for the Nigerian Electricity Regulatory Commission (NERC) is to design a tariff structure that will take into account cost reflective levels and target subsidies efficiently for the poor. It will have to take into account willingness to pay and affordability.

A significant portion of the Nigerian population resorts to expensive captive generation using AGO, PMS, SOLAR, or other costlier fuels. It is estimated that as much as 4000 MW of self-generation exists in the system. This is more than the 3800 MW available in the grid. It is estimated that it costs around 30 U.S. cents to generate a KWh using stand-alone generators in Nigeria. Hence, a significant consumer surplus exists in the system allowing a good elbowroom for the regulator to reach across the above tariff of 10 U.S. cents per KWh to reach cost reflective levels as per MYTO II of 2015.

2.1.3 Gas Pricing

The pricing of gas is a major issue in Nigeria and is very central to electricity generation because about one-half of Nigeria's generation plants are thermal. This proportion is set to go up with a limitation on utilization of hydro capacity. Further exploitation of hydropower resources might be difficult due to capital intensiveness, even though the Government has plans that are still at a conceptual stage, to develop large hydro facility at Mambilla in Adamawa State.

Gas is the logical choice for power generation in Nigeria, both in terms of gas availability and capital requirements. Nigeria has the seventh largest proven gas reserves in the world, with 202 TCF of high-grade gas, (www.allafrica.com). It faces significant demand boom, which might expectedly alter its industrial and economic development potentials. However, supply significantly lags demand, threatening economic growth. Utilization of gas resources is a challenge because of various factors such as the violent situation in Niger delta militancy environmental, and social issues surrounding it. The original contracts between the oil companies and the Government were production-sharing arrangements for oil but do not cover gas. Oil companies, producing these associated gases, want a commercial price for gas supplied to the domestic market that matches international prices, (McFarLand, 2018).

The Government, arguing that this gas is a national asset, wants to price gas low, especially for the power sector in an attempt to keep the retail electricity prices low. Since the international LNG prices are more attractive, the oil companies have an incentive to divert gas to international export markets as much as they could and since they do not have an incentive to supply for the domestic market, flare the rest of the gas. The result is a terrible gas-flaring situation in Nigeria. In addition, the local gas processing and transmission infrastructure did not develop at all. Erratic availability of gas, resulting from lack of investments in infrastructure, poor planning and sabotage of pipelines, has also been a major cause of poor utilization of existing power generation capacity.

In February 2008, Federal Government of Nigeria approved a package of measures to improve the medium-to-long-term development of the gas sector that included a new gas pricing policy. It introduced a Strategic Aggregator, rolled out a Gas Master Plan that identifies the future of gas infrastructure network. This, it will to be built by the potential investors, and an obligation for gas producers to serve the domestic market.

The Government's policy mandates all oil and gas operators to set aside a pre-determined amount of gas for the domestic sector. The policy sets a penalty for default at $3.5/mcf of obligation that is under-supplied and otherwise flared, and is not tax deductible. An environmental surcharge of 0.5 C /mcf is levied over this. The policy also stipulates that the relatively cheaper Nigerian gas should sell in the domestic market first. The gas policy mandates the sector benchmark pricing to match these categories,

- Cost + for strategic domestic sector;
- Netback for the strategic industrial sector;
- Alternative fuels pricing for commercial users.
- Lastly, it introduces the concept of strategic aggregator, which will be accountable for the volume and price of the gas supply. The Government's policy introduces a floor price of US$0.40/MMBtu at power plants based on a price of US$0.10/MMBtu at the wellhead and a transmission charge of US$ 0.30/MMBtu.

The price of gas to non-power consumers is expected to cross subsidize the price to power plants resulting in a pooled price of US$ 0.80/ MMBtu to the gas producers. This arrangement of a pooled price is expected to be managed through the proposed institutional arrangement of a gas aggregator. The proposed Gas Aggregator will manage the gas supply portfolio and payment for gas to the domestic sector. The Gas Aggregator will be the first contact point for the gas trade and marketing. it will issue Gas Purchase Orders (GPO) after due diligence. Sellers make gas available to the Buyer at the Delivery Point agreed with the Buyer. However, the price of gas for power generation is set to go up to US$ 1.00/MMBtu by 2013.

The Government also introduced a securitization framework to ensure investment in gas supply for the power sector. Both these steps will provide a much-needed boost to gas supply to the power sector.

The short-medium term gas plan, projects a rise in domestic gas supply from current 710 mmcf/d to 2605 mmcf/d by 2012 (NNPC). Specifically, it expects to double capacity to 1400 mmcf/d by end 2008 and triple capacity to 2042 mmcf/d by 2009. If successful, the supply plan will enable gas-fired generating capacity to grow to 4651 MW within 12 months and further grow to 6158 MW by end of 2009. It will also triple the gas supply to domestic industries from 179 mmcf/d to 435 mmcf/d by end 2009, (www.energymixreport.com and www.shell.com.ng). All the noble plans failed as Nigerians are more electricity deficient now than ever.

2.1.4 Electricity Pricing Schemes

Electricity prices can be broadly categorized into two types - static prices that do not change with a change in demand and dynamic prices that change with changing demand situation, (Faruqui & Palmer; 2012, Simshauser & Downer, 2014, Desai & Dutta, 2013 and Quillinan, 2011).

a. **Flat tariffs:** Price remains static even though power demand changes. Consumers under such a scheme do not face the changing costs of power supply with a change in aggregate demand. Thus, consumers have no financial incentive to reschedule their energy usage.
b. **Block Rate tariffs**: This scheme differentiates between customers based on the quantity of electricity consumption. The scheme consists of multiple tiers characterized by the amount of consumption.
c. **Seasonal tariffs**: These schemes observe different rates in different seasons to match the varying demand levels between seasons. Energy is charged at a higher rate during high demand seasons and the price lowers during low demand seasons.
d. **Time-of-use (TOU) tariff**: These are pre-declared tariffs varying during the different times of the day, that is, high during peak hours and low during off-peak hours. It is also called time-of-day (TOD) tariff.
e. **Super peak TOU:** It is similar to TOU but the peak window is shorter in duration, about four hours, to give a stronger price signal.
f. **Critical peak pricing (CPP)**: Consumers are charged a high fixed rate during a few peak hours of the day and a discounted rate during the rest of the day in this pricing scheme. It gives a very strong price signal and enhances the reduction of excessive peak load
g. **Variable peak pricing (VPP)**: This is quite similar to CPP with the only difference that the peak prices are not fixed, and vary from day to day.
h. **Real-time pricing (RTP)**: This is the purest form of dynamic pricing and the scheme with the maximum uncertainty or risk involved for the consumers. Here the prices change at regular intervals of one hour or less and the consumers are aware of the prices beforehand as per the design of the scheme.

2.2 Conceptual Review

2.2.1 The Concept of Quality Perception

- ❖ Quality broadly speaking is superiority or excellence. By extension, perceived quality can be defined as the consumer's judgment about a product's overall performance, excellence or superiority. Perceived quality is
- ❖ Different from objective or actual quality,
- ❖ A higher-level abstraction rather than a specific attribute of a product,
- ❖ Global assessment that in some cases within consumer has evoked set.

- Objective quality versus perceived quality.

Several researchers including Dodds and Monroe 1984; Garvin 1983; Holbrook and Corfman 1985; Jacoby and Olson 1985, Parasuraman, Zeithaml, and Berry 1986) have emphasized the difference between objective and perceived quality. Holbrook and Corfman (1985), for example distinguish between mechanistic and humanistic quality. Mechanistic is quality involving an objective aspect event. Whereas, humanistic quality involves the subjective response of people to objects and is therefore a highly relativistic phenomenon that differs between judges" p. 33. Objective quality is the term used in the literature such as Hjorth-Anderson 1984; Monroe and Krishnan 1985) to describe the actual technical superiority or excellence of the products.

Concern centres on the selection of attributes and weights to measure objective quality researchers and experts for instance, Consumer Reports do not agree on what the ideal standard or standards should be. Others such as Maynes 1976 claim that objective quality does not exist, that all quality evaluations are subjective. For example, Garvin (1983) discusses product-based quality and manufacturing-based quality. Product-based quality refers to amounts of specific attributes or ingredients of a product. Manufacturing-based quality involves conformance to manufacturing specifications or service standards. In the prevailing Japanese philosophy, quality means, zero defects in doing it right the first time. Conformance to requirements Crosby (1979) reported incidence of internal and external failures. Garvin (1983) offers several other definitions that illustrate manufacturing-oriented notions of quality. These concepts are not identical to objective quality because they, too, based are on perceptions. However, measures of specifications may be actual, rather than perceptual; the specifications themselves are set based on what managers perceive to be important. Managers' views may differ considerably from consumers. Consumer Reports ratings may not agree with managers' assessments in terms of either salient attributes or weights assigned to the attributes.

In a study for General Electric, Morgan (1985) points out striking differences between consumer, dealer, and manager perceptions of appliance quality. When asked how consumers perceive quality, managers listed workmanship, performance, and form as critical components. Consumers actually keyed in on different components: appearance, clean ability, and durability. Similarly, company researchers in the exploratory study measuring beverage quality in terms of "flavor roundedness" and "astringency" whereas consumers focused on purity (100% fruit juice) and sweetness. To reiterate the experience, perceived quality in the model is the consumer's judgment about the superiority or excellence of a product. This perspective is similar to the user-based approach of Garvin (1983) and differs from product-based and manufacturing based approaches. Perceived quality is also different from objective quality, which arguably may not exist because all quality is a perception of someone, be it consumers, managers, or researchers at Consumer Reports.

2.2.2 The Concept of Price Perception

Price, from the consumers' angle is what is given up or the sacrifice to obtain a product. This definition is congruent with Ahtola's (1984) argument against including monetary price as a lower level attribute in multiattribute models because price is a give component of the model, rather than a get component. Defining price as a sacrifice is consistent with conceptualizations by other pricing researchers, (Chapman 1986; Mazumdar 1986; Monroe & Krishnan 1985). From several studies reviewed, we can delineates the components of price: objective price, perceived nonmonetary price, and sacrifice. Jacoby and Olson (1977) distinguished between objective price, i.e. the actual price of a product and perceived price i.e. the price as encoded by the consumer.

Some consumers may notice that the exact price of Hi-C fruit juice is $1.69 for a 6-pack, but others may encode and remember the price only as expensive or cheap. And this is true for Chivita juice and Five Alive juice viv-a-vis Rabena juice" Still others may not encode price at all. A growing body of research supports this distinction between objective and perceived price (Allen, Harrell, & Hutt 1976; Gabor & Granger 1961; and Progressive Grocer 1964).

Studies have also reveal that consumers do not always remember actual prices of products. Instead, they encode prices in ways that are meaningful to them, (Dickson & Sawyer 1985; Zeithaml 1982, 1983). Levels of consumer attention, awareness, and knowledge of prices appear to be considerably lower than necessary for consumers to have accurate internal reference prices for many products (Dickson & Sawyer 1985; Zeithaml 1982). Dickson and Sawyer p. 10, reported that the proportions of consumers checking prices of four types of products; margarine, cold cereal, toothpaste, and coffee at points of purchase ranged from 54.2 to 60.6%.

2.3 Empirical review

2.3.1 Pricing in Retail Electricity

Pricing in competitive markets generally depends on customers' perception of the value derivable from consumption of electricity. The producers' supply cost tends to be dynamic in nature. However, regulated markets generally experience flat tariffs that do not reflect the supply costs. Desai and Dutta, (2013) prove that dynamic pricing is more efficient than traditional flat rate tariffs as it utilizes the consumer surplus and reduces peak loads.

Various processes of developing price are studied which are as follows. Harris, (2006) describes the way of deriving the price of electricity by indexing it against a weighted average of present and past wholesale rates. To David & Li, (1993), state that pricing electricity at the retail levels is in both concurrently and at other times pricing affect the demand response to dynamic tariffs, thus demonstrating cross-elasticity of demand. They develop theoretical frameworks that address the price formation problem with cross elasticity of demand under certain conditions. Skantze et al., (2002) revealed that delay of information flow between different markets causes price variations. Prices correlates only if transmission lines, which are not congested, connect the markets. Stephenson et al., (2001) mentioned that variations in electricity pricing schemes might depend on several factors like thermal storage, combined heat, power generation, auto-producers, photovoltaic, net metering, small hydropower plants, dynamic prices, renewable energy, green tariffs, and consumer characteristics like consumption patterns. Garamvolgyi & Varga, (2009) viewed prices can be designed by using artificial intelligence techniques to classify consumers based on procurement costs. Holtschneider and Erlich, (2013) develop mathematical models based on neural networks for modeling consumers' demand response to varying prices. Their model is can identify an optimal dynamic pricing by Mean-Variance Mapping Optimization method.

Seetharam et al., (2012) developed a real-time self-organizing pricing scheme, called "Sepia", to compute the unit price of electricity based on consumption history, grid load, and type of consumer. This pricing scheme is decentralized and a grid frequency is use for grid load measurement in smart meters for determining the subsequent unit price of electricity. McDonald and Lo, (1990) alludes that an appropriate social basis of price designs for retail electricity includes welfare considerations for both consumers as well as suppliers.

2.3.2 Wholesale Market Pricing

Electricity trades in a wholesale market for industrial customers and electricity retailers. The market price for a future period discovers through a bidding process in the bulk electricity markets pool.

Kirschen et al., (2000) illustrates a method of determining market price through bidding. The lowest bid price sets by the supplier based on its costs of supplying a quantity of electricity for a future period. Then a pool of bid prices accepts bulk buyers. Do the selection of the bids from the highest priced one, in the order of decreasing prices, until the cumulative demand matches the supply. The last accepted bid price from the pool of selected bids sets the market price. However, the key price design decisions can depend on factors like contract pricing or compulsory pool pricing, one-sided or two-sided bids, firmness of bids or offers, simple or complex bids, price determination timing with respect to actual delivery, capacity payments, geographically-differentiated pricing and price capping.

David and Wen, (2000) in a study reviewed literature to discuss bidding by individual participants for individual profit maximization. They also discuss the role of regulators in limiting possible market abuse by some participants. The survey reveals that oligopoly exists in the market, instead of perfect competition, due to the several characteristics of the electricity market that restrict the number of suppliers. Different methods and ideas uses model bid prices.

Li et al., (1999) represent electricity trade as a two level optimization process. A priority list method through a ―Centralized Economic Dispatch‖ (CED) uses the top level. The lower level has sub-problems of decentralized bidding. Here, hourly bid curves developed for the CED by using self-unit scheduling based on parametric dynamic programming. Both the levels focus on revenue maximization rather than on cost minimization. Zhang et al., (2000) developed bidding and self-scheduling models using probability distributions and Lagrangian relaxation respectively.

Weber and Overbye, (1999) used a two-level optimization problem to determine the optimal power flow considering social welfare. They determine Nash equilibrium along with a market price with all participants trying for individual profit maximization. Krause and Andersson, (2006) used agent-based simulators to demonstrate different congestion management schemes such as market splits, locational marginal pricing, and flow-based market coupling. The welfare aspects of different pricing schemes analyses these methods to arrive at suitable market power allocations. Zhao et al., (2010) proposed that the bid cost minimization technique, generally used in the wholesale market, actually provides a much higher cost than the minimum bid cost. However, Zhao et al., (2008) further introduce transmission constraints in the problem, making it complicated but more realistic. Han et al., (2010) uses CPLEX's MIP for this problem to find low efficiencies. They overcome this problem by objective switching method, in which can reduce the feasible region by performance cuts to minimize infeasibilities and improve efficiency.

2.3.3 Elasticity of Electricity Demand

A clear idea of the demand-price relationship or elasticity is helpful for effective demand side management (DSM). Borenstein et al., (2002) narratives insist that elasticity of demand can be short-run as well as long run. In Short-run, elasticity describes the price-response from the system with its current infrastructure and equipment. In long run, elasticity consider the investments that can respond to higher prices during a longer time span. Wolak, (2011) observes that electricity markets mostly have low elasticity of demand, at least in the short-run. Dealing with low demand elasticity leads to the implementation of large price spikes in spot or cash pricing markets. He concludes that consumer response is roughly similar for short hourly peaks and longer periods of high price.

Ifland et al., (2012) reveals a steep slope of the demand curve from a study of the German electricity market. However, his field test proves that dynamic tariffs can increase demand elasticity and demand curves are more elastic during cold seasons in Nigeria and less elastic during hot weather or dry season. Kirschen, (2003) footnoted that implementation of dynamic pricing definitely increases the elasticity of demand. He further notes that demand curves are steep, and shift, depending on the time of day or day of week. Shaikh and Dharme, (2009) demonstrates the seasonal variation of load curve with TOU tariffs in the Indian power market context. Kirschen et al., (2000) studied the short-term price response in the electricity market of England and Wales. In this case, half-hourly prices are announces 13 hours in advance. They reviewed cross-elasticity of demand along with self-elasticity. Cross elasticity measures the rate of change of demand for one time with respect to change in the price of another time. They form a 48 by 48 matrix of elasticity coefficients. They further established that the consumer respond to a price increase in the short-run is rare unless the price increase is significantly high. This low demand response can be because of consumption scheduling that involves some relatively cumbersome technology. They posits that consumers respond more to short-term price hikes than to short-term price drops. They develop a non-linear elasticity function from their study. However, Braithwaite, (2010) explains that there can be no particular formula for determining the amount of demand response, which varies across customer types.

Methods and Materials

3.1 Research design

Descriptive survey design accounted for building this paper. The choice of survey research design considers appropriate because of its advantages of identifying attributes of a large population from a group of individuals (Zikmund, 2003). The design was suitable for the study as the study sought to determine pricing tariff and consumer perceived valued of energy mix electricity marketing of Nigeria

3.2 Population of the study

Population of a study is an aggregate of 2,000 staff, intermediaries and consumers of Port Harcourt electricity distribution company (PHED) selected for this analysis. Research interests centres on price of electricity, service quality, consumer perception of the service quality in terms of price value paid for services of the said electricity.

3.3 The sample

Simple purposive sampling was adopted. In doing that, 10% of 2,000 (200) questionnaire administered. 66.5%, (133) was retrieved for analysis. However, 33.5% (67) were either wrongly filled, therefore, rendered invalid. The difficult terrain that PHED covers hampered the objective to cover the entire research population. PHED covers Rivers, Bayelsa, Akwa Ibom and Cross River States in the Niger Delta of Nigeria respectively. Taro Yamani (1964) formula was used to determine the study sample

3.4 Instrument for data collection

Questionnaires was appropriately moderated. The respondents were administered with the questionnaire to complete, without disclosing their identities. The primary data contained information extracted from a structured questionnaire in which the respondents were required to give specific answers to question stems by ticking in front of an appropriate answer and administer it on staff of the organization.

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Though the questionnaire was valid and reliable because it addresses the research objectives and adhere to the contents, it was not subjected to Cronbach ɖ validation. However, question stems measure the reliability of content.

MATERIALS

3.1 Methods

The study use absolute numbers, frequencies of responses, percentages and chi-square for analysis. Answers to the research questions provide leeway through the comparison of the percentage of workers to response to each statement in the questionnaire related to any specified question they consider they can answer.

The simple percentage method uses straightforward easy to interpret and understand statistics.

The formula for percentage used:

% = f/N x 100/1

Where f = frequency of respondents response

N = Total Number of response of the sample

100 = Consistency in the percentage of respondents for each item

3.2 DATA ANALYSIS

The data collected from the respondents were analyzed in tabular form. Two hundred-(200) questionnaire were administered and one hundred and thirty three (133) questionnaire retrieved.

Question 1: Gender distribution of the respondents.

TABLE I

Gender distribution of the respondents

Response		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	77	57.9	57.9	57.9
Valid	Female	56	42.1	42.1	100.0
	Total	133	100.0	100.0	

From the above table it shows that 57.9% of the respondents were male while 42.1% of the respondents were female.

Question 2: The positions held by respondents

TABLE II

The positions held by respondents

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Marketers	37	27.8	27.8	27.8
	HRMs	50	37.6	37.6	65.4
	Senior staff	23	17.3	17.3	82.7
	Junior staff	23	17.3	17.3	100.0
	Total	133	100.0	100.0	

The above tables shows that 37 respondents which represents 27.8% of the respondents are marketers, 50 respondents which represents 37.6 % are human resource managers, 23 respondents which represents 17.3% of the respondents are senior staff, while 23 respondents which represent 17.3% of the respondents are junior staff

3.3 TEST OF HYPOTHESES

There is the relationship between determinants of pricing of tariffs and consumer perceived value of energy

Table III

There is the relationship between determinants of pricing of tariffs and consumer perceived value of energy

Response	Observed N	Expected N	Residual
Agreed	40	33.3	6.8
strongly agreed	50	33.3	16.8
Disagreed	26	33.3	-7.3
strongly disagreed	17	33.3	-16.3
Total	133		

Table IV Test Statistics

	There is the relationship between determinants of pricing of tariffs and consumer perceived value of energy
Chi-Square	19.331[a]
Df	3
Asymp. Sig.	.000

0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.

Decision rule:

There researcher therefore reject the null hypo thesis that there is no the relationship between determinants of pricing of tariffs and consumer perceived value of energy as the calculated value of 19.331 is greater than the critical value of 7.82. Therefore, accept the alternate hypothesis that state that there is the relationship between determinant of pricing and consumer perceived value of energy-mix electricity.

TEST OF HYPOTHESIS 2

There is no significant relationship between electricity performance DisCoys and customer satisfaction.

Table V DisCoys performance and customer satisfaction

Response	Observed N	Expected N	Residual
Yes	73	44.3	28.7
No	33	44.3	-11.3
Undecided	27	44.3	-17.3
Total	133		

Table VI Test Statistics

	DisCoys performance and customer satisfaction
Chi-Square	28.211[a]
Df	2
Asymp. Sig.	.000

0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 44.3.

Decision rule:

There researcher therefore reject the null hypothesis that state there is no impact of determinant of pricing tariffs on Nigeria economy as the calculated value of 28.211 is greater than the critical value of 5.99

Therefore, accept the alternate hypothesis that there is impact of determinant of pricing tariffs on Nigeria economy.

3.3 Conclusion

Even though Nigeria is abundantly rich in energy resources, it is clear that unless appropriate pricing, and cost reflective measures are adopted for both electricity and gas, its energy sector growth will not be sustainable. However, these pricing measures will not yield the desired results unless complementary governance measures are put in place to make them sustainable.

3.4 Recommendation

This study has helped in drawing the attention of policy makers and electricity market players in Nigeria and other developing countries in general, to reassess their position because of the benefits of dynamic and customized pricing, demand mapping, segmentation for electricity markets and automation technologies, and choose a decent option of effective and efficient management of their power industry.

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