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## Natural Monopoly in the Privatized Nigeria Power Industry and Sustainable Service Delivery: An Assessment of the Ikeja Electricity Distribution Company as a Microcosm of the Post-Privatization Electricity Distribution Companies in Nigeria

**Dr. Patrick S. Ohikhena**

Senior Lecturer, Department of Business Administration, Wellspring University, Nigeria

**Dr. Williams Akerejola**

Lecturer, Department of Business Administration, Wellspring University, Benin City, Nigeria

**P.O. Emenike**

Chartered Accountant, Emenike and AMP; Co, Chartered Accountants-Audit, Nigeria

### **Abstract:**

*The electricity industry in Nigeria was privatized in 2005 giving rise to Electricity Generating Companies (Gencos), Transmission Company of Nigeria (TCN), and Electricity Distribution Companies (Discos). In particular, 11 companies emerged in the country each with an allotted operational zone. The industry has been operating as a natural monopoly. The objective of the study was to establish that the natural monopoly of the Nigeria electricity power industry has a significant effect on the ability of the Ikeja Electricity Company to deliver sustained power supply to consumers. Within the operational domain of Ikeja Electricity Distribution Company, the study concentrated on the electricity consumers in Alimosho Local Government Area which is the largest Local government Area in Lagos State. The sample size was 377 calculated using Raosoft sample size calculator. Out of the 377 copies of the questionnaire administered, 311 were returned fully completed representing a response rate of 82.49%. The analysis of data was done with Z test. There were 10 findings. The only hypothesis of the study shows that the natural monopoly of the Nigeria electricity power industry in which the Ikeja Electricity Distribution Company operates has a significant effect on its ability to deliver sustained power supply to consumers. The recommendation is that the distribution segment of the market be deregulated to give rise to competition.*

**Keywords:** Natural monopoly, sustainable service delivery, privatization, power industry

### **1. Introduction**

A major intellectual proposition that has loomed large in the literature on the electric industry is that the industry and similar industries that are affected by price and entry regulation fall into the category of what is referred to as "natural monopoly". Simply put, a monopoly exists when a single person or enterprise is the sole supplier of a particular product or the provider of a particular service. It is characterized by a lack of economic competition in the production of a good or service, lack of viable substitute goods or services, and there is the possibility of being in control of prices which could result in a high monopoly price above the seller's or service provider's marginal cost. This could, in turn, lead to a high monopoly profit (Wikipedia, 2017).

Stretching it further, the term "natural monopoly" does not refer to the actual number of sellers in a market but to the relationship between demand and the technology of supply (Posner, 1969). Where the entire demand within a relevant market can be satisfied at lowest cost by one firm rather than by two or more, the market is a natural monopoly, not minding the actual number of firms in it (Posner, 1986). Put differently, a natural monopoly involves production conditions where it is considered less costly to produce goods and services in a single firm than it would be in two or more firms (Joskow, 2006).

In the electricity power industry, it is said that the monopoly of having a sole electricity provider is allowed because the companies incur large costs in producing and distributing power to consumers; and it is considered that its services will be more efficient when done alone than having many providers. However, the trade-off is that government regulates and monitors such a utility company to ensure that the rates it charges the consumers are affordable and the timing of increases in prices are controlled (Investopedia, 2018).

The proponents of the theoretical proposition that the electric industry is a "natural monopoly" support their stand with the argument that no two electricity companies can operate in the same neighbourhood so as not to overrun the streets with utility poles and electric wires of the different competing companies in the process of signing up consumers and hooking up the power lines to their houses (Posner, 1986). The arguments on natural monopoly began in

the United States of America in the late 19<sup>th</sup> century. By the 20<sup>th</sup> century, attention was focused on the scope of price and entry regulation; additional industries began to be involved; new and larger regulatory agencies came up; while it had spread to both the States and Federal levels of the United States (Joskow, 2006).

However, by the 1970s, the idea of natural monopoly viewed from the standpoint of price and entry regulation was widely criticised by both academic researchers and policy makers; and this led to a reduction in its application in many regulated industries. Another fall-out of the criticisms is that some of the industries became completely deregulated; some others were restructured to allow for competition in the segments that were potentially competitive; while in others, new performance-based regulatory frameworks were being applied to core network segments of the industries (Winston, 1993; Winston and Peltzman, 2000; Armstrong and Sappington, 2006; Joskow, 2006).

Even then, some key segments of the electric industry and other industries like the natural gas distribution, water, and telecommunications, still had some form of regulation based on price and entry regulation. However, such natural monopoly industries are said to be characterized by problems of economic performance: excessive prices, production inefficiencies, costly duplication of facilities, poor service quality, and unwarranted distributional impacts (Joskow, 2006).

Prior to privatization, the power sector in Nigeria was controlled by the Power Holding Company of Nigeria (PHCN), a Parastatal wholly owned by government. It could be regarded as a natural monopoly not just because it was the only player in the market; it was also because no other investor could have gone into it even if the platform was provided for investors to go into it. However, the power sector in Nigeria has been privatized since 2005. In this era of a privatized power sector, the monopoly has shifted away from government to the 11 companies owned by the private investors that took over the 18 publicly-owned companies that hitherto controlled the sector. With the privatization, the sector is now made up of the electricity generation companies (Gencos), the transmission Company of Nigeria (TCN), and the electricity generation companies (Discos). What this translates to therefore is that the privatization of the power sector in Nigeria has witnessed a transition from a monopoly to another monopoly; from a government monopoly to a private-sector monopoly. The Power Holding Company of Nigeria (PHCN), was the monopoly government enterprise that was solely responsible for the generation, transmission, and distribution of electricity in Nigeria; and with the privatization, the 11 distribution companies have been allotted specific operational domains without providing room for other competing companies in those domains allotted to them (Electric Power Sector Reform Act, 2005).

Thus, the Discos in Nigeria operate as monopolies. The only difference between them and the defunct PHCN lies in the fact that while the defunct PHCN's monopoly covered the entire country, the Discos are natural monopolies in the different States or group of States of the Federation allotted to each of them as operational domains. However, as the Organization for Economic Co-operation and Development (2003) would argue, the more competitive a particular industry involved in privatization is, the more the recorded improvements in output, profitability, and efficiency. Furthermore, it states that the efficiency gains could have a one-off effect on GDP, or where there are upward incentives for innovation, this could help substantially to reduce costs, and raise the rate of economic growth of a country (The Organization of Economic Co-operation and Development, 2003).

Contrary to the high expectations of Nigerian consumers in the wake of the privatization of the industry, electricity supply has not improved appreciably from what it was during the era it was a government monopoly; when it was solely the responsibility of government to generate, transmit, and distribute electricity. The current situation is that the demand side made up of customers and consumers is desirous to reap sustained dividends from a privatized power sector, while disgustingly the supply side, which is in the hands of monopoly companies that emerged out of the privatization, is unable to meet up with the demand for electricity.

What is a service? A service is what a customer receives from a seller or producer in return for his or her money (Mohr and Bitner, 1995). Service delivery therefore is the process of rendering a service to customers, consumers or clients. In service delivery, two critical factors are considered: the process of the service delivery and the service outcome. The service must be perceived by the customers, consumers or clients to be of good quality to ensure customer satisfaction, and this, in turn, leads to customer loyalty and retention. The quality of service delivery is measured by the extent to which the service is able to meet the customers' expectations (Mohr and Bitner, 1995; Ndingo'ori, 2015).

By extension, sustained service delivery which is the ability for a firm to sustain the service delivery to meet the expectations of the customers, consumers, and clients over a long period falls within the gamut of corporate sustainability. Although there are some other definitions of corporate sustainability, the United Nations Global Compact (2014) defines it simply as "a company's delivery of long-term value in financial, environmental, social and ethical terms". The UN organ advocates that companies seeking to be sustainable should adhere to five business principles; namely, (1) have a principled business (operating with integrity which compels them to have respect for fundamental issues like human rights, labour, environment and anti-corruption); (2) strengthening society, which makes them take on issues outside their internal operations to include strategic issues prevailing in its external environment such as poverty, conflict, uneducated workforce, etc., that would contribute to their business success and viability; (3) leadership commitment, which involves bringing about change in the companies starting with their leadership; (4) reporting progress, which emphasizes that in addition to the strategic reports which show measurable gains and losses, attention is also paid to non-financial reporting; and (5) local action, through which companies, realising that there are general universal principles of managing, should also not lose sight of the fact that they exist in nations and communities and must act within them as responsible corporate citizens.

From this definition, it has become highly essential that companies that are committed to long-term corporate success and that understand that such success is possible through their ability to deliver value to their customers should today embrace corporate sustainability. The three pillars of sustainability are social ('people'), environment ('planet'), and

economic ('profit'). The people (employees and customers) are the social. The employees are the history makers who desire job security and pride in the workplace; while the customers desire transparency more than ever before from the companies they do business with in terms of how responsible, ethical, and sustainable they are. The environment (the planet) is in terms of recycling a company's waste products and handling of issues of environmental degradation and pollution; while the economic (profit) is in terms of the money the companies make from their business activities (Investopedia, 2017; Wikipedia, 2018). Sustained service delivery can be inferred from the definition to be about how a firm should deliver its services to its customers in such a way that it is not concentrating on profits alone, but on how their services are delivered to the customers and how the services are perceived to be of good quality by the people being served, to encourage their repeat patronage and to invite others.

Consequent upon the foregoing, the privatization of the electric power industry in Nigeria is one without the deregulation of the industry to usher in competition; that is, it is an environment of a natural monopoly. Thus, two key issues are therefore involved in this study: (1) the natural monopoly under which the electricity distribution companies that arose out of the privatization of PHCN operate and (2) their capability for sustainable service delivery under the prevailing business environment.

### *1.1. Problem Statement*

During the period the power sector in Nigeria was government-driven, electricity consumers were at the mercy of the workers of PHCN in a post-paid regime because there was no competition: there were the meter readers and bill distributors (the marketers) known for not reading meters but send estimated and coded bills; the staff in the customer care unit known for their discourteous behaviour in handling consumer complaints of over billing and illegal disconnections; the field staff who were responsible for disconnection of electricity supply, some of who engaged in illegal disconnections to extort money from consumers; as well as staff in the control rooms who were used to switching on and off the control knobs to cut off power supply to certain areas they intentionally wanted to punish on flimsy excuses.

However, with the privatization of PHCN, the industry is currently controlled by the three types of companies operating in the sector; namely, the Electricity Generation Companies of Nigeria (Gencos), the Electricity Transmission Company of Nigeria (TCN); and the Electricity Distribution Companies of Nigeria (Discos). While the generation end of the supply chain is opened up for more companies and even State governments, like the Lagos State Government, with relevant capacities to generate power for contribution to the national grid, the distribution arm of the chain operates as a monopoly of 11 companies nation-wide regulated by government, each with its allotted operational domain.

The distribution segment of the electricity supply chain is currently operating under a regulated natural monopoly. The expectation of the consumers, household and industrial, is that there would be a phenomenal improvement in the supply of electricity to match demand as a result of the privatization of the industry. However, the general observation of consumers in the Lagos area allotted to the Ikeja Electricity Distribution Company is that electricity supply to them by the company has not improved under the new dispensation beyond what it was in the era of the PHCN. This shows that there is a gap between the anticipated level of electricity supply and the actual level of supply. The focus of this study therefore is to establish whether the natural monopoly status of the companies operating in the privatized industry is contributing to this gap between the anticipated electricity supply post-privatization and the actual supply of electricity to the consumers. In particular, there is the need to ascertain how the natural monopoly status of the distribution segment which does not allow for competition affects the service delivery of the Ikeja Electricity Company to its consumers.

### *1.2. Research Objective*

The research objective of this study is to establish that the natural monopoly of the electricity distribution industry in which the Ikeja electricity distribution company in Nigeria operates significantly affects its ability to deliver sustained power supply to consumers.

### *1.3. Research Hypothesis*

The natural monopoly of the Nigeria electricity power industry in which the Ikeja Electricity Distribution Company operates has a significant effect on its ability to deliver sustained power supply to consumers.

## **2. Review of Related Literature**

### *2.1. The Concept of Privatization*

According to the Organization for Economic Co-operation and Development (2003) Report, privatization is one of the strategies within the gamut of the broader structural adjustment reform initiative adopted by nations in resolving issues arising from poor performance of their public utilities and the dwindling effect on their economies. In adopting the strategy of privatization, it takes political will and commitment on the part of government to overcome bureaucratic bottlenecks. Therefore, objectives have to be clearly defined and prioritized; and sale of the state enterprises is done based on commercial considerations. That is, the sale is done in a way that it is as transparent as possible to enhance integrity and ensure credibility with potential investors and public support.

However, prior to privatization, an effective communication campaign is very important to explain the objectives of the programme to the customers. Some of the objectives include "fiscal objectives, attracting investment, improving corporate efficiency and performance, introduction of competition into hitherto monopolistic markets, capital market development, as well as political objectives" (Organization for Economic Co-operation and Development, 2003: 8). It is

pertinent to observe that in the privatization of the PHCN, much as many consumers had wished for it to happen, there was no enough public sensitization in form of campaigns as to the integrity and credibility of the investors, let alone their core competencies and pedigree in the power sector. The privatization was therefore based more on political considerations. Moreover, the market is still monopolistic as there has been no competitor in the areas allotted to the existing licensed 11 distributing companies (Discos) (Organization for Economic Co-operation and Development, 2003).

Looking at the objectives of privatization, one critical observation of the Organization for Economic Co-operation and Development (OECD) (2003) Report is that privatization is also faced with the challenge of articulating and reconciling objectives and trade-offs. This is because there are interrelationships and sometimes conflicting relationships between objectives. For example, there are conflicting relationships in the objective of revenue maximization and creating competitive market structures; ensuring efficiency in the running of the companies and employment creation; profitability and public's interest; etc. However, more often than not, the objectives are not clearly specified and prioritized before implementation. Besides, privatization of State-owned Enterprises (SOEs) requires skills and expertise that are not available in the public sector. As most privatization processes are driven by public officers and advisers, it is essential for the public sector to develop "intelligent customer" capability to fully understand the quality of advice from experts (Organization for Economic Co-operation and Development, 2003).

In the Nigerian power sector reforms, the major issue now before the Nigerian Electricity Regulatory Commission (NERC), the electricity generation companies (Gencos), and the electricity distribution companies (Discos), is in the area of reconciling the objectives of revenue maximization and creating competitive market structures. The regulatory authority has declared that creating a competitive market structure in the industry should commence with the introduction of "eligible customer regulation" that would enable eligible customers to approach the Gencos for direct purchase of power instead of going through the Discos; an idea which the Gencos have embraced but has been vehemently opposed by the Discos who are already declaring force majeure. The position of the Gencos is that such competition is necessary to remove the bottlenecks in power generation to be able to increase their power generation capacities and ensure financial viability in the sector (PUNCH, 2017).

## *2.2. Empirical Studies on Privatization*

Empirical studies on privatization show results that point to the direction of interest of each of the researchers concerned. For instance, Nellis (2002) notes that studies carried out by the International Labour Congress (ILO) suggests that while a number of privatization retained workers or led to increased employment because most governments tend to promote job retention in their privatization, the experience in the post-privatization era was that losses were higher than the gains. As expected, the area of interest of the ILO is in how privatization results in job losses or retention which in their study under reference resulted in lower financial gains.

Majority of other previous studies focused on the impact of privatization on profitability, real output, investment, productivity, and employment; where empirical evidence shows, in spite of data collection and methodological challenges, that privatization results in significant increase in profitability, real output, and efficiency of privatized companies. Furthermore, empirical evidence shows positive relationship between privatization and improvement in the macro-environment. Fiscal objectives in the Organization for Economic Co-operation and Development (OECD) countries with regard to privatization have recorded some successes where governments try to reduce deficits and debt, improve tax revenues from the privatized companies, and to have some windfalls from sale. However, the results should be taken with a note of caution as there is no evidence of causality in the relationship (Organization for Economic Co-operation and Development, 2003).

Another observation is that less attention has been directed to the effects of distribution. The distributional effect of privatization includes the effects of privatization on prices and changes in access to goods and services that were provided by the privatized State-owned companies. This is in the direction of viewing privatization particularly from how it improves efficiency and performance of the emergent companies in terms of service delivery to consumers in a regulated environment (Organization for Economic Co-operation and Development, 2003).

### 2.2.1. Empirical Studies on Privatization in the Electric Power Industry

Some empirical studies show that in privatization, efficiency in service delivery is enhanced when there is competition and it is not too robust when there is no competition. For instance, Newberry and Pollitt (1997) studied privatization of the Central Electricity Generating Board (CEGB) in the United Kingdom and report that it increased efficiency. However, while shareholders benefitted by way of increased profitability, consumers did not share in the gains because of lack of sufficient competition. On the other hand, La Port and Lopez De-Silanes (1998) studied Mexican privatized companies which involved a comparison of 218 enterprises from 26 sectors, privatized from 1983-1991. They report that the performance of privatized companies quickly converged with private sector companies, especially where there was a competitive market. There was increased output, and a phenomenal decline in employment. However, the profitability did not come at the expense of consumers in the form of higher prices, or at the expense of the workers in the form of unemployment; but as a result of improved efficiency.

There are other studies which show the effect of privatization on the consumers. For instance, Holder (1998), in his survey of several studies on privatization in the UK, reports that privatization has resulted in higher performance in terms of higher labour productivity of public utilities in the telecom post-privatization era than the pre-privatization era. This led to lower prices in real terms and improved service quality. Similarly, Boyland and Nicoletti (2000), in their study on the telecom in 23 OECD countries from 1991-97, which was focused on investigating the impact of privatization and market

liberalization on efficiency, report evidence of competition having a relationship with lower prices, improved productivity, and higher service quality levels. However, the report did not provide evidence on the impact of privatization on any of these variables taken alone.

Goodman and Loveman (1991) summarise the arguments for and against privatization to be from three perspectives: (1) Managers, public or private, will always act in the best interests of their shareholders. For privatization to be effective therefore managers in private firms should be given incentives to act in the public interest, which reduces efficiency, amongst other things; (2) There can be discipline in managerial behaviour where there is competition. Therefore, for there to be agreement between profits and public interest, the privatized service or asset should be in a competitive market; and (3) The simple transfer of ownership from public to private hands will not automatically reduce cost or enhance the quality of services. Rather, where the above conditions are not met, government's involvement in these services becomes inevitable.

This summary of the arguments on privatization as presented by Goodman and Loveman (1991) is within the spectrum of this study in so far as it helps to illuminate the variables of this study in the areas of monopoly and competition as well as the quality of service in the privatization of the power sector in Nigeria. It is pertinent to observe that the electric power environment in Nigeria is still largely regulated. The areas of changes in prices in terms of electricity rates, and access to electricity supply by the consumers from when it was a monopoly under the PHCN and now that the industry is in the hands of private investors in a natural monopoly are of particular interest to this study.

### 2.3. *The Concept of Natural Monopoly*

There are some utilities that are considered to be "natural monopolies" which include rail, water, electricity, etc., where one large business supplies the entire market at a lower price than two or more companies would do. An argument that has loomed large over the years is that a natural monopoly is a situation where it is not easy to have more than one company providing a good or a service in an efficient way; a situation where competition will actually increase costs and prices instead of reducing them (Posner, 1986). In support of this, Carlton and Perloff (2004) argue that a market is a natural monopoly when one single firm is involved in producing instead of two or more firms that would lead to an increase in the production costs.

However, another position is that "natural monopoly" does not mean the actual number of sellers in the market; rather, a natural monopoly market refers to the relationship between demand and the technology of supply (Posner, 1969). This means that if a firm is able to satisfy the entire demand within a market at lowest cost than two or more firms will do, the market is a natural monopoly not minding the number of firms involved. Where the market contains more than one firm, two options are open: either the companies will merge into one or the production will continue to consume more resources than ordinarily would have been required. The first option will produce a competition that will not last for too long; while the second option will lead to inefficient results. Faced with this scenario, natural monopoly does not readily lend itself to competition as a viable regulatory mechanism. As a result, some form of control is required to ensure satisfactory performance especially in the areas of profits, rates, quality of service, etc. These controls refer to gas, water, and electricity companies known as "public utility regulation" (Posner, 1986).

A more radical position describes the "natural monopoly" concept as a myth which dismisses competition as being part of an electricity industry because the industry is made up public utilities. DiLoirengo (1996) argues that the natural monopoly theory on electric utilities is a myth and therefore not tenable because prior to the emergence of natural monopoly there has been competition in the electricity industry for decades in dozens of cities in the United States of America. He explains that the economist, Primeaux (1986), who studied electric utility competition for more than 20 years, came up with the finding that there is direct competition in the electric utility industries. In such competitions, there was direct rivalry between one company and another for about 80 years in some cities; and the competition was mostly in the areas of prices and services. It is noteworthy that in those competitions, customers had remarkable benefits compared to cities where electric utility monopolies did not exist.

Furthermore, contrary to the position of those who argue for natural monopoly, there is no excess capacity when there is competition than there is under natural monopoly. As a result, DiLoirengo (1996) asserts that the "theory of natural monopoly fails on every count": when competition exists price wars are not "serious", there is better consumer service, and lower prices; competition lasts for a long time, and the consumers prefer competition to regulated monopoly. Problems arising from consumer satisfaction in the areas of dual power lines in one city were seen by consumers to be not as significant as the benefits from competition. However, DiLoirengo (1996) also points out that Primeaux (1986) found that although electric utility executives generally acknowledged the consumer benefits of competition, they personally still preferred monopoly!

It is noteworthy to observe that since many years after the publication of Primeaux (1986)'s book, *The Review of Austrian Economics*, at least the state of California has been transforming its electric utility industry "from a monopoly controlled by a handful of publicly held utilities to an open market (and) other states are moving in the same direction, finally abandoning the baseless theory of natural monopoly in favour of natural competition" (DiLoirengo (1996:54).

### 2.4. *Natural Monopoly, Regulation, and Competition*

Regulation and deregulation are two sides of the same coin each with its benefits and limitations. Regulation refers to a situation where the government sets up laws and rules that define and limit how an industry or company would be operated. This means that government has some level of control as to how the operators should be limited in carrying out their business (Abhyanker and Khaparde, 2002). Regulation is, however, imperfect; and the firms' responses to the

incentives provided in the regulatory rules and procedures could be costly and unanticipated. In some cases, the costs involved in regulation may be significantly higher than the cost of unregulated natural monopoly or the net social benefits accruable from regulation could be significantly reduced (Joskow, 2006).

Simply put, a monopoly, on the other hand, is when a single person or enterprise is the sole supplier of a particular product or provider of a particular service. The major feature of monopoly is the lack of economic competition in the production of a good or service, lack of viable substitute goods and services; and the possibility of being in control of prices which could result in a high monopoly price above the seller's marginal cost leading to a high monopoly profit (Wikipedia, 2017).

The electricity industry is regarded as a natural monopoly because the transmission and distribution of electricity have natural monopoly characteristics. In particular, where there are firms that are vertically integrated in the industry, vertical integration can effectively extend the natural monopoly to generation in addition to transmission and distribution. However, even as natural monopolies, they are subject to some form of regulation. This means that some natural monopolies such as the electric power, natural gas distribution, water, and telecommunications industries have important segments that could continue to have natural monopoly characteristics and at the same time be subject to some kind of price and entry regulation (Joskow, 2006).

Where natural monopolies are unregulated, "sunk cost" is a type of cost that links the behavioural definition of natural monopoly and the challenges of economic performance that could arise. This is the cost that is associated with long-term investments in physical or human assets whose value is lower when applied to alternative uses in terms of engaging in the production of different products; or when applied at different locations in terms of high transportation costs than what it was originally intended to be used for. In a worse case, the investment may be worthless when applied to an alternative use. It is noteworthy therefore that sunk capital costs form a large proportion of the total costs of most of the industries that have been regulated as natural monopolies such as railroads, electric power, telephone, gas pipelines, water networks, cable television networks, etc. Some of the notable attributes of sunk costs include: (1) They carry a potential stream of benefits over a period of time; (2) It is not easy to divert the assets associated with sunk costs to alternative uses when the cost commitments have been made without reducing their value from what they were intended for (3) They make the difference between firms that are already in the market and potential entrants into the market meaningful; (4) Without sunk costs there is no actual difference between firms already in the market and potential firms in the market because there will be no costs involved in entry and exit; and (5) They also create opportunities for existing firms in the market to sustain prices around the break-even level and at the same time discourage entry by potential competitors (Joskow, 2006).

In the face of significant economies of scale, existing companies in a natural monopoly engage in certain practices that prevent entry of new companies or deter others from entry into the market. For instance, the existing companies adopt "blockaded entry". This is where a single firm in the market determines the pure monopoly price which does not attract entry by new firms. In this case, the incumbent company does not feel any threat of entry. On the one hand, the potential entrants are not encouraged to go into the market because of their conviction that the post-entry era will not generate enough revenue to cover their total costs. It could also be in form of "entry deterrence". Here the incumbent deters other entrants by taking some actions, which could be costly, to make potential competitors in the market to believe that the market is unprofitable (Joskow, 2006).

Besides, the incumbent company could also consider it more profitable to adopt the strategy of "accommodated entry". This is a strategic behaviour on the part of the incumbent company whereby it accommodates profitable entry through sacrificing some short-term profits to make entry easier. In doing so, it tries to maintain higher prices than they would be if entry was done on a large scale (Joskow, 2006).

Apart from the entry barriers introduced in the marketplace by incumbent companies, there is also the argument that government itself imposes price and entry regulations in industries where there are natural monopolies when it feels that the industries will perform poorly; and where such regulations in terms of price, entry, and related supporting regulations that are meant to improve performance are easy to implement. In the area of economic efficiency, common reasons that attract regulation in a natural monopoly include inefficient cost of production (including inefficient entry and exit); inefficient price signals whereby the prices are greater than marginal cost; product quality and dynamic inefficiencies including issues associated with reliability of service, in terms of power outages for instance; various aspects of the quality of service which include queues for obtaining connections to the network; regulating the prices the monopoly firm can charge for new products which could increase rather than decrease inefficiencies associated with product quality, research and development, and the adoption of product and process innovations; adoption of innovations in production and product dimensions by engaging in research and development; as well as firm viability and breakeven constraints (Joskow (2006).

With particular reference to firm viability, Joskow (2006) points out that private firms will only supply goods and services if they expect to recover the costs of providing the goods and services. It is doubtful that a firm will willingly supply its services, where it considers that the process of regulating prices will not yield the desired income. This means that regulation does not lead private firms to automatically expect to earn enough revenues to cover their production and distribution costs. These costs include cost of materials and supplies; compensation necessary to attract suitable employees; costs of capital investments; return on investments reflecting cost of capital, economic depreciation, taxes, etc. Other considerations, apart from economic efficiency, include income distribution, "essential services," cross-subsidization and taxation by regulation; price discrimination; and political consideration and political economy considerations.

Regulation of natural monopoly is meaningful if (1) there is efficient pricing of goods and services. This is because regulated prices should provide consumers with efficient price signals to guide their consumption decisions; (2) there is

efficient production costs, which is because the rationale for restricting entry to a single firm by the natural monopoly is to make it easier for the firm to exploit all economies of scale and economies of scope that are available through the underlying technology, bearing in mind the organizational and related transactions costs; (3) there are efficient levels of output and investment (firm participation and firm-viability constraints) which presupposes that the regulated firm would supply the quantities of services demanded by consumers and to make the investments in facilities important so that it would be able to provide the services in a timely and efficient levels; (4) efficient levels of service quality and product variety, which points to the fact that products could have varying levels of service quality and reliability. Arising from this, different costs are incurred at different levels of service quality and reliability; coupled with the fact that the way consumers value service quality and reliability also differ. Therefore, regulatory bodies should be interested in the levels of service quality and reliability being provided by the monopoly firms, show concern for the options that are available to consumers in terms of variety of quality and reliability, as well as ascertain that these options are reflective of the consumer valuations and the costs that are attached to ensuring that consumers have a variety of levels of quality and reliability from which they are able to make their choices; and (5) there should be considerations for monopoly profit and rent extraction. Having regard to the distortions in efficiency arising from monopoly pricing, it is also expedient that regulatory laws be put in place to ensure that excess profits that emanate from monopoly profits are extracted for the benefit of consumers (Joskow, 2006).

There could be an alternative situation where two or more vertically integrated segments in the electricity chain could initially have the characteristics of natural monopoly and economies of vertical integration changes due to technology; and this could make one or more of the segments to become competitive (Joskow, 2006). Following from this, it has been observed that numerous generating plants exist in each region of the United States; which means that it is possible to make the generation segment of the chain to be competitive (Joskow and Schmalensee, 1983; Joskow, 1997).

In the Nigerian electricity market post privatization, there are the electricity generating companies (Gencos), the transmission company of Nigeria (TCN), and the electricity distribution companies (Discos). There are no electricity retail companies (Rescos). While competition exists in the area of power generation; there is no competition in the area of power transmission. There is also no competition in the distribution segment of the industry as the companies operate essentially as monopolies in a regulated environment. In particular, we observe that one significant difference between the situation in the Nigerian power industry and Joskow (2006)'s observation in his work lies in the fact that as a result of distortions in efficiency arising from monopoly pricing, regulatory laws are expected to be in place to ensure that excess profits that emanate from monopoly profits are extracted for the benefit of consumers, a situation which is completely strange in Nigeria (Joskow, 2006).

## *2. 5. Dys-functionalities inherent in Natural Monopoly in Juxtaposition with Competition*

Posner (1986) examines business performance under natural monopoly and argues that performance could be unsatisfactory from a social point of view in the following ways: (1) Unlike a competition, where consumers obtain many goods at prices that are quite lower than the actual value of the goods to them, monopoly enables the seller to take more part of the extra value that would ordinarily have come to consumers. However, it is not in all cases that possession of monopoly will always guarantee that a firm will charge the monopoly price; (2) Internal efficiency is the commonest type of efficiency that has to do with cost minimization. In a competitive market, the firm can benefit from cost minimization in two ways: by driving down costs the firm can have greater profits or by retaining the price and increasing the volume of sales. On the other hand, cost reduction enables the monopolists to increase profits not minding whether it is in the short-run. This is because it does not have competitors.

However, a disturbing scenario is where the firm, as suggested by Posner (1986), involves itself in (1) "managerial self-indulgence" which involves sharing of monopoly profits between managers and stockholders. This comes by the subordination of short-term profit maximization to long-term managerial interests which could come in form of security, prestige, entrenchment, political power and acceptability. It could also be involved in "industrial politicization" by pursuing policies of profit maximization in the short-term to build long term value of political support by investing so much on public relations aimed at corporate image and influence building. Although even competitive firms engage in these through trade associations, the most disturbing aspect of the monopolies is their involvement with government; (2) The failure of a monopoly to optimize the rate and direction of technological change. Innovation involves introducing new technology through creativity. Much as it is desirable for firms, it is not only expensive because substantial costs have to be met long before revenues start accruing; it is also a risky venture for a private firm to go into. Besides, innovation involves knowledge, which when well properly deployed can be quite useful to others. The only problem is that the successful innovator may not have it easy reaping private benefits that will be commensurate with the social benefits of his work. His inability to so reap may make the rate of innovation to be suboptimal (Posner, 1986).

Other notable dysfunctional outcomes of natural monopoly include (1) Lack of efficiency in serving customers, quality goods and services, and customer responsiveness. Monopolists are known to arbitrarily refuse to provide quality goods and services and to be responsive in meeting the needs of consumers. All these happen because the customer has no choice. In a worst case scenario, they may segregate the part of the market to serve well while other customers are left to suffer; they are rude to customers, and sell inferior goods or render poor services. Although the monopolist may not be indifferent to quality, he only takes advantage of being the only producer of the good or provider of the service to focus only on cost reduction not minding whether the quality becomes inferior in the process in order to make maximum profit. As a result, he holds quality constant and increases price. However, he loses sight of the fact that the anticipated profit may be lost where the consumer reacts by not buying the product or service (2) In a natural monopoly market which was

initially meant for one firm, there could be cases where more than one firm could be in the market due to anticipated technological change. This could result in wasteful and destructive competition because the market is a natural monopoly which does not easily lend itself to more entrants that would bring in competition. The competition could be so fierce and ruinous that the level of inefficiency could increase; and some of the firms could be forced to enter into mergers and acquisitions as a result of price wars. In such a case, only the efficient one will survive which means the competition will be short-lived (Posner, 1986).

### *2.6. Empirical Studies on Natural Monopoly in the Electric Industry*

Although there has been some theoretical literature on natural monopoly, but on the contrary, not much empirical studies have so far been done in the field, save to the best of our knowledge, the works of Cowing (1974); Christiansen and Greene (1976); Rose (1987); Rose and Joskow(1990); and Jamasb and Pollitt (2003) on the shape of firm level costs functions. Some of these works have been examined already in this work.

In particular, not much empirical work exists on the extent to which the costs of rendering the services under a natural monopoly are sub additive. However, in spite of the dearth of empirical works, it has been argued that although more of the earlier works emphasized economies of scale, it is important to observe that no matter the size of the geographic area covered by the natural monopoly it would still be very costly for two competing companies to operate in the same environment because of the cost pertaining to installation of wires on each street (Joskow, 2016).

### *2.7. Service Delivery in a Privatized Environment*

A service is what a customer receives from a seller or producer in return for his or her money (Mohr and Bitner, 1995). There are two things that must be considered in service delivery: the process of the service delivery and the service outcome. The process of rendering a service leads to an outcome in which the customer is either satisfied or not satisfied with the service experience. The service provider must therefore ensure that considerable attention is paid to the process of designing the system through which the service is produced and delivered to the customers (Brown, Fisk, Bitner, 1994; Mayer, Bowen, and Moulton, 2003).

Consequently, it is expected that the process of delivery will ensure that the service outcome is well received by the customers; hence what should be of paramount importance in the design of the process of delivery is that of meeting the needs and expectations of the customers (Goldstein, Johnston, Duffy and Rao, 2002). These two things of service delivery and service outcome must be perceived to be of good quality by the customers to ensure customer satisfaction, which will, in turn, lead to customer loyalty and retention. The quality of service delivery is measured by the extent to which the particular service is able to meet the customers' expectations (Mohr and Bitner, 1995; Ndingo'ori, 2015).

On the effect of monopoly on quality of product or service delivery, the argument put forward by Joskow (2006) on how quality is affected by creating a monopoly and regulating the prices is monumental. According to him, depending on the prevailing situation, inefficiencies associated with product quality, research and development, and the adoption of product and process innovations are increased rather than decreased when a monopoly is created and price regulation is adopted to determine the prices it can charge. He argues further that where the regulated monopoly is a private firm which does not survive on government subsidies, it may be possible for government to regulate the prices and service quality of the firm. However, government may not be able to compel the firm to balance supply and demand in the long-run. Besides, price and entry regulation may also depend on the constraints of regulator's ability to obtain full information about the firm's cost opportunities, managerial effort levels, as well as attributes of demand (Joskow, 2006).

Unless private firms are able to recover the costs of providing goods and services, they will not be in a position to supply them. As indicated above, some of the costs include costs of materials and supplies, compensation necessary to attract suitable employees and to motivate them to put in the required levels of effort, the direct cost of capital investments in the enterprise, a return on the investments, which reflect the opportunity cost of capital, economic depreciation, taxes, as well as other costs incurred to provide service. Where the process of regulating prices does not provide them the avenue to earn sufficient revenues to cover production and distributions costs, the firms will not be in a position to voluntarily provide the service. As a result, if regulated private monopolies are to provide services, the price-setting process within the gamut of the entire regulatory process must provide adequate financial support to encourage them to supply the services in such a way that consumers' value on the products exceed the costs at which the firms will be able to supply them (Joskow (2006).

### *2.8. The Concept of Corporate Sustainability*

Corporate sustainability is an offshoot of the concept of sustainable development. The Brundtland Commission's Report (1987), titled "Our Common Future", which was commissioned by the World Commission for Environment and Development (WCED) describe sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission for Environment and Development, 1987). It also puts it as "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. Areas covered by sustainable development include economics, social justice, environmental science and management, business management, politics, and law.

Elkington (1997) who developed the concept of the Triple Bottom Line proposes that business goals are inseparable from the environments and societies in which they operate. Whilst it is true that business organizations would primarily pursue short-term economic gains, the business may not be sustainable if the social and environmental impacts



are neglected. As Dyllick and Hocketts (2002) suggest, corporate sustainability lies at the interface of economic contribution, environmental performance, and social responsibility; and these three dimensions could be seen as distinct at the operational level but integrated at the strategic level.

From these three dimensions, some scholars have suggested that corporate sustainability involves a mix of sustainable development, corporate social responsibility, stakeholder theory, and corporate accountability which form its four pillars. As a new and evolving paradigm, its focus is that managers that are embracing it do so because it emphasizes the stakeholder value which provides an alternative to the traditional growth and profit-maximization model associated with the shareholder value. Although it takes into consideration that corporate growth and profitability are vital in the firms, it goes beyond that to direct attention to the fact that for business organizations to pursue economic goals successfully, they must take into account the societal goals especially those relating to sustainable development which include economic protection, social justice, equity as well as economic development (Wilson, 2003).

Even at that, there is no commonly accepted definition of corporate sustainability as used in respect of organizations. In the literature, some scholars focus on the environment aspects of sustainability; others on the social aspects; while some others take an integrated approach of combining the environmental, the social, and economic domains without focusing on any particular domain (Montiel, 2008; Linnenluecke and Griffiths, 2010; Hahn, Pinkse, Ptreuss and Figge, 2014).

Some attempts have, however, been made at defining corporate sustainability. One definition sees it as a business approach that creates long-term stakeholder value through the implementation of business strategies that consider how business is operated ethically, culturally, socially, environmentally, and economically. It considers strategies that have to do with the longevity of a business through transparency and employee development. From this view point, it is seen as a broader term that covers corporate social responsibility, corporate citizenship, corporate philanthropy, and sustainable development (Wikipedia, 2017). Another definition sees it as a business approach which emphasizes long-term shareholder value by taking on opportunities and managing risks in economic, environmental and social dimensions. Its guiding principles are seen as two-fold: (a) having sustainable "business practices" which are critical to the creation of long-term shareholder value in a world where resources are increasingly becoming scarce, and (b) "sustainability factors" which include opportunities and risks which most competitive companies must attempt to minimize to remain in business (Robecosam, 2017).

Sustainable business practices are grouped into environmental, social, and economic practices. The environmental practices are about the consumption of natural resources and the release of emissions which have impact on the health of the eco-system (Dyllick and Hocketts, 2002). They also involve how to reduce environmental pollution and degradation by conserving resources in the areas of energy and sustainable waste management (Belu, 2008). The social practices focus on adding value to the local community (Dyllick and Hocketts, 2002) as well as helping to maintain stable communities and quality of life inside of them within the overall gamut of human rights (Krug, Burnett, Dennis and Lopez, 2008). On the other hand, economic sustainability practices are those that guarantee long-term liquidity and above average return on investments to the shareholders (Dyllick and Hocketts, 2002).

On the second principle of corporate sustainability factors, corporate organizations are now faced with numerous long-term challenges which emanate from those faced by the global economy. These challenges include scarcity of resources, demographic shifts, climate change, etc., which now tend to redefine the business landscape in terms of societal expectations, formulation and implementation of public policies, regulatory frameworks as well as business environments and investments. However, these challenges create opportunities as well as attendant risks which companies must address today to remain competitive in business tomorrow. Companies which are proactive are able to anticipate and manage current and future opportunities in the economic, environmental, and social areas and the attendant risks; by way of emphasizing quality, innovation, and productivity. These are the companies that are able to remain as market leaders and are more likely to create competitive advantage over their rivals and garner long-term stakeholder value (Robecosam, 2017).

To be specific, environmental factors which constitute challenges include biodiversity, energy use, noise, resource depletion, solid waste, transport, and water use and discharge (Azapagic, 2008). The social factors include corporate citizenship, corporate philanthropy, social partnership, social sponsorship, development of human capital through employee training programmes, improvement management, apprenticeship programmes, fringe benefits, flexible work time models, health and prevention programmes, flexible workplace design, qualification programmes for returnees, minority promotion programmes and occupational childcare, stakeholder involvement as well as customer satisfaction (Hahn and Scheermesser, 2006; Belu, 2008; Krug et.al (2008). The economic factors include corporate governance, risk and crisis management, codes of conduct and compliance, corruption and bribery, talent attraction and retention, promotion of economic viability, economic profitability, and economic equity (Dyllick and Hocketts, 2002; Hahn and Scheermesser, 2006; Belu, 2008; Krug et.al (2008).

It is important to emphasise that organizations are increasingly compelled to get involved in sustainability practices through regulatory pressure, pressure from customers, pressure from employees, as well as pressure from the managements of organizations because of the understanding that investment in sustainable practices could considerably improve financial performance (Daily and Huang, 2001; Wilkinson, Hill, and Gollan, 2001; Azapagic, 2008; Ameer and Othman, 2012). Organizations that successfully engage in sustainability practices do so within the gamut of their overall strategy that enables them to have organizational support including top management support and bottom-up support that involve all business units. Through these, stakeholders have intrinsic and extrinsic motivation which makes it easier for sustainability performance data to be closely monitored (Seidel, Recker, Pimmer and Von Brocke, 2010).

However, while corporate sustainability could increase revenue and employee productivity; it could also lead to reduction in energy expenses, waste expenses, materials and water expenses, hiring expenses, strategic and operational risks as well as attract talent and result in tax advantages (Wikipedia, 2017). There are however barriers to its adoption. These are in the areas of ease of implementation and production risks (Hall, Dennis, Lopez, and Marshall (2009).

On the whole, some of the key ingredients of corporate sustainability include: (1) Corporate Transparency: This refers to a company having an internal environment which has open and engaging relationship with its external environment in order to improve performance and increase profits. As an open culture, it promotes employee involvement in innovation and creative processes. This is because engaging the community results in a much bigger team; and an inward-looking approach by organizations to realise changes to be made to fulfil environmental needs such as energy efficiency, reduction in product waste and toxicity, etc. Besides, designing innovative products results in higher profits and open communication with stakeholders which give rise to higher level of information disclosure, clarity, and accuracy; (2) Stakeholder Engagement: This requires that organizations adopt an internal and external approach in order to be better informed about their social and environmental impacts. Internally, sustainability involves employee education to reduce impacts on the environment through waste reduction, energy efficiency, etc. while externally, it takes the form of engaging stakeholders which include customers, suppliers, community, Non-governmental Organizations, etc. in open and effective communication; and (3) Proactive Thinking: Sustainability takes the form of upgrading technology that could transform the product instead of doing away with old materials that could be recycled. This reduces costs and ultimately leads to increase in profits (Wikipedia, 2018)

In the electricity supply from the Ikeja Electricity Distribution Company, we are interested in how the Disco would deliver sustained service to consumers in terms of longevity; by being able to operate transparently in the face of current estimated and coded bills; adopt an inclusive approach by effectively engaging the stakeholders including the consumers; and being committed to proactive strategic thinking that would lead to new technology in power distribution. Our observation is that the need to study the service delivery of the Discos in Nigeria from the angle of sustainability, which is one of the variables of this study, is monumental and compelling in the light of the fact that the Discos are already thinking of disengaging from the industry because of alleged rising cost of service delivery in the face of regulated prices; their sharp practices in form of estimated and coded bills to consumers to increase their profits, notwithstanding.

### 3. Methodology

Although there are 11 companies that are in the distribution domain of the electricity supply chain in Nigeria, the focus of this study would be on the electricity consumers under the Ikeja Electricity Distribution Company, Lagos, which is seen from the point of view of a natural monopoly. Furthermore, within the operational domain of Ikeja Electricity Distribution Company, the study will concentrate on the electricity consumers in Alimosho Local Government Area, which is the largest Local government Area in Lagos State.

In this study, the sample size was calculated using Raosoft sample size calculator. With a margin of error of 5%, confidence level of 95%, response distribution of 50%, and a population size assumed to be 20,000, the sample size was 377.

The multi-stage sampling techniques was adopted which involved stratifying the population after which the sample was drawn using random sampling.

Data was collected from primary source through questionnaire formulated using Likert scale; and the questionnaire was pre-tested with 105 respondents using test-retest reliability which gave  $r_s = 0.90$ . In the main study, out of the 377 copies of the questionnaire distributed to electricity consumers in Alimosho Local Government of Lagos State, 311 were returned fully completed which represents 82.49% response rate.

**4. Analysis of Data**

No	Statement	SA	%	A	%	U	%	D	%	SD	%	Total	Total %
1.	The natural monopoly market encourages the Ikeja Electricity Distribution Company to adopt the fraudulent estimated and coded billing system which discourages employee commitment to rendering sustainable quality service to customers.	204	65.59	62	19.94	2	0.643	12	3.859	31	9.968	311	100
2.	Employee involvement in value creation to gain competitive advantage and have a good market share is not encouraged by Ikeja Electricity Distribution Company since it is not exposed to competition.	199	63.99	51	16.398	11	3.537	3	0.965	47	15.11	311	100
3.	Scope of prices and entry regulation make it difficult for retailers to emerge in the market	203	65.28	21	6.75	6	1.93	53	17.04	28	9.00	311	100
4.	There is consistent poor service delivery by the Ikeja Electricity Distribution Company arising from natural monopoly and this leads to consumer resistance expressed through huge backlog of unpaid bills.	201	64.63	19	6.11	2	0.64	48	15.43	41	13.19	311	100
5.	Due to entry regulation, with no room for new entrants into the electricity market allotted to the Ikeja Electricity Distribution Company, the company leverages on this to render consistently poor services to consumers.	209	67.20	19	6.11	0	0	49	15.76	34	10.93	311	100
6.	Due to price regulation, the Ikeja Electricity Distribution Company is unwilling to install pre-paid meters in consumer households thereby making the Company to continue with the estimated and coded billing system.	198	63.67	26	8.36	1	0.32	25	8.04	61	19.61	311	100

No	Statement	SA	%	A	%	U	%	D	%	SD	%	Total	Total %
7.	Even where pre-paid meters have been installed, the Ikeja Electricity Distribution Company still programmes the meters to do estimated billing, and the field staff still carry out illegal disconnections and demand bribes from consumers in the face of consistently poor services.	189	60.77	23	7.39	5	1.61	50	16.08	44	14.15	311	100
8.	The Ikeja Electricity Distribution Company, along with other Discos, is vehemently opposed to the direct sale of electric power to willing buyers (consumers) by the Electricity Generation Companies to open up the market for deregulation.	202	64.95	21	6.75	0	0	58	18.65	30	9.65	311	100
9.	The regulated monopoly which empowers government to fix electricity prices at intervals of five years and minor price adjustments yearly to enable the Ikeja Electricity Distribution Company to meet its operating costs as contained in MYTO but which has not been done since 2008 has made the Company to render consistently poor services and increase prices arbitrarily through estimated and coded billing.	205	65.92	18	5.79	4	1.28	40	12.86	44	14.15	311	100
10.	The regulated natural monopoly which does not allow the Ikeja Electricity Distribution Company to fix electricity prices still leads to load-shedding, frequent power outages and total darkness in some areas to punish consumers	199	63.99	20	6.43	1	0.32	30	9.65	61	19.61	311	100

*Table 1: Analysis of Some Likert Scale Statements by Percentages*

*Source: Field Survey, 2018*

As shown in Table 1, out of 311 respondents, 204 or 65.59% strongly agree that the natural monopoly market encourages the Ikeja Electricity Distribution Company to adopt the fraudulent estimated and coded billing system which discourages employee commitment to rendering sustainable quality service to customers but 62 or 19.94% agree, 2 or 0.643% are undecided, 12 or 3.859% disagree while 31 or 9.968% strongly disagree. Also, 199 or 63.99% strongly agree, 51 or 16.398% agree that employee involvement in value creation to gain competitive advantage and have a good market share is not encouraged by Ikeja Electricity Distribution Company since it is not exposed to competition; but 11 or 3.537% are undecided; while 3 or 0.965% and 47 or 15.11% disagree and strongly disagree respectively.

The results also show that 203 or 65.28% strongly agree that scope of prices and entry regulation make it difficult for retailers to emerge in the market; 21 or 6.75% agree; but 6 or 1.93% are undecided; while 53 or 17.04 disagree and 28 or 9% strongly disagree. On the issue of whether the consistently poor service delivery by the Ikeja Electricity Distribution Company arising from natural monopoly leads to consumer resistance expressed through huge backlog of unpaid bills, 201 or 64.65% strongly agree, 19 or 6.11% agree; but 2 or 0.64% is undecided while 48 or 15.43% and 41 or 13.19% disagree and strongly disagree respectively.

Furthermore, 209 or 67.20% strongly agree that due to entry regulation, with no room for new entrants into the electricity market allotted to the Ikeja Electricity Distribution Company, the company leverages on this to render consistently poor services to consumers, 19 or 6.11% agree, but 49 or 15.76% disagree and 34 or 10.93% strongly disagree. With regard to the statement that due to price regulation, the Ikeja Electricity Distribution Company is unwilling to install pre-paid meters in consumer households thereby making the Company to continue with the estimated and coded billing system, 198 or 63.67% strongly agree, 26 or 8.36% agree, but 1 or 0.32% is undecided, while 25 or 8.04% disagree and 61 or 19.61% strongly disagree.

In the case of the statement that even where pre-paid meters have been installed, the Ikeja Electricity Distribution Company still programmes the meters to do estimated and coded billing, and the field staff still carry out illegal disconnections and demand bribes from consumers in the face of consistently poor services, 189 or 60.77% strongly agree, 23 or 7.39% agree, but 5 or 1.61% is undecided; while 50 or 16.08% disagree and 44 or 14.15% strongly disagree respectively. Also, the results show that 202 or 64.95% strongly agree, 21 or 6.75% agree that the Ikeja Electricity Distribution Company, along with other Discos, is vehemently opposed to the direct sale of electric power to willing buyers (consumers) by the Electricity Generation Companies to open up the market for deregulation; while 58 or 18.65% disagree, and 30 or 9.65% strongly disagree.

With regard to the statement that the regulated monopoly which empowers government to fix electricity prices at intervals of five years and minor price adjustments yearly to enable the Ikeja Electricity Distribution Company to meet its operating costs as contained in MYTO (Multi-year Tariff Order) but which has not been done since 2008 has made the Company to render consistently poor services and increase prices arbitrarily through estimated and coded billing, 205 or 65.92% strongly agree; 18 or 5.79% agree; 4 or 1.28% undecided; 40 or 12.86% disagree; and 44 or 14.15% strongly disagree. Furthermore, 199 or 63.99% strongly agree; 20 or 6.43% agree; 1 or 0.32% undecided; 30 or 9.65% disagree; and 61 or 19.61% strongly disagree that the regulated monopoly which does not allow the Ikeja Electricity Distribution Company to fix electricity prices still leads to load-shedding, frequent power outages, and total darkness in some areas to punish consumers.

## 5. Hypothesis Testing

### 5.1. Hypothesis

The natural monopoly enjoyed by the Ikeja electricity distribution company (Disco) in Nigeria has a significant effect on its ability to deliver sustained power supply to consumers.

Ho:  $p \leq 0.5$

HA:  $p > 0.5$

	x	freq(f)	f (%)	fx	f(x-x) <sup>2</sup>
SA	5	201	64.63	323.15	64.63 (5-3.99) <sup>2</sup>
A	4	28	9.00	36.00	9.00 (4-3.99) <sup>2</sup>
U	3	3	0.97	2.91	0.97 (3-3.99) <sup>2</sup>
D	2	37	11.90	23.80	11.90 (2-3.99) <sup>2</sup>
SD	1	42	13.50	13.50	13.50 (1-3.99) <sup>2</sup>
Total		311	100.00	399.36	234.6972

Table 2: Regulation and Sustainable Electricity Service Delivery

Source: Field Survey, 2018

Note: These Figures Were Generated by Taking the Average of the Scores in Questions 1-10 of the Questionnaire

$$Z_c = 6.47$$

$$Z_{10.05} = 1.645$$

### 5.2. Decision

Reject Ho since  $Z_c = 6.47 > Z_t = 1.645$  at 0.05 level of significance using the critical value approach. Using the p-value approach, reject Ho  $p\text{-value} = 0.00001 < 0.05$ , and accept the alternate hypothesis that the natural monopoly enjoyed by

the Ikeja electricity distribution company (Disco) in Nigeria has a significant effect on its ability to deliver sustained power supply to consumers.

## 6. Discussion of Findings

The hypothesis tested has established that the natural monopoly enjoyed by the Ikeja electricity distribution company (Disco) in Nigeria has a significant effect on its ability to deliver sustained power supply to consumers.

More specifically, other findings in the study show that (1) The natural monopoly market encourages the Ikeja Electricity Distribution Company to adopt the fraudulent estimated and coded billing system which discourages employee commitment to rendering sustainable quality service to customers (2) Employee involvement in value creation to gain competitive advantage and have a good market share is not encouraged by Ikeja Electricity Distribution Company since it is not exposed to competition (3) Scope of prices and entry regulation make it difficult for retailers to emerge in the market (4) There is consistent poor service delivery by the Ikeja Electricity Distribution Company arising from natural monopoly and this leads to consumer resistance expressed through huge backlog of unpaid bills (5) Due to entry regulation, with no room for new entrants into the electricity market allotted to the Ikeja Electricity Distribution Company, the company leverages on this to render consistently poor services to consumers.

Other findings include: (6) Due to price regulation, the Ikeja Electricity Distribution Company is unwilling to install pre-paid meters in consumer households thereby making the Company to continue with the estimated and coded billing system (7) Even where pre-paid meters have been installed, the Ikeja Electricity Distribution Company still programmes the meters to do estimated and coded billing, and the field staff still carry out illegal disconnections and demand bribes from consumers in the face of consistently poor services (8) The Ikeja Electricity Distribution Company, along with other Discos, is vehemently opposed to the direct sale of electric power to willing buyers (consumers) by the Electricity Generation Companies to open up the market for deregulation. (9) The regulated monopoly which empowers government to fix electricity prices at intervals of five years and minor price adjustments yearly to enable the Ikeja Electricity Distribution Company to meet its operating costs as contained in Multi-year Tariff Order (MYTO) but which has not been done since 2008 has made the Company to render consistently poor services and increase prices arbitrarily through estimated and coded billing and (10) The regulated natural monopoly which does not allow the Ikeja Electricity Distribution Company to fix electricity prices still leads to load-shedding, frequent power outages, and total darkness in some areas to punish consumers.

These findings have support in the work of Posner (1986) who observes, among of other things, that natural monopolies are characterized by lack of efficiency in serving customers, providing quality goods and services, and showing commitment to customer responsiveness. He explains that monopolists are known to arbitrarily refuse to provide quality goods and services and to be responsive in meeting the needs of consumers; and that all these happen because the customer has no choice. He observes also that in a worst case scenario, they may segregate the part of the market to serve well, while others are left to suffer; they are rude to customers, and sell inferior goods or render poor services.

As Posner (1986) also observes, internal efficiency, which is the commonest type of efficiency that has to do with cost minimization, is one of the dysfunctions of natural monopoly. This is because unlike what obtains in a competitive market, the firm can benefit from cost minimization in two ways: by driving down costs the firm can have greater profits or by retaining the price and increasing the volume of sales. On the other hand, cost reduction enables the monopolists to increase profits not minding whether it is in the short-run. This is because it does not have competitors.

The findings also show that the electricity company does not take the needs and expectations of the customers into consideration. This is because the quality of service delivery is consistently poor and the company has refused to break away from the estimated and coded billing system to increase profits which it inherited from the defunct PHCN. These find support in the work of Goldstein et al (2002) who argue that it is expected that the process of service delivery will ensure that the service outcome is well received by the customers; and that is why what should be of paramount importance in the design of the process of delivery is that of meeting the needs and expectations of the customers. They add that the two things of service delivery and service outcome must be perceived to be of good quality by the customers to ensure customer satisfaction, which will, in turn, lead to customer loyalty and retention. Besides, Mohr and Bitner (1995) and Ndingo'ori (2015) throw light that the quality of service delivery is measured by the extent to which the particular service is able to meet the customers' expectations.

Still on the effect of natural monopoly on quality of product or service delivery, the argument put forward by Joskow (2006) on how quality is affected by creating a monopoly and regulating the prices is monumental. According to him, depending on the prevailing situation, inefficiencies associated with product quality, research and development, and the adoption of product and process innovations are increased rather than decreased when a monopoly is created and price regulation is adopted to determine the prices it can charge. He argues further that where the regulated monopoly is a private firm which does not survive on government subsidies, it may be possible for government to regulate the prices and service quality of the firm. However, government may not be able to compel the firm to balance supply and demand in the long-run. Besides, price and entry regulation may also depend on the constraints of the regulator's ability to obtain full information about the firm's cost opportunities, managerial effort levels, as well as attributes of demand.

Consequently, Joskow (2006) is of the view that unless private firms are able to recover the costs of providing goods and services, they will not be in a position to supply them. Some of the costs include costs of materials and supplies, compensation necessary to attract suitable employees and to motivate them to put in the required levels of effort, the direct cost of capital investments in the enterprise, a return on the investments, which reflect the opportunity cost of capital, economic depreciation, taxes, as well as other costs incurred to provide service. In the face of these costs, it is in

the opinion of Joskow (2006) that where the process of regulating prices does not provide the companies the avenue to earn sufficient revenues to cover production and distributions costs, the firms will not be in a position to voluntarily provide the service. As a result, if regulated private monopolies are to provide services, the price-setting process within the gamut of the entire regulatory process must provide adequate financial support to encourage them to supply the services in such a way that consumers' value on the products exceeds the costs at which the firms will be able to supply them.

Furthermore, viewed from the overall platform of the sustainable business practices which are grouped into environmental, social, and economic practices, the objective of this study has been achieved. The study set out to show that the natural monopoly enjoyed by the Ikeja Electricity Company in the electricity market in Nigeria significantly affects its ability to deliver sustained electricity supply to the consumers in its allotted domain. The inability of the company to provide consumers with sustained power supply has forced most consumers to seek alternative sources of power including the use of generators of different sizes and quality. This results in environmental pollution, along with the pollution that comes from the generators of the Disco itself. As Dyllick and Hocketts (2002) point out, the environmental practices of a firm are about the consumption of natural resources and the release of emissions which have impact on the health of the eco-system. Against the backdrop of this understanding, the environmental practices of the Ikeja Electricity Company should have involved how to reduce environmental pollution and degradation by conserving resources in the areas of energy and sustainable waste management. This is not so in a situation where the helpless consumers in the busy Lagos metropolis that is fast assuming the status of a mega-city are compelled to increase environmental pollution through engaging in power generation as individuals and corporate bodies (Belu, 2008).

Also, the social practices of the Company should focus on adding value to the local community (Dyllick and Hocketts, 2002) as well as helping to maintain stable communities and quality of life inside of them within the overall gamut of human rights and sustainable life in the eco-system (Kruget al, 2008). The residents of Lagos and other cities in Nigeria have been groaning in pain since the Discos took over power generation because the people are forced to live in darkness. Storage of perishable household foods and other items is difficult, and communication is impaired due to lack of regular supply of electricity to charge phones, laptops, and other multimedia devices, which form the hallmark of modern business. Also, the human rights of the consumers are being trampled upon as they are increasingly dehumanised to believe that suits they have taken against the Disco would amount to barren exercises as it is owned by those in control of political power in the country.

On the other hand, economic sustainability practices are those that guarantee long-term liquidity and above average return on investments to the shareholders (Dyllick and Hocketts, 2002). The long-term liquidity of the Ikeja Electricity Company is impaired because of its inability to engage in stakeholder transparency in service delivery, to adopt an inclusive stakeholder engagement and to be proactive in its strategic thinking (Wikipedia, 2018) in the best practices of providing long-term services that would ensure sustained value creation for the customer in terms of superior efficiency, superior service quality, superior innovation, and superior customer responsiveness that would, in turn, lead to sustained profits. This gives rise to 'paper' profits as the bulk of the 'profits' in their books is likely to be attributable to assets tied down in uncollectible debts arising from estimated and coded billing.

## 7. Conclusion and Recommendations

From the study, we have been able to establish that the generating segment has been opened up for competition but that the distribution arm has experienced a transition from a public monopoly to a private monopoly. The argument has been that it is not easy to have more than one Distribution Company having their different electric wires on the same street. Even then, going by the various definitions of a natural monopoly as being able to produce at lower production costs what two or more producers or service providers would have done, the situation in Ikeja Electricity Distribution Company and other Discos in Nigeria do not fall into those definitions because their costs of service delivery is high in so far as they rely solely on hydroelectricity as the main source of power generation.

This has however been overtaken by technology and the diversification of the sources of electric power. Having observed that the present electricity supply in Nigeria is majorly based on hydroelectricity in the face of global energy diversification; we believe that the generation and distribution segments could be diversified in accord with the global trend to allow other entrants into the market that could generate power from at least 10 sources which have been found workable in other countries: (1) Solar energy (2) Wind energy (3) Geothermal energy (4) Hydrogen energy (5) Tidal energy (6) Biomass energy (7) Hydroelectric energy (8) Nuclear energy (9) Fossil Fuels (Coal, Oil and Natural Gas), and (10) Wave energy. Some of these have not been tried in Nigeria, and even the ones that have been tried are done on small-scale by some companies.

With the diversification of the sources of generating power, it would then be easier to open up the distribution segment to new entrants that would take advantage of the different sources of power, some of which would not require the proliferation of wires by different companies on the same street. Some of the sources of power could even enable the distributors to customise their services by installing their distributive equipment in the premises of consumers that have registered with them, or segment the market and adopt the focus (niche or specialization) strategy to concentrate in some target markets.

This diversification of the sources of energy away from the preponderance of the hydroelectric power would ensure that the cost of doing this may not be restricted to a few companies that are able to meet the cost as it is with the natural monopoly. Unlike the natural monopoly that adopts "blockaded entry" strategy, "deterrence entry" strategy, and "accommodated entry" strategy through which existing natural monopolies discourage new entrants or force them to

accept mergers or acquisition, the diversification of the Nigerian energy market will reduce cost of entry and therefore provide opportunity for new entrants to take advantage of reduction in cost of entry. This will give room for the deregulation that would usher in competition.

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