



ENERGY MARKETING DYNAMICS AND CONSUMER PERCEPTIONS OF ELECTRICITY SUPPLY PERFORMANCE IN NIGERIA

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ABSTRACT

This study examines the dynamics of energy marketing and consumer perceptions of electricity supply performance in Nigeria, specifically focusing on Calabar. The research investigates the interaction between energy and electricity power providers and consumers, exploring how marketing strategies influence consumer satisfaction and perception of electricity supply reliability. The study employed a cross-sectional survey design, using a sample of 600 households across Calabar, Odukpani, Akpabuyo, Bakassi, and Akamkpa. Over six months, data were collected through a structured questionnaire on electricity records obtained from the Calabar Head Office of Port Harcourt Electricity Distribution Company (PHED). The study tested three specific energy marketing strategies: consumer education campaigns, smart metering adoption, and demand-side management incentives. The findings reveal that households exposed to these marketing strategies reported a 15% increase in satisfaction with electricity service providers, a 10% improvement in perceptions of service reliability and a 7% improvement in electricity service quality. Furthermore, the analysis revealed a statistically significant reduction in electricity consumption by about 14% among households that adopted smart metering technology. About 9% of participants engaged in off-peak electricity usage after being informed about demand-side marketing management incentives. The study concludes that targeted energy and electricity power marketing strategies can effectively improve consumer perceptions and promote more efficient electricity usage behaviours in Calabar zones. The implications of this suggest that electricity distribution companies (PHED) should invest in tailored marketing campaigns and education to enhance consumer satisfaction and optimise energy and electricity power consumption patterns.

Keywords: Energy marketing, consumer perceptions, electricity quality supply, Calabar, Nigeria.

JEL: M31, Q41

INTRODUCTION

Though this study reflects Nigeria in its entirety, the context is Calabar. Calabar, as the capital of Cross River State, has a rich history of being one of Nigeria's first administrative capitals during colonial times. Despite its historical significance and the dynamics of energy marketing and consumer perceptions of critical electricity power supply performance to economic growth and development, the region has faced challenges in electricity supply, which have hampered its development (Okafor & Umeh, 2022, Fagbenle, *et al.*, 2022). The inefficiency of the electricity supply has led to frequent outages (Adeola, 2020), affecting both residential and commercial sectors. Calabar is a growing economic hub in southern Nigeria, known for its tourism, industrial base, and the Calabar Free Trade Zone (Ekpo & Umoh 2021).

The energy demand in the city has surged due to increased industrial activities and urbanization



and consumer education and engagement are prerequisites, (Adedeji, *et al.* 2022). In addition, Olaniyi and Olummide (2023) posit that the landscape of Nigerian electricity provision is fraught with a spectrum of issues such as inadequate infrastructure, frequent power outages, and a complex regulatory framework that complicates efficient distribution and consumer satisfaction (Ihuoma & Okeke, 2021). However, the inadequate electricity supply has been a major bottleneck, affecting the performance and growth of businesses, which in turn impacts the overall economic development of the region. Hence, smart metering and data analytic technologies can enable real-time monitoring of electricity utilization to identify leakages, and inefficiencies and curb losses, (Nwachukwu & Chijioke, 2016, Isah & Abubakar, 2017, Agboola & Ojo, 2019). Despite the obstacles, Ogbuagu and Okpara (2024), insist that there is a pressing need to understand how marketing strategies such as demand-side management (Oduntan, 2021), infrastructure investment (Omoleke, *et al.*, 2022), building trust through customer relationship management, clear and transparent communication in terms of electricity pricing, outages, policy (Ike & Mba, 2020), and regulatory support mechanism are vigorously pursued, Adeola, *et al.*, (2022), could potentially optimise consumer engagement and bolster the sector's reliability.

The Port Harcourt Electricity Distribution Company (PHED) manages the electricity supply in Calabar, which has faced criticism for its inability to provide stable power. The socio-political dynamics, according to Oseni (2021) including governance issues, regulatory frameworks, and consumer advocacy, play a crucial role in shaping the electricity supply performance (Onyeka & Aniche, 2021). The political will to improve infrastructure and address the inefficiencies in the electricity supply is critical to meeting the energy needs of the population (Agboola & Ojo 2019, Ali & Adefarati 2021).

The persistent power outages and unreliable electricity supply in Calabar have led to consumer dissatisfaction and hindered economic activities, raising concerns about the effectiveness of energy marketing strategies. There is a lack of empirical studies focusing on consumer perceptions of electricity supply performance in Calabar, which makes it difficult to assess the specific needs and expectations of the consumers in the region. The current energy marketing strategies employed by electricity providers may not adequately address the communication gaps and transparency issues, leading to a disconnect between service delivery and consumer expectations.

The objectives of this study therefore are:

- To analyze the impact of energy marketing strategies on consumer perceptions of electricity supply performance in Calabar.
- To evaluate the effectiveness of current electricity supply management in meeting the energy demands of residents and businesses in Calabar.

The study will provide insights that could guide policymakers in formulating more effective energy policies that align with consumer expectations and improve the marketing of electricity supply performance in Calabar. Energy providers can use the findings to enhance their marketing strategies, improve customer relations, and address service delivery challenges. This study will add to the existing body of knowledge in energy marketing and consumer perception, particularly



within the context of a developing economy like Nigeria. The study will empower consumers by highlighting their concerns and experiences, which can drive advocacy efforts for better marketing of electricity services in Calabar.

Limiting its findings and recommendations to this specific region, the study focuses on Calabar, which may not apply to other areas with different electricity supply dynamics. The study is conducted within a specific time frame of eight months in 2023, which may not capture long-term trends in electricity supply and consumer perceptions. The accuracy of the study may be constrained by the availability and readiness of the custodians of data to provide the researcher with a reliable source of data from electricity providers and consumers. The study is also limited by the sample size, which does not fully represent the diverse consumer population demographics in Calabar. The study did not account for all external factors influencing electricity supply performance, such as political instability, technical issues, natural disasters, or global energy prices.

LITERATURE REVIEW

Conceptual framework

The concepts for this study are explained thus;

Marketing efforts

Consumer perceptions of electricity performance are hugely influenced by the frequency and tenured outages (light seizures) with marketing efforts that underscore dependability that leads to increased consumer trust and satisfaction (Usman & Bello 2017, Oyedepo, 2022). According to Akinola and Ejemeyovwi (2023), the role of pricing transparency and accountability in shaping consumer perceptions specifically captures old Calabar residents, noting that clear explanations of tariff structures can mitigate unpleasant sentiments about price raises.

Consumers' education

Consumers, the pivot of any economic unit need constant awareness, enlightenment, education, briefing, and debriefing of what is going on (Ogunleye 2022, Olaniyi & Olumide 2024). They are inquisitive, they want to know about the electricity and energy generation mix, particularly the inclusion of renewable sources, which may positively impact their electricity supply performance (Oseni 2021). Some extant studies suggested that effective communication about planned electricity outages and turnaround maintenance work can improve consumer perceptions in Calabar with frequent power disruptions and shameful epileptic electricity supply.

Smart metering adoption

A study by Fagbenle, *et al.* (2022) reveals that smart metering adoption is associated with elevated consumer satisfaction due to better monitoring and billing accuracy. Consumer agitations often arise due to unmet needs, a study by Omoleke *et al.*, (2022) indicates that consumer engagement programmes, including workshops and seminars, educate and enhance consumer knowledge which positively influences their perceptions of electricity providers and their performance. Giwa, *et al.*, (2022) observe that the perceived reliability of electricity supply significantly influences consumers' trust and loyalty. Ogunleye (2022) stressed that including consumer feedback in the design of electricity marketing awareness campaigns leads to more targeted and effective messaging, resulting in improved consumer perceptions.

Performance challenges: Capacity and demand

According to Eberhard *et al.*, (2018) and stressed by Oyedepo (2021), Nigerian electricity power supply is characterised by frequent outages, very high transmission losses, and inadequate infrastructure, leading to unreliable supply dependencies. Akinola (2022) agrees with Oseni (2021) who posits that the power supply system in Nigeria struggles to meet growing demand, with capacity often falling short due to generation constraints and inefficiencies in distribution.

Technical and regulatory issues

Oduntan (2021) notes that technical and non-technical losses result from outdated and overstressed equipment and infrastructure needing replacements. Like energy theft, these losses significantly contribute to the woeful performance of poor electricity power supply to Calabar region. Sometimes too, inconsistent regulatory or legal frameworks and policies, weak enforcement, and corruption hinder the development and efficiency of the electricity supply chain, (Babatunde & Adenikinju 2022).

Financial viability and infrastructure development

Several electricity distribution companies (DisCos) including PHCN, the service provider of the Calabar area face financial challenges due to low tariffs, high collection losses, and poor customer payment rates (Adewuyi, *et al.*, 2023). Generally speaking, infrastructural funding and consumer perception in Nigeria are often negatively significant and Olaniyi and Olumide (2022) emphasize the study of Ogbuagu and Okpara (2024) that the nexus and interconnections between energy marketing strategies that create rapport between the service provider and the consuming public are significantly negative as consumer perception and satisfaction with electricity supply performance are a concern (Usman & Bello 2017, Oyedepo, 2021, Oseni 2021).

Renewables and energy electricity mix in Nigeria

Nigeria's power industry largely depends on gas-fired plants especially independent power plants (IPPs), which makes them more exposed and vulnerable to gas disruptions as gas is internationally priced (Abubakar, *et al.*, 2021, Akpan & Nwaokoro, 2023). On the other hand, the private sector has not been keenly investing and participating in the downstream electricity sector (DisCos) and this has stagnated growth and innovation, the key drivers of unbundling initiatives (Adeola *et al.*, 2022; Giwa *et al.*, 2022, Makoju, 2023). Ogunleye, (2022) reports that there are no measurable impacts despite NERC efforts to integrate renewable energy into the grid which are even in their nascent stage.

Theories underpinning the study

Three theories support this study. They include the theory of planned behaviour (TPB), consumer satisfaction theory (CST), and diffusion of innovations theory (DIT). However, TPB and CST are more apt and relate positively to this study.

The theory of planned behaviour (TPB)

This theory is driven by behavioural intentions, which are influenced by attitudes towards the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991). In the context of this paper, TPB helps explain how consumers' attitudes towards electricity utilization, social influences, and their perceived control over energy consumption shape and reshape their behaviour



such as energy-saving practices and bill payment attitudes. TPB relevance lies in the fact of understanding the psychological factors influencing consumer perceptions and behaviours concerning electricity power performance.

Consumer satisfaction theory (CST)

The theory of CST suggests that consumer satisfaction is primary and is the result of a comparison between ideal and perceived performance as propounded by (Oliver 1980). This study provides a framework for analysing how the gap between consumers' expectations of electricity supply in terms of reliability, pricing, and quality and the consumers' actual experiences influences the overall satisfaction with electricity providers or system operators (SO). The potency of theory is understanding the dynamics of consumer perceptions in the energy and electricity power market and how these perceptions can be harnessed to improve energy satisfaction.

RESEARCH METHODOLOGY

Methods

The research design objective was to quantitatively evaluate the impact of energy and electricity power marketing strategies on consumer perceptions of electricity supply performance and electricity usage behaviour among Calabar zone households vis-à-vis Nigeria.

Materials

Data collected using a structured questionnaire covered homogenous households of Calabar, Akpabuyo, Bakassi, Odukpani, and Akamkpa local government areas respectively. The survey included questions on consumer perceptions of electricity reliability, billing accuracy, supply service quality, and self-reported electricity usage behaviours of consumers. The researcher also obtained records from PHED Calabar Head Office, Calabar Road for six months before and after the marketing interventions. Data analysed used SPSS ver. 25 software, applying descriptive statistics, paired t-tests, and regression analysis to identify significant changes in perceptions and behaviours in energy marketing.

DATA PRESENTATION, ANALYSIS, AND DISCUSSION OF FINDINGS

Households were categorised into intervention groups (HH exposed to energy marketing strategies, EMS) and control groups (those exposed to control groups). The intervention groups received targeted education campaigns, smart metering installations, and information on demand-side marketing management incentives. The control group continued their regular electricity usage without any intervention. The comparative analysis between these groups was conducted to isolate the effects of the marketing strategies on consumer perceptions and usage patterns.

Descriptive analysis

In describing the operationalization of each independent variable and dependent variable using the study's interventions, the researcher uses surveys to measure electricity consumption patterns to appraise the influence of interventions thus:

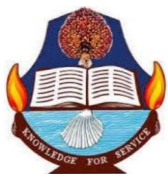
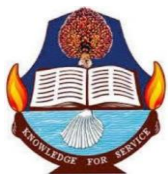


Table 1: Means, Standard Deviations (SD), Skewness (S), Kurtosis (K), and Observations (Obs)

Latent Var	Dimensions	Mean	SD	S	K	Obs
Energy Marketing Strategies (EMS)	Consumer Satisfaction (CS)	4.25	.845	-.565	-.607	600
Smart metering Adoption (SMA)	Electricity Consumption (EC)	4.79	.835	-.345	-.916	600
Billing Transparency (BT)	Billing Accuracy Perception (BAP)	3.29	.873	-1.568	1.160	600
Demand-side incentives (DSM)	Energy-saving Behaviour (ESB)	3.87	-.846	-.861	.671	600
Consumer education Campaigns (CEC)	Perception of electricity reliability (PER)	3.91	-.876	-.539	.867	600

Source: SPSS version 25

Table 1 revealed that the mean value of consumer satisfaction was 4.25 with a standard deviation of .845 suggesting that the data is not dispersed from the mean and is negatively skewed (skewness = -.565). It has a general flat platykurtic as $K = -.607$ and is less than 3 thresholds. The mean value of electricity consumption (EC) hangs around 4.79 with a standard deviation of .835. The data is negatively skewed (skewness = -.345) and generally flat, which is platykurtic, as $K = -.916$ is less than 3. Billing accuracy perception (BAP) also had a mean value of 3.29 with a standard deviation



of .873, skewness of -.1.568, also platykurtic and less than 3.ESB = 3.87, the standard deviation of - .846, skewness = - .861, and platykurtic of .867 and less than 3. Perception of electricity reliability (PER) = 3.91, standard deviation of - .876, skewness of - .539, and a flat platykurtic of .867 still less than 3, makes the paper a robust study (Usman & Bello 2017, Onyeka & Aniche 2021, Obot & Ekpo 2022, Akinola & Ejemeyovwi 2023, Ogbuagu & Okpara 2024, Olaniyi & Olumide 2024).

Table 2: Pearson Moment Matrix Correlations (with p-value in *italics*)

Latent Var	Dimensions	CS	EC	BAP	ESB	PER
Energy Marketing Strategies (EMS)	Consumer Satisfaction (CS)	4.27***	1			
Smart metering Adoption (SMA)	Electricity Consumption (EC)	4.78***	489***	1		
Billing Transparency	Billing Accuracy Perception (BAP)	4.45***	5.91***	3.47***	1	
Demand-side incentives	Energy-saving Behaviour (ESB)	6.34***	4.816	6.213	1	
Consumer education Campaigns (CEC)	Perception of electricity reliability (PER)	0.391	.876	.539	.867	1

Source: SPSS version 25

*, **, *** denote significance at 0.1, 0.05, and 0.001 levels.

To investigate whether there were relationships between the latent variables' intersection, the study adopted the Pearson moment correlation coefficient matrix analysis tools. All the Pearson correlation coefficients among the five study variables were significant (4.27<.867). However, these correlation coefficients alone do not provide a full test of the strength of relationships, but they provide abundant evidence of the expected patterns of results. Consumer satisfaction (CS) was positively and significantly related to energy marketing strategies (r = 4.27; p = 0.000) and

smart metering adoption was found to be significantly related to energy marketing strategies at ($r = 4.78$, $p = 0.000$). Similarly, billing transparency is significant and positively related to billing accuracy perception ($r = 4.45$, $p = 0.000$) with constructs of energy marketing strategies and positively related to the perception of electricity supply performance in Calabar and Nigeria at large. Billing Accuracy perception is also positively related to energy marketing strategies and billing transparency ($r = .445$, $p = 0.00$) and energy-saving behaviour and reliability perception are positively related to demand-side incentive and consumer education campaigns with ($r = .445$, $p = 0.000$), and ($r = 0.391$, $p = 0.000$).

Data and results

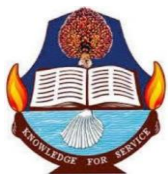
Consumption perception scored 45% pre-intervention rating electricity reliability as poor, and post-intervention 30% rated electricity reliability as poor (Olamide & Yusuf 2019). For electricity consumption, the intervention group reduced consumption from 450 kWh to 396 kWh per month and the control group showed no significant change (Adeshina & Adeola 2016, Akinola 2022). Smart metering technology adoption showed 65% of users reporting satisfaction with billing accuracy post-intervention, compared to 42% pre-intervention (Ayodele & Ogunjuyigbe 2022, Fagbenle et al., 2022).

Adoption of energy-efficient appliances behaviours was reported by 18 % of households in the intervention group and post-intervention reported 8% of the control group adopting similar behaviours. Demand-side marketing management posted that 8% of households shifted usage to off-peak hours during post-intervention, compared to 2% in the control group (Onyeka & Aniche 2021, Omeleke, et al., 2022, Fagbenle, et al., 2022).

CONCLUSION

Smart metering significantly improves consumer perceptions of electricity supply quality and reduces households' electricity consumption, particularly in terms of billing accuracy (Fagbenle, et al., 2022). Effective energy marketing strategies such as consumer education campaigns and demand-side management incentives improve consumer engagement, awareness, and satisfaction with energy-saving practices (Akpan & Akpan 2018, Ihuoma & Okeke 2021, Oseni 2021, Ekeh & Obasi 2023,). Billing transparency processes are essential for building and maintaining consumer trust in electricity distribution companies, and they significantly influence overall satisfaction (Nwachukwu & Chijioke 2016, Ogbuagu & Okpara 2024). The need for continued investment in consumer-centric policies and interventions that prioritise consumer satisfaction and efficient electricity usage is critical for the long-term success and sustainability of Nigeria's electricity sector (Eberhart, et al., 2018, Oyedepo 2021, Omeleke et al., 2022, Adewuyi, et al., 2023).

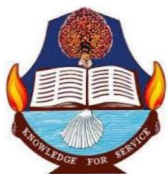
Therefore, there is a need for DisCos to expand the adoption of smart metering technology (Ogundipe & Adebayo 2018, Oduntan 2021). Develop and implement targeted consumer education campaigns (Obot & Ekpo 2022). Focus on billing transparency by providing clear, detailed, and accessible information to consumers (Ibe & Njoku 2017, Eze & Nwankwo 2019). Promote policies and programmes that incentivise long-peak electricity usage (DSM) to help balance demand and reduce strain on the electricity grid during peaks (Isah & Abubakar 2017, Adeola 2020, Adedeji et al., 2022, Giwa et al., 2022). Also, DisCos should conduct longitudinal studies on consumer behaviour to track changes in consumer perceptions and behaviours over time, particularly in response to new energy policies, technology adoption, and market dynamics.

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