UNIVERSITY OF CAPE COAST

AN EVALUATION OF CUSTOMER SATISFACTION AND POWER THEFT IN THE ELECTRICITY MARKET OF GHANA: A SERVQUAL APPROACH

NURUDEEN JAMIO

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BY

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FEBRUARY, 2025

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature…….…… Date: ……

Name: Nurudeen Jamio

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature…….…… Date: ……

Name: Dr. Michael Owusu Appiah

ABSTRACT

Electricity theft has gained a lot of attention in recent years due to its severe impact on the energy sector, especially in developing countries. Although electricity theft methods such as meter by-passing and meter tampering and their effect of huge distribution losses are well-known in Ghana, the government continues to search for an effective system to nip the problem in the bud. Among the drivers of electricity theft identified in various studies are high tariffs, corruption and poor law enforcement. Part of the solution to the canker is in improving service quality as studies in other countries have established a relationship between customer satisfaction and electricity theft. Through an online research questionnaire and using the SERVQUAL Approach, this study set out to ascertain the level of customer satisfaction in the electricity market of Ghana, identify the reasons for power theft and determine the relationship between customer satisfaction and power theft. Overall, respondents were not satisfied with the service quality in the electricity market of Ghana. All five service quality dimensions of empathy, assurance, tangibles, responsiveness and reliability were rated low. Thus, the probable reasons for power theft such as high tariffs and poor customer service were confirmed. Further, there was a negatively significant relationship between service quality and power theft among electricity consumers. As a way forward, electricity companies in Ghana should enhance the experience of their customers by improving the quality of service they provide. This improvement in service quality complemented with other strategies such as investment in theft prevention and detection technologies would go a long way to addressing electricity theft in Ghana.

KEY WORDS

Customer satisfaction

Electricity theft

Service quality

SERVQUAL Model

DEDICATION

To my father, Osumanu Mohammed Jamio and my mother, Mohammed Fatimatu Baraya.

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LIST OF ACRONYMS

ACSI	American Customer Satisfaction Index
AVE	Average Variance Extracted
CSI	Customer Satisfaction Indexes
CWM	Cash Waterfall Mechanism
ECG	Electricity Company of Ghana
ECSI	European Customers Satisfaction Index
ESLA	Energy Sector Levy Act
GCSI	Ghana Customer Service Index
GRIDCo	Ghana Grid Company
IMF	International Monetary Fund
ISSER	Institute for Statistical, Social and Economic Research
LM	Linear Model
NED	Northern Electricity Department
PLS	Partial Least Square
PURC	Public Utilities Regulatory Commission
RMSE	Root Mean Squared Error
SAP	Structural Adjustment Programme
SCSI	Swedish Customers Satisfaction Index
SEM	Structural Equation Modelling
SERVQUAL	Service Quality
UPS	Uninterruptible Power Supply
VIF	Variance Inflation Factors
VRA	Volta River Authority
WAGP	West African Gas Pipeline

CHAPTER ONE

INTRODUCTION

Background to the Study

Electricity is a topical issue in Ghana and the world over. Its discussions center mainly on production, supply, and consumption. Two subjects under distribution and consumption that this study looked at are customer satisfaction and electricity theft which are thought to be linked (Yakubu & Narendra, 2017).

Globally, Customer satisfaction is crucial for businesses for many reasons. Firstly, it is significantly linked to higher economic returns. The ability to establish a satisfied customer base ensures company profitability (Yeung et al., 2002). Secondly, long-term corporate performance depends on satisfied customers (McColl-Kennedy & Schneider, 2000). Global electricity customer satisfaction levels vary across regions.

One customer behaviour in the energy industry that has caught the attention of researchers is electricity theft which experts believe is one of the major headaches for electricity companies in the world. Globally, electricity theft costs over 25 billion dollars annually (Micheli, Soda, Vespucci, Gobbi & Bertani, 2019). There has been research into the drivers as well as the types and methods of electricity theft. There is also some understanding of the causes of electricity theft which may vary for various reasons such as economic situation and government policies. Ghana has had its fair share of troubles from electricity theft. The Electricity Company of Ghana, the Energy Commision and other state institutions continue to look for effective ways to address the canker.

In developed economies, the electricity market is mostly competitively run by both state and private enterprises. In Africa the electricity market is

mostly state-controlled and monopolistic. It is noteworthy that even though these monopolies may have reasons to be customer-oriented, they enjoy enough luxury from the inherent protection within their market structure unlike other businesses in competitive markets. According to Kotler, Armstrong, Saunders and Wong (2002), delivering superior value beyond what competitors bring to the market is a key requirement for building customer relationship.

The market orientation of Ghana's state owned electricity companies, assumes critical significance within the discourse on customer satisfaction and electricity theft in the country's electricity market due to the government's dominance in the sector. As the sole distributor of electricity, the government's approach to market orientation profoundly influences consumer experiences and perceptions. A market-oriented public sector in Ghana's electricity industry would prioritize customer needs, preferences and feedback, fostering a more customer-centric environment. Bamfo and Dogbe (2017) showed that Ghana's public sector fell far behind the private sector in terms of market orientation. For majority of electricity consumers in Ghana, they are either served by the Northern Electricity Distribution Company (NEDCo) or Electricity Company of Ghana (ECG) depending on the customer's geographical location. Both companies are state-controlled. The argument is that the public sector does not prioritize service quality and customer satisfaction enough since it has a ready market (Akinboade et al., 2012).

Ghana is an energy pioneer in Africa (Kumi, 2017) and was only second to south Africa, as at 2015, in terms of access to electricity (World Bank, 2015 as cited in MacLean, Gore, Brass and Baldwin, 2016). Ghana's demand for electricity has increased steadily over the past two decades, with average annual

growth of 3.3% between 1990 and 2013. From 2013 to 2023, demand was projected to rise by 6% yearly (Diawuo et al, 2020). The highest demand was 2,192 MW (GRIDCo, 2018). Total available installed power as at 2017 was 3,890 MW (Energy Commission, 2018). In Ghana, electricity is essential for both industry and household, as it does in every other economy. For economic infrastructure to develop and for goods and services to be produced, electricity must be provided consistently and sustainably (Eshun & Amoako-Tuffour, 2016).While production is enough to meet demand, the system is frequently frustrated by distribution challenges which result in chronic supply shortages (Diawuo, Sakah, Pina, Baptista, & Silva, 2019). Typically, the supply shortages lead to load shedding, a situation that has been popularised by the term dumsor. Customer satisfaction in the electricity market bothers on a host of items including billing processes, power supply efficiency, service connections, information generation and disconnections management.

Statement of the Problem

Electricity theft and customer satisfaction are interconnected subjects that significantly impact the electricity sector. High tariffs have been identified as a major driver of both customer dissatisfaction and electricity theft. This creates a two-way relationship between the two factors such that electricity theft raises production costs, which in turn leads to higher tariffs, causing further dissatisfaction among customers. Conversely, customer dissatisfaction can drive electricity theft, as customers may feel compelled to resort to illegal connections due to perceived unfair pricing or service issues.

Although numerous studies have explored electricity theft and customer satisfaction separately, few have examined the relationship between these two factors, particularly in the context of Ghana. Existing literature such as the works of Meesala and Paul (2018), Alharthey (2019) and Shyju, Singh, Kokkranikal, Bharadwaj, Rai and Antony (2021), have shown a strong academic interest in customer satisfaction and its relationship with service quality. However, the service quality of electricity in Ghana faces significant challenges, notably due to frequent power outages (Adom, 2013). Research on the economic impact of these outages, especially on small and medium enterprises (SMEs) in Ghana, has been well-documented (Danso-Wiredu, Dadson, & Amoako-Andoh, 2016). However, there is a gap in understanding customer satisfaction in the Ghanaian electricity market, particularly in relation to power theft, service reliability, billing, and complaint management.

The introduction of the SERVQUAL model by Parasuraman et al. (1988) has been widely used to assess customer satisfaction in various industries, including energy markets. However, studies on customer satisfaction in electricity markets, particularly in African countries like Ghana, remain under-explored (Keelson, Aboagye, & Addo, 2014). In addition, while research on customer satisfaction in the energy market exists globally, there is a noticeable lack of studies that specifically address the link between customer satisfaction and electricity theft in Ghana's unique electricity market. Few studies, such as those by Chodzaza and Gombachika (2013), Usman (2013), and Drosos et al. (2020), have looked at satisfaction in electricity markets, and even fewer have applied the SERVQUAL model or its modified versions to this context.

This dissertation saught to fill this gap by examining the relationship between electricity theft and customer satisfaction in the Ghanaian electricity market, with a focus on how theft influences customer perceptions of service reliability, fair pricing, and overall satisfaction.

Purpose of the Study

The purpose of this study is to evaluate client satisfaction and power theft in the electricity market of Ghana using the Servqual approach and Partial Least Squares Structural Equation Modelling.

Objectives of the Study

The specific objectives of the study are to:

i. ascertain customer satisfaction in the electricity market of Ghana.
ii. identify the reasons for power theft in the electricity market of Ghana.
iii. determine the relationship between customer satisfaction and power theft in the electricity market of Ghana.

Research Questions

To achieve the objectives of the study, the following research questions were answered:

i. What is the level of customer satisfaction in the electricity market of Ghana?
ii. What are the reasons for power theft in the electricity market of Ghana?
iii. What is the relationship between customer satisfaction and power theft in the electricity market of Ghana?

Significance of the Study

This study demonstrates the applicability of a dominant customer satisfaction model – the servqual model, in the monopolistic electricity market of Ghana. The findings of the study would add to the existing body of knowledge on customer satisfaction and power theft in the energy market. The study would further provide empirical evidence for understanding customer expectations in the market, how the client perceives service quality, drivers of electricity theft and the connection between client satisfaction and power theft.

It is expected that these findings would inform the power supply companies and the government of the necessary steps to take in terms of customer orientation and management of losses through theft.

This study should generate further interest in understanding the electricity consumer in the current electricity market.

Scope of the Study

The study covers customer satisfaction and power theft in the electricity market of Ghana. It samples views of domestic, commercial, government and private customers from across all sixteen regions of the country.

Limitations of the Study

The study adopted survey research methods with the use of a suitable questionnaire for collection of required data from respondents via the internet. That means only literates who had internet access and smart mobile phones, or computers could be targeted. There was the possibility of having skewed responses in terms of numbers between urban populations, which ordinarily have more literates, and peri-urban and rural areas. Again, since the researcher

did not have field representatives across all sixteen regions of Ghana, the responses could be skewed towards areas where WhatsApp contacts and WhatsApp groups could be more easily accessed.

Definition of Terms

Customer satisfaction

The overall assessment of total acquisition and consumption experience of a product or service over a period of time (Anderson et al., 1994). It is a measure of how goods and services meet or surpass customer expectation.

Service quality

Customers' perceptions of the services they received vs their expectations (Parasuraman et al., 1988). It is the general opinion that consumers have about any given product or business (Beamish and Ashford, 2007).

Electricity theft

Electricity theft is the unlawful use of power through energy meter manipulation, meter bypassing, and various other means to avoid paying for services rendered (Depuru et al., 2011).

SERVQUAL model

A model for measuring service quality originally designed by Parasuraman, Zeithaml, and Berry (1985, 1988). It describes service quality as the difference between customers' expectations and customers' perceptions by a service provider. In the model, there are five dimensions of service quality: (1) Tangibles, (2) Assurance, (3) Responsiveness, (4) Reliability and (5) Empathy.

Partial Least Squares Structural Equation Modeling

PLS-SEM is a commonly used statistical method for examining intricate connections between latent and observed variables. In terms of data requirements and modeling, PLS-SEM provides more flexibility.

Organisation of the Study

This study is made up of a total of five chapters. The first chapter discusses aspects of the electricity market in the global and Ghanaian contexts, research objectives and questions, significance and the scope of the research, definitions of words, and study organization. The literature review in chapter two features pertinent general and specific academic materials on the subject. The chapter also offers information on earlier studies that have been done in the same field. The research methodology is covered in detail in Chapter 3, along with the research design, sample, sampling method, data collection and analysis techniques. Analysis of the data and a discussion of the findings are presented in chapter four. In chapter five, the final chapter, the overview, findings, and suggestions from the research are presented.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter presents the literature review of the study. The literature review is centred on (1) the SERVQUAL model of ascertaining customer satisfaction and (2) assimilation-contrast theory; both of which were used in the study. Customer satisfaction, electricity theft and other related concepts are discussed in the chapter. Since the study is on the electricity market of Ghana, the review also looks at the history of Ghana's energy industry, installed capacity, challenges and the current electricity market discourse. The chapter ends with empirical review of electricity theft, customer satisfaction in the electricity market and conceptual framework of the study.

Theoretical Review

The SERVQUAL model and assimilation-contrast theory underpin this study.

SERVQUAL - A conceptual model of service quality

In 1985, Parasuraman et al. designed a model for the assessment of service quality. They used well-established methods for creating scales that were not always readily observable in the developemtent of their SERVQUAL instrument. After a thorough examination into the quality of four service industries (securities brokerage, retail banking, product repair and maintenance and credit cards), they developed a conceptual framework for service quality. They did 12 customer focus groups and 14 executive interviews through which a fairly consistent pattern of responses emerged although the focus groups were

diverse. The different groups resoundingly confirmed that providing services that exceed or at least meet customers' expectations is a key component of good service quality. Consequently, Parasuraman et al. defined service quality as "the level of disparity between consumers' expectations or wants and their perceptions". Initial research found the following ten general characteristics or dimensions:

1. Tangibles
2. Reliability
3. Responsiveness
4. Competence
5. Courtesy
6. Credibility
7. Security
8. Access
9. Communication
10. Understanding

Parasuraman et al. went on to establish the Gap hypothesis. According to the researchers, "the difference between a consumer's expectations about a broad class of service and their impression of the actual performance of a given firm drives the consumer's belief about service quality." The provision of perceived high-quality services was shown to be seriously hampered by these limitations. Figure 1 below dispalys the Gap model:

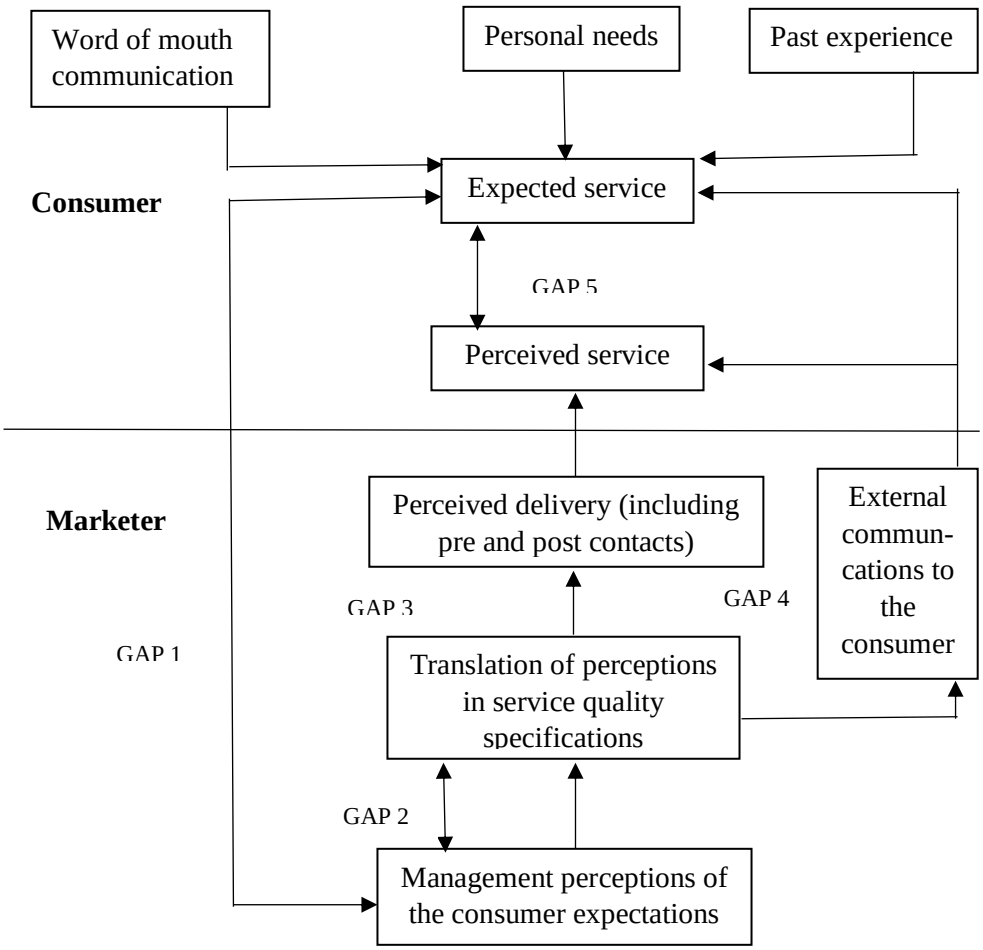

Figure 1: SERVQUAL gap model

Source: Parasuraman *et al.* (1985)

The SERVQUAL instrument measures gap 5. According to Zeithaml et al., (1990) gap 1 which highlights the company's lack of awareness of what the customers expect, is "the first and possibly most critical step in delivering quality service". They observed that occasionally this occurs because businesses neglect or undervalue the importance of thoroughly understanding customers' expectations – and this includes both private and public companies. Three characteristics that their investigation identified as contributing to gap 1 are shown in Figure 2.

Figure 2: Key factors contributing to gap1

Source: Zeithaml et al. (1990)

To create a tool for measuring how clients perceive the quality of the services they receive, the researchers engaged in a quantitative research phase. This was after expanding on the qualitative phase and the aspects they discovered during the investigation. The exploratory portion of the work resulted in the discovery of 97 elements that represented the 10 dimensions of service excellence.

The final instrument, SERVQUAL, was composed of 22 items that fell into five categories (Tangibles, Reliability, Responsiveness, Assurance, and Empathy), as shown in Table 1.

Table 1: Five dimensions of revised version of SERVQUAL

Dimension	Definition	Item Scale
Reliability	The ability to perform the promised service dependably and accurately	4
Assurance	The knowledge and courtesy of employees and their ability to convey trust and confidence	5
Tangibles	The appearance of physical facilities, equipment, personnel, and communication materials	4
Empathy	The provision of caring, individualized attention to customers	5
Responsiveness	The willingness to help customer and to provide prompt services	4

Source: Parasuraman et al. (1988).

Popular SERVQUAL data analysis techniques include the servqual gap, which computes a single measure of service quality, dimension-by-dimension analysis, and item-by-item analysis. By the time these studies were finished, academia had seen the first real effort to gauge service quality. Many still believe that SERVQUAL is a useful and significant tool in ascertaining customer satisfaction.

Criticisms against the SERVQUAL model

From its early date of introduction to date, the servqual model has received its fair share of criticisms nothwitsndaing its tremendous contribution to a deeper appreciation of service quality. The criticisms have borthered mainly on the reliability and validity of the instrument used. For example, according to Carman (1990) there was little evidence, whether empirical or theoretical, that supported the use of the gap model as a sound measure of service quality.

Bolton and Drew (1991b) were not convinced by the validity of the idea of expectation-performance disconfirmation whereby customers subconsciously compare performance (including previous perfomance) with their personal expectations. In their work, Cronin and Taylor (1992) concluded that servqual discomfirmation framework alone could not be used in measuring service quality since a number of considerations, features or dimensaions are not covered by the model.

Still on the proposition by researchers that SERVQUAL ignored the importance of certain items, for example, Carman (1990) disagreed that component analysis should be used to determine the distinction between expectation and perception. He said that serious theoretical and practical questions about the reliability of assessing the distinction between expectations

and perceptions were brought up by the model.

SERVQUAL looks deeper into the process of service delivery and pays little attention to the outcomes of the service encounter. Cronin and Taylor (1992) as well as Richard and Allaway (1993) have observed the absence of consideration for outcome quality in the servqual model. Teas (1993a) and Buttle (1996) have also pointed to the invalidity of the use of 'expectations' as a measure of customer's perception of service quality. For them, the model arrives at customer perception through the service process rather than the service outcomes.

It has been argued that the total number of items constituting each servqual measurement dimension are not sufficient. Each measurement dimension has about five or less numbeer of items bringing the total as summarised by Buttle (1996) as ranging from 15 to 48. The main concern here is that the number of items may not be sufficient in effectively capturing the variance in these dimensions. To address this concern, the main proponents of the model have explained that where necessary and depending on the study, further items may be added or dropped provided these items are suitable for adjusting the existing items in the model. The researchers cautioned that no matter how widely the number of items could be presented, there is always the constraint of practicability. What is instructive to note is that there is room for addititon and removal of items depending on the context of the study.

Another grounds upon which the servqual model has been challenged is the use of the 7-point Likert scale which some researchers have labled as problematic. In some cases, the scale has been criticised for its agreeable labeling or for the lack of it. Respondents might understand the extreme ends

easily than the mid-point and this could lead to what Lewis (1993) termed as "overuse of the extreme ends of the scale". The mid-point could be mistaken to be a "don't know" response. Hence, each point should be verbally labelled. Aside the mid-point confusuion, the number of available response options per question (7 in the case of the servqual 7-point likert) some researchers have found the options to be too many. Babakus and Mangold (1992) thought that respondents might find it frustrating. Instead, they suggested a five-point scale which they were sure would boost both the turnout and quality of the responses.

Quality and satisfaction parameters vary for products as well as services. This has led to another criticism against the SERVQUAL which uses a certain number of dimensions. Dominant in the literature is the concern that there could be many more dimensions. The scholars have, however, disclaimed that the model could be varied to suit contexts and many researchers have thus varied the scale sometimes using fewer or more items.

Assimilation-contrast theory

The Assimilation-Contrast Theory explains how consumers evaluate services by comparing expectations and performance. Originally based on Sherif and Hovland's (1961) research on post-exposure product or service performance, and synonymous to the theory of dissonance (Schiebler, 2018), the theory combines assimilation and contrast models.

Under the Assimilation Model, consumers adjust their perceptions to match expectations only when there is a small discrepancy. Customers tend to bring the performance they perceive from the service provider to meet their level of expectation, hence, their satisfaction becomes the degree of the gap between what they expected and the performance they perceived; but only if the

gap is minimal (Chege, 2021; Rao & Sahu, 2013). When a customer experiences a product or service, their initial impression is influenced by their exisiting expectations, attitudes and beliefs.

However, if the new information is significantly different from the customer's expectations, they experience a contrast whereby the consumer effectively evaluates the product or service unfavorable (Jumawan, 2021; Schiebler, 2018).

Some key notes in this theory are that consumers form biases based on their experiences, comparison is essential for assimilation or contrast, satisfaction results from the degree of difference between expected and perceived performance and small discrepancies lead to assimilation and satisfaction, while large discrepancies lead to contrast and dissatisfaction.

Conceptual Review

Customer satisfaction

Scholars have made several attempts to define and measure consumer pleasure. The whole evaluation of the purchasing and using experience of a good or service over time is known as customer satisfaction (Anderson et al., 1994). Customers' evaluation of their experience following the purchase of a good or service in relation to their pre-purchase expectations is known as customer satisfaction, according to Gronroos (1983).

Essentially, it indicates that when services are judged by the customer to be satisfactory, it means that customer needs have been met, therefore, the overall consumption experience is positive. Researchers including Hoffman and John (1997) believe that customer satisfaction is the heart of marketing. This is

consistent with the view that ensuring customer satisfaction is vital for the survival and growth of any business as it fosters strong connections between strategies and managerial decisions. Satisfied customers become loyal customers (Kataria & Saini, 2020; Leninkumar, 2017) which leads to higher future revenues (Fornell, 1992; Bolton, 1998). These observations are important to all industries including the energy industry which is highly capital intensive and critical on both macro and micro economic levels. A longstanding debate in business is whether prioritizing product or service quality leads to customer satisfaction, or if satisfying customers inherently drives quality. While some have argued that quality precedes customer satisfaction, others suggest the opposite. Those advocating for quality-first argue that by delivering superior products or services, customer satisfaction is naturally engendered. Ultimately, the debate underscores the interconnectedness of quality and customer satisfaction, with both factors playing significant roles in business success.

In essence, satisfaction is based on individual view point although some common features can be identified in the way the individual perceives it. One important consideration in understanding the customer's view and their satisfaction of a product is the context. Different contexts may exude different satisfaction levels. For instance, a restaurant may please its customers when they procure air conditioners to maintain a cool ambience for a good eating experience. The same provision may not be appreciated by customers during the cold season since the general atmospheric condition is already cold.

In today's dynamic business environment, a prime theme in many marketing strategies is the concept of customer satisfaction. Examining customer satisfaction through different studies on service quality has become

essential for developing effective market strategies. Azar (2009) notes that due to the importance of the concept, many have opted for client satisfaction analysis to evaluate their service quality. In other words, for a company to know whether or not its customers are satisfied, it is imperative to evaluate the service quality that the company is providing.

Measurement of customer satisfaction

The essence of measurement of customer service is well established in management literature and in marketing. Researchers adopt different attributes, techniques and dimensions in measuring customer satisfaction since there is no particular single scale that is universally recognised. Yi (1990), focused mainly on attributes of client satisfaction such as the buying decision experience, the kind of product or service, the company shop or department, the consume–use experience, pre-buying and performance experiences. The measurement of customer satisfaction is often considered exploratory and not a precise science as it involves understanding complex human emotions, preferences and expectations which can be subjective and mulitfaceted. Unlike quantitative metrics like sales figures or website traffic, client satisfaction is not alsways easily quantifiable. Usually, developing methods to measure customer satisfaction invloves a combination of qualitative and quantitative techniques which aim to capture a wide range of sentiments and expeiences.

From marketing perspective, Kotler (1991) related customer satisfaction to a person's complacency or discontentment when comparing their expectations with the outcome of a service, product, or performance. The key word in his view was “comparison”. Kotler and Armstrong (2012) in the above context, subsequently conceived consumer satisfaction in terms of the

expectations brought on by the post-purchase analysis of goods or services. Gilbert et al. (2004) state that the expectancy-disconfirmation method, the performance-only approach, and the technical and functional dualism approaches are some of the most widely accepted theories of measurement. Also important is the understanding that aside the different measurement techniques and concepts when it comes to measurement and understanding of customer satisfaction, the measurement scales, data collection methods and format of questions, all vary considerably (Wilson, 2002).

It is reasonable to suggest that client satisfaction measurement is not a simple construct. Generally, consumers do not loook at only one or two features to derive satisfaction, rather, their satisfaction is based on a whole array of items. An item may have five or more physical features in a customer's satisfaction array. But physical features of a product are only one aspect of many other features that could come into play such as time, human relations, ambience etc. Nunnally (1967) as cited by Gilbert and Veloutsou (2006) states that multi-item measures are preferable to single item measure in determining customer satisfaction partly due to the fact that it is more difficult and less accurate to determine satisfaction from a single item measure. The former offers more consumer-perspective information about consumer satisfaction. Again, multi-item measurements provide scale dependability that is not feasible with a single item measure.

If the customer is at the center of the services that businesses provide and if improvement in the work processes need to be stimulated, then measurement of customer satisfaction must be considered (Waris, Yacob, & Zakiyatussarrioh, 2010). Some scholars hold the view that customers assess

their satisfaction after experiencing a product or service (Yu¨ksel & Rimmington, 1998). One useful observation is that measurements are more accurate when done closely in time to the period within which the consumer experienced the product or service (Mittal et al., 1999).

Importance of customer satisfaction

A company that measures the satisfaction of its customers is able to determine its performance and organizational relevance within the market it operates. This explains why some countries have developed Customer Satisfaction Indexes (CSI). CSI are customer satisfaction degrees established for industry, commerce and trade solely from the viewpoint of consumers unlike the measurement of consumer acceptance and loyalty from the view point of the producer. It typically involves collecting feedback from customers through surveys or other methods and then calculating a score or index based on the response of the clients. Countries such as the United States, Sweden and larger Europe have established the America Customers Satisfaction Index (ACSI), Swedish Customers Satisfaction Index (SCSI) and the European Customers Satisfaction Index (ECSI) respectively. Large companies may have their own CSI.

By examining data on customer satisfaction and comparing it across different contexts or time periods, policy makers gain valuable insights into what drives customer satisfaction. This information can then be used to shape policies and strategies aimed at improving customer experiences, driving business growth and and enhancing overall satisfaction within various industries. Another importance is that it has a direct relationship with behavioural intentions (Cronin et al., 2000). In other words, it helps the

company to determine behavioural intention of the consumer and to better predict the customer, therefore.

Service quality

One of the accurate and reliable lenses through which sutomer satisfaction has been viewed over the years is service quality. There has not been a universally accepted single definition of service quality despite its importance in the determination of market superiority and competitiveness (Beecham, 2009). It has notable influence over client satisfaction (Dehghan, 2011). Demand for electricity has increased globally and locally in the last decade. Efforts to increase energy production is therefore a common phenomenon around the globe. The quality of service that the energy companies provide, be they private or state-owned entities, remains a major topic.

Where there is competition, service quality, like customer satisfaction, becomes a critical parameter in establishing superior business performance (Chowdhary & Prakash, 2007). For instance, in a deregulated electricity market where consumers can choose their electricity provider, companies must focus on delivering reliable service, addressing customer concerns promptly and offering competitive prices to attract and retain customers. In this scenario, superior service quality such as ensuring uninterrupted power supply, quick response to outages, clear communication about billing and service plans, as well as responsive customer service becomes a crucial differentiator. Companies that excel in these areas are more likely to achieve higher levels of customer satisfaction leading to customer loyalty, positive word-of-mouth and superior business performance. A company that consistently provides reliable electricity service with minimal interruptions and offers responsive customer

support will likely earn higher satisfaction ratings from its customers. These satisfied clients are more likely to remain loyal to the company.

Service quality should not be the concern of private entities only; it should be a strategic tool for both private and public businesses. State owned entities should also focus on delivering quality service keeping the client in mind. Wisniewski (2001) notes that it is difficult to assess the service quality provided by state-run organizations. One reason is that state-run organizations often operate in monopolistic or oligopolistic environments, where customers have limited or no alternatives. Without competitive pressure, there may be less incentive to prioritize service quality.

State-run organizations may be bound by bureaucratic procedures and regulations which can hinder agility and responsiveness to customer needs. Decision-making processes may be slower, making it challenging to address service quality issues promptly. These organizations may face less accountability compared to private enterprises. Accountability mechanisms, such as customer feedback systems or performance metrics may be less robust or transparent. Also, political considerations can influence the operations of state-run organizations, sometimes prioritizing other objectives over service quality. Decisions may be influenced by political agendas rather than solely focusing on improving customer satisfaction.

State-run organizations may operate with limited resources due to budgetary constraints or bureaucratic allocations. This can impact their ability to invest in infrastructure, technology, and staff training necessary to maintain high service standards. The organizations may prioritize stability and continuity over innovation and improvement. This can result in a reluctance to adopt new

technologies or processes that could enhance service quality. It is possible to assess service quality in state-run organizations albeit challenging. Implementing transparent accountability mechanisms, promoting a customer-centric culture, and ensuring sufficient resources are some of the ways to improve service quality even in state-run entities.

Electricity theft

Electricity theft constitutes non-technical losses in electricity distribution and transmission where consumers of electricity illegally consume electricity generated and transmitted by utilities (Carr & Thomson, 2022). It is a widespread phenomenon and causes utilities to not receive the total price of power sold (Obafemi et al., 2019). There are other non-technical losses such as administrative errors which can lead to revenue leakage and reduced financial performance. Non-compliant electricity companies may be liable to legal losses which emanate from litigation and regulatory non-compliance. Companies can suffer financial penalties and legal fees. There are also collection losses which occur when customers default on payments or when collection efforts are ineffective. One key causative factor is inadequate debt recovery processes.

These losses negatively affect the service quality of the utilities as the utilities become incapable of procuring state of the art machinery to maintain and or improve the services they provide because of insufficient funds (Meeks et al., 2019; Yakubu & Narenda, 2017).

Electricity theft strategies

Several strategies are employed by consumers of electricity. Studies by Tarannu et al. (2017) and Yakubu and Narenda (2017) have highlighted the following strategies used by consumers to steal electricity;

- Understating of electricity consumed at the time of meter reading by employees of electricity utilities leading to billing irregularities
- Adjusting meters to reduce their functionality well so that consumption is under reported leading to lower bills.
- Fixing magnets on the sides of the electricity meter to reduce the recorded readings of the meter.
- Inserting needles drilled into the meter in order to stop or slow it down.
- Opening the electricity meter to disconnect some cables which affect actual readings of the electricity consumed.
- Insertion of sugar cane to the spinning aluminium dial which attracts ants into the meter thereby slowing it down.
- By-passing the meter using jumper wires to alter the consumption readings.
- Turning the meter upside down to stop it from working.
- The database is edited on the computer servers in order to understate consumers' consumption.
- Use of remote to slow down speed of the electricity meter.
- Utilising a phase-to-phase connection.
- Using alternative neutral lines in the electricity connection.

According to Meeks et al. (2019) and Winther (2012), the aforementioned electricity theft strategies can be grouped into three broad

categories. They are (1) meter by-passing; (2) meter tampering; and (3) billing irregularities. Yakubu and Narenda (2017) further indicated that the theft of electricity is engineered by three groups of stakeholders in the electricity market. They are: electricity consumers, company employees and licensed sales entities.

Capacity and challenges

Ghana has more than doubled its installed generation capacity in the last ten years. A 3,795 MW capacity was reached in 2016 compared to 1,730 MW in 2006. The highest national demand during the same period was only up to 50% from 1,393 MW. Notwithstanding the higher generation over demand, an estimated daily average production loss of $2.1 million has become a sigingifacnt supply side challenge which has threatened smooth operations. Almost all developing economies have similar or worse electricity supply situation.

There are several negative factors that affect the provision of power. In Ghana, hydro and thermal sources are used extensively in power production. In recent times, there have been calls for the power sector to embrace a system of power mixes. The Akosombo Dam, whose water level regularly falls below practical operating levels, has been a major source of Ghana's electricity. Gas-powered plants have been added to the pool as a mitigation measure. Again, the thermal source of electricity also have their challenge – inadequate supply of natural gas affects production.

Another challenge as noted by Kumi (2017) is the failure to recover the cost of electricity produced mainly as a result of obsolete distribution equipment, poor tariffs, non-payment by consumers and power theft.

Transmission losses are a major challenge in emerging economies. Due to the bad nature of the electricity infrastructure, detecting and controlling the losses is extremely difficult. Most meters in Ghana are post-paid. Customers consume the power and are billed on monthly basis. Aside non-payment associated with the post-paid meters which results in disconnections, there is the real threat of electricity theft.

Prepaid meters have the potential to reduce electricity theft. The meters require users: businesses, hosueholds and governemnt institutions to pay for electricity via an electronic card before consumption. This eliminates the possibility of accumulating unpaid bills helping to significantly reduce financial burden on providers. The meters can be monitored remotely and in real-time, enabling providers to detect and prevent tampering or unauthorized usage. This also reduces energy loss due to theft or technical issues. When prepaid meters are installed, consumers become more aware of their energy usage and this encourages responsible consumption and energy efficiency. Providers are able to reduce operational costs since the need for manual meter reading and associated disadvantages such as bribery of field officers are eliminated. These meters have more advanced security features than post-paid meters such that they can be designed with anti-tampering features, making it harder for individuals to manipulate or bypass the meter. It gives providers and policy makers the benefit of adequate data for analysis. These meters provide insights into energy usage patterns thereby helping service providers to optimize grid management and planning. ECG in the past decade has embarked upon prepaid meter installations in parts of the country but electricity theft persists.

Several energy sector reforms have taken place in various countries across the world and this is partly due to the considerable losses recorded in electricity transmission and distribution. Sector reforms began some four decades ago led by Chile in 1982 (Jamasb et al., 2014). The UK reformed its electricity sector in 1989. Several other countries have reformed their electricity industry afterwards. Mostly, the reforms include economic models that aim to break monopoly and producer dominance in the market, bring in more investment and improve financial and operational efficiency.

As far as reforms are concerned in Ghana, the elephant in the room, perhaps, is government's indebtedness to independent power producers. As at year end 2022, the indebtedness stood at $1.6bn (Marc, 2024). In spite of the institution of various programmes such as the ESLA and CWM, the revenue issues and gargantuan arrears persist. The debt crisis has not been resolved by the Energy Sector Levy Act (ESLA), a special purpose corporation established as a public limited liability business to issue long-term bonds to settle energy industry obligations owed to banks and trade creditors. Similalry, the Cash Waterfall Mechanism (CWM) which was designd to ensure quick and automated payment to energy providers has also not been effective. In the arrangement, ECG would collect revenue from consumers.The collected revenue would be distributed proportionally to various beneficiaries along the electricity value chain, including independent power producers (IPPs), based on a predetermined formula. CWM is designed to bring transparency and accountability to the revenue collection and distribution process, reducing the risk of mismanagement and corruption. It is subject to regular auditing to ensure its effectiveness.

Ownership and control in the industry

The energy industry in Ghana is essentially a monopoly under state control with a few Independent Power Producers. The Volta River Authority (VRA), a state-owned power producer operates three facilities: two hydro electric facility at Kpong and Akosombo as well as the Aboadze thermal plant. The Ghana Grid Corporation owns and manages the transmission network (GRIDCo). The Electricity Company of Ghana (ECG) distributes power from the producer plants to households and buseinesses in the south of the country while the Northern Electricity Department (NED) supplies to the north.

Sector reform in Ghana

The first of the sector's important improvements, according to Kapika and Eberhard (2013), happened in 1987. A number of reasons necessitated the reforms. Service levels were considered substandard. The company struggled to support its operations financially. There was unrest at the company's labour front. In the end, four catchment areas (regions) were reassigned to VRA (Malgas, 2008). Over time, the reassignment of the four regions led to the creation of a new unit under VRA for the northern part of the country (Kapika & Eberhard, 2013). For some time, the World Bank assisted the government with loans to manage the power sector. Through policy recommendation and later on as loan conditionality by the World Bank, significant reforms were intiated in the power sector in 1995 (Edjekumhene, Amaka-Otchere & Amissah-Arthur, 2006).

Early in the 1990s, the World Bank warned that without sector-specific policy changes, it would no longer be able to finance projects within the power sectors of the the developing world. At the time, Ghana was trying to get a loan

to develop the Aboadze thermal plant. In response to the World Bank policy paper on the conditions,the Government released new electricity sector reform strategies (ISSER, 2005).

The final report submitted in 1997 by a committee set up by the government in 1994 known as the Power Sector Reform Committee (PSRC) presented a number of recommendations which the government was convinced were the most pragmatic antedotes to the challenges in the sector then. To improve transmission and distribution services, the committee recommended the creation of open access for the inclusion of third-party energy companies. This they hoped, would also create competition. They further recommended the establishment of guidelines on setting tariffs transparently and considering other financing modules to augment the capacity of existing utility companies (Edjekumhene, Amaka-Otchere, & Amissah-Arthur 2006). The proposed financing modules included private partnerships. There has since been diversification but mostly on the production front, one of the most recent being the Karpowership Ghana Company Limited which has a 470MW floating powership.

Impact of electricity on Ghanaian businesses and homes

Electricity has become a major determinant of socio-economic development for any country on the globe. Access to electricity is considered a public need and as a right of the citizen (Brew-Hammond & Kemausuor, 2009). This is because it is necessary for basic daily life activities such as lighting, cooking, heating, powering of plants, etc. Electricity is also needed for transportation, education, mineral exploration, communication etc. thereby supporting all sectors of the economy. A steady supply of electrical power is

necessary for daily household tasks, work, play, healthcare, and the economy as a whole. During an electricity crisis, businesses may experience interruptions leading to reduced output. Industries struggle to operate at full capacity leading to decreased production levels. This reduction in production can hinder the overall growth of the economy.

Data centers and cloud computing services require constant electricty to ensure uninterrupted access to data. Banks and financial institutions rely on cloud computer networks for internet banking transactions. Telecommunication providers need constant electricity to provide uninterrupted service. IT and software companies, online retailers and e-commerce platforms, hotels and hospitality services are also afffected by power outages. Hospitals and healthcare facilities require electricity to power anaesthetic machines, theatre operating lamps and oxygen concentrators among several other equipment to save lives. In Ghana, there are large and small cold stores that preserve and sell frozen foods. These refrigerated storage facilities including warehouses and manufacturing plants are affected by power outages.

Businesses that are severely affected by power outages often employ various strategies such as the use of installed babckup generators, UPS systems and rented generators. Many businesses have backup generators to ensure continuous operation. Some have redundant systems to maintain functionality. In some cases emergency response plans are implemented to minimize downtime and ensure business continuity. Businesses make alternative work arrangements to reduce the effects of loadshedding such as modifying their shift systems. Employees may work remotely or from alternative locations. There is also the option of temporary relocation for some businesses where operations

may be temporarily relocated to areas with power. Where possible, a plant or manufacturing site may scale back operations or close temporarily. There is also emergency power rentals where temporary generators or power solutions are rented. In hospitals, for intances, there is internal load shedding where non-essential non-emergency equipment are shut down to conserve energy. These adjustments help minimize the impact of power outages on business operations and ensure continuity of critical services.

Electricity supply crisis can have monumental economic impact on a nation. Due to power blackouts and load shedding, Ghana lost 1 percent of GDP annually (World Bank Group, 2013). The potential output and expansion of Ghana's economy was hindered in dollar terms between $320 million and $924 million annually (ISSER, 2005). In 2015, electricity crisis in Ghana caused severe shock and panic to households and businesses (Ackah, 2015). The impact of electricity on economies is worlwide. According to Ferguson et al. (2000), both advanced and less-developed nations around the world exhibit a correlation between the use of electricity and the production of wealth. It has been noted that this association is much more pronounced for countries with greater wealth.

There are several possible causes for the higher correlation between electricity use and production in countries with greater wealth. Wealthier countries tend to have more advanced data centers, research facilities and manufacturing and entertainment industries which require a lot of electricity to operate. This leads to a higher correlation between electricity use and production. As the economies of countries expand, the energy required to power businesses, homes, and transportation increase. It can be observed that wealthier countries tend to have more urban populations, which consume more electricity

for lighting, heating, and cooling. Unlike poor rural communities, affluent societies have an energy consumption life-style owing to the use of air conditioning, electric vehicles, and energy-intensive appliances. Wealthier countries tend to adopt new technologies faster, leading to increased electricity use for computing, data storage, and other digital activities. In order to easily transmit and distribute electricity advanced economies invest in electricity infrusture that are robust and adequate to meet the high demand. Wealthier countries may have policies promoting economic growth, industrial development, and urbanization, which can increase electricity demand. Access to credit is an important factor. Wealthier countries often have better access to credit, making it easier for individuals and businesses to invest in energy-consuming technologies and appliances.

Electricity demand in Ghana

Under the National Electrification Scheme, the country targetted the acchievement of electricity access for all by 2020. This anticipated growth in the grid's user base meant that more electricity needed to be produced to meet the rising demand. By 2020, the growth in power demand was projected to range from 20,453 to 34,867 GWh (Adom & Bekoe, 2012). Total generation really stood at 14,069 GWh as at the end of 2017 (Energy Commission, 2018). Ultimately, due to a number of reasons, this goal was not achieved. Between 2007 and 2013, the amount of power consumed by households rose from 1996 GWh to 3, 060 GWh. As a result of supply-side limitations the consumption decreased significantly. Electricity generation had fallen by 11.3% from 12,963 GWh in 2014 to 11, 492 GWh in 2015. Residential energy use increased to 3932 GWh in 2016 compared to 2015 levels as a result of the supply shock recovery

(Adom, 2011; Energy Commission, 2016). In general, 6% to 7% was projected to be the annual increase rate for electricity demand (Energy Commission, 2012).

Due to factors such as urbanization, rising population, more people owning appliances and technological improvement, household power demand has increased (Adom, 2011; Dramani & Tiwari, 2013; Mensah, Marbuah & Amoah, 2016). A gradual rise in thermal generation has mostly been responsible for meeting this growth.While Ghana ranks very high among countries in the sub-region in terms of access to electricity per population, it is worrying that the nation has consistently suffered power supply problems in the past three decades.

Empirical review of service quality and customer satisfaction

In a study of a national electricity company in Philippines to determine customer satisfaction amidst COVID-19, Ong et al. (2023) discovered that tangibility, responsiveness and empathy were highly rated. This was an indication that the customers highly rated the service quality dimensions of tangibility, responsiveness and empathy provided by the electric company. Saini (2018) analysed service quality of utilities in India. Through the low ratings of customers, it was demonstrated that the performance of the utilities was unsatisfactory, hence, the clients were dissatisfied. A similar study of a postal service company in Malaysia by Ali and Amir (2020) demonstrated that empathy, responsiveness, assurance and reliability were lowly rated by the customers of the postal service.

In Chodzaza and Gombachika (2013) client satisfaction was low because the service quality of the state-run electricity company was poor. The

customers reported below average to marginal perceptions of all the service quality dimensions. Arthur et al. (2016) investigated the service quality and satisfaction among customers of the Electricity Company of Ghana in Obuasi. They discovered that the five dimensions of service quality were rated poor.

According to a 2016 report by the International Bank for Reconstruction and Development/The World Bank on the improvement of service quality for electricity distribution companies, the existing service quality regulation is thorough and sufficient for establishing the framework for service quality, which borders on supply continuity, technical quality, and commercial quality. In Nigeria, Usman (2013) developed a scheme to evaluate the satisfaction of customers of electricity distribution companies so that their level of satisfaction could be determined and their satisfaction index computed. The paper found customer dissatisfaction with the product performance of the distribution companies. Specifically, there was customer dissatisfaction with service delivery as the attitude, information, response, feedback and distribution of the companies were poorly rated.

Drosos, Kyriakopoulos, Arabatzis and Tsotsolas (2020) used products, services, customer service, and pricing policy to ascertain the quality of service rendered by electricity providers in Greece to households. They found satisfaction with customers. Another report by the Indian Institute of Management (2015) which focused on service delivery of the Kerala State Electricity Board in India found that the attributes measured were rated high by all the market segments.

Customer satisfaction of US households with regards to gas and electricity services fell in 2018 although the levels remained consideraly high

(American Customer Satisfaction Index, 2019). It was revealed that higher prices, extreme weather conditions and decline in electric power reliability were the factors responsible for this decline. Additionally, Winther (2012) in a comparative study on power theft among electricity customers in rural communities in Tanzania and India revealed that the quality of service offered by the utilities in the countries were poor. This was because there was a lack of transparency in the information relating to customer billing, low confidence in the meters, deterioration of battery banks, delay in the replacement of the battery banks among others.

Using items such as billing and payment, price, corporate social responsibility, communications, customer service data on power quality and reliability, Power (2019) calculated how satisfied electric utility customers in the USA were with their service. It came out that overall, the customers were satisfied with the electricity utilities and that the satisfaction had increased from previous years. Banza (2019) on the other hand noted in a study that majority of the households in municipalities in Democratic Republic of Congo rated that quality of electrical service between average and very poor.

Empirical review of power theft

Solo and Tongpangkumla (2013) evaluated an intervention to manage electricity in rural areas in India. According to the researchers, the communitisation intervention (decentralising electricity management using community empowerment) resulted in a reduction in power theft in the villages. Thus, power theft during the pre-intervention period was high whereas it reduced during the post-intervention period in the villages. In Pakistan, it was

established that all nine electricity distribution companies studied in Jamil and Ahmad (2014) suffered electricity theft of various forms.

Report by Japan International Cooperation Agency (2017) on the power transmission and distribution system in Addis Ababa revealed that distribution loss which comprised technical and non-technical losses were considered to be high especially when compared with the internationally acceptable level of distribution loss. Onat (2018) discovered in Turkey that there was huge amount of illegal electricity energy in use. In a similar vein, the study of Banza (2019) observed a very high rate of electricity theft through illegal connection among households in unplanned neighbourhoods in Democratic Republic of Congo. The lowest rate of these illegal connection in some neighbourhoods was 80% with some entire neighbourhoods found to be illegally using electricity.

In a study by Winther (2012) on power theft, it was reported that electricity customers of some rural communities in Tanzania and India engaged in illegal electricity practices. Such practices included using more electricity than their respective utility companies were aware of (e.g. in Tanzania, some domestic customers used their electricity supply for commercial purposes while in India, some customer used more electricity points than they were charged). With a two-digit percentage of electricity theft reported, Obafemi et al. (2021) concluded in their study that power theft was prevalent among households in Lagos, Nigeria. It was reported that 14% of household electricity consumers had either been involved in electricity theft or knew a household involved in electricity theft.

Yakubu and Narendra (2017) stated in their study of power theft in Ghana that over 2900 electricity theft cases involved consumers, workers and

licensed sales representatitves. The study included several power theft strategies like the use of large-sized magnets; directly bypassing metres; and using jump wires to bypass metres. Similarly, Gupta et al. (2022) discovered in their study that power theft using strategies such hooking on the direct line was rampant and kept growing in India.

Power theft in Ghana is a constant phenomenon. Reports from the Electricity Company of Ghana attest to this. Regarding illegal connections, ECG announced its intetion to reward informants who report illegal connections an amount equal to 6% of offender surcharge fees (www.ghanaweb.com, 2023). The company reported that inefficiencies, power-theft were still hampering energy debt recovery (www.ghanaweb.com, 2022). As a power theft management strategy, the company announced amnesty for customers with meter issues (www.myjoyonline.com, 2022). They cautioned the public against power theft (www.myjoyonline.com, 2022) and replaced 400 fake meters at Adeiso (www.ghanaweb.com, 2021).

In exploring the feasibility of whistleblowing of electricity theft in Ghana, Adongo, Taale, Bukari, Suleman and Amadu (2021) established that not many people are willing to report electricity theft for many reasons including the lack of anonymity in reporting, empathy for perpetrators and lack of awareness of the civic duty of reporting the crime. While the researchers admitted the need for a change in attitudes towards reporting electricity theft, they recommended a review of the Whistleblower Act 2006 (Act 720) to provide clearer and broader protection for whistleblowers such that the use of pseudonyms and complete non-disclosure of whistle-blower identity should be allowed.

Empirical review of service quality, customer satisfaction and power theft

Yakubu and Narendra (2017) discovered that customers considered electricity tariffs exorbitant and they dwelled on this excuse and general poor service quality including fluctuating voltage to perpetrate theft against the utility service provider. Spanish residential energy customers' perceived switching costs, loyalty, customer happiness, and service quality were all examined by Ibáñez et al. (2006). They discovered that both satisfaction and loyalty were significantly dependent on the quality of service by the utility providers. It was established in the study that that when service quality is high, energy customers get satisfied and remained loyal which implies that they would not engage in activities such as energy theft.

In the study of Chodzaza and Gombachika (2013), they revealed that electricity service providers had poorly rated customer loyalty. This was attributable to the poor service quality the organisation rendered. Their study established also a positive relationship between service quality and customer loyalty. Arthur et al. (2016) established that service quality which was measured along the dimensions of tangibles, reliability, empathy, responsiveness and assurance had a negative impact on customer satisfaction and so they called for an improvement in service quality. This call was necessary because with the poor-quality service, customers would not realize the value of their payment for the service. Should the poor-quality service persist, the customers could resort to illegal electricity connection. In investigating the drivers of electricity theft in Ghana and drawing on evidence from the Ashanti Region, Yakubu et al. (2018) concluded that poor quality of service was a motivating factor for electricity theft.

Conceptual Framework

This conceptual framework of service quality and power theft (Figure 3) demonstrates how customer staisfaction, which is a product of service quality, relates to power theft. In Figure 3, Customer satisfaction is based on the five SERQUAL dimensions of service quality which could be rated high or low and are in turn interpreted as customer satisfaction or dissatsifaction, respectively. Figure 3 indicates that high customer satisfaction leads to low electricity theft. Conversely, low customer statisfaction leads to high electricity theft.

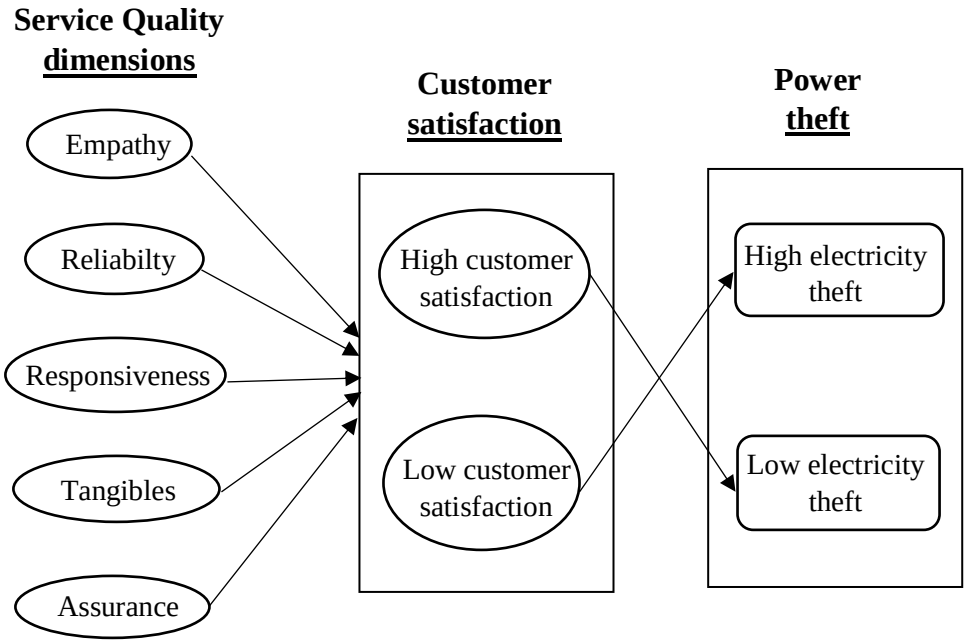

Figure 3: Conceptual framework of service quality and power theft

Source: Researcher's construct

Gap Analysis

The literature review has revealed a number of theoretical, methodological, industry-specific and practical gaps.

The theoretical discourse shows that available frameworks for measuring customer satisfaction are context-dependent. There is no universally applicable model without adaptation. Although this a limitation, it is understandable that having a one-size-fits-all is difficult. Another theoretical issue is the complex nature of customer satisfaction and service quality which require more research on their interplay, particularly in the energy sector.

In terms of methodology, the widely used SERVQUAL model has received criticisms including concerns about its reliability, validity, and the assumption that customers have clear expectations about service quality – which is not always the case. Also, most studies using this model are cross-sectional. This limits their ability to capture service quality dynamics over time.

Two industry-specific gaps have been noted. Firstly, there is the need for more research on customer satisfaction in the energy sector, particularly in Ghana and other developing countries, due to the significant electricity supply challenges. Secondly, technology alone is insufficient to combat electricity theft due to the complexity of the phenomenon. There are economic, cultural and psychosocial aspects to the problem that need to be addressed.

The literature shows the unique characteristics of the energy industry which requires a tailored framework to measure customer satisfaction. Additionally, there are practical implementation challenges such as collusion and lack of law enforcement. Like the United States and Europe, Ghana has its Customer Service Index (GCSI) which periodically gauges customer satisfaction levels across industries including utilities. There is the need for more public sensitization on the GCSI for more discource and patronage.

From the above analysis, there are three future research directions:

1. Adaptation of the SERVQUAL model: The SERVQUAL model could be adapted, for example, as energyqual or electriqual, for the energy sector whereby emerging trends and technologies would be incorporated to address the complexities of electricity theft.
2. Longitudinal studies: Future research should employ longitudinal designs to capture the dynamics of customer satisfaction and service quality over time.
3. Context-specific frameworks: Researchers should develop context-specific frameworks for measuring customer satisfaction in the energy sector, taking into account the unique characteristics of the energy sector.

Contribution to knowledge

The literature review has shown the significant relationship between customer satisfaction, service quality and electricity theft. It has highlighted the unique characteristics of the energy industry based upon which it has suggested the need for tailored frameworks for measurement of customer satisfaction and service quality in the industry.

The review underscores the need to pay attention to contextual factors such as culture, economics and social psychology in addressing the menace of electricity theft. Finally, the review brings to the fore the universal acceptability and limitations of the servqual model and emphasizes the need for its adaptation in different research endeavours.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter describes the research methods adopted in the study and the justification for their utilization. The components of this chapter are the research approach, study design, population, sample and sampling techniques and research instrument. The other components are the data collection procedure, data analysis and ethical considerations.

Research Design

The research design employed in this study was the descriptive research design. This research design discovers answers to questions of who, what, when, and sometimes how (Cooper & Schindler, 2006). According to Fraenkel and Wallen (1993), the descriptive research design yields a sizable number of replies from many individuals at once, offers a comprehensive understanding of the events, and attempts to explain people's views and behaviors based on information gathered at a certain point. Babbie (1999) adds that this research design is utilized when it is necessary to generalize from a sample to a population.

Descriptive research was favored due to its efficient and quick data collection process as suggested by (Creswell, 2012). A merit of this design is that it neutralises the investigator or eliminates, as much as possible, their influence on the data collection and analyses processes to the extent that they it results in them being removed and depersonalised in the study (Collins, 1975). Included in the disadvantages of this design, however, is the propensity of biases being introduced by the respondents of the study (Bhattacherjee, 2012).

This study also used the quantitative research approach. The approach was deemed appropriate since it allows for quantification of large data obtained for a study. It deals with numeric data and enables the generalisation of research findings. Also, a quantitative research strategy, in accordance with Hair, Bush, and Ortinau (2003), aids in the generation of significant insights into the linkages between behavioral patterns and market determinants as well as the verification or validation of pre-existing correlations.

Study Area

Ghana has sixteen administrative regions carved through a referendum in December 2018 from a previous ten regions. The administrative regions and their capitals and population figures as at 2021 are as presented in Table 2.

Table 2: Regional population figures as at 2021

Region	Capital	Population
Ahafo	Goaso	564,668
Ashanti	Kumasi	5,440,463
Bono	Sunyani	1,208,649
Bono East	Techiman	1,203,400
Central	Cape Coast	2,859,821
Eastern	Koforidua	2,925,653
Greater Accra	Accra	5,455,692
North East	Nalerigu	658,946
Northern	Tamale	2,310,939
Oti	Dambai	747,248
Savannah	Damongo	653,266
Upper East	Bolgatanga	1301,226
Upper West	Wa	901,502
Volta	Ho	1,659,040
Western	Sekondi-Takoradi	2,060,585
Western North	Sefwi Wiawso	880,921

Source: Ghana Statistical Services (2023).

Population

The population used in this study was electricity customers in the electricity market of Ghana. According to Sasu (2022), the electricity customer population in Ghana as of 2021 was 5,426,242. Electricity cosumers in Ghana are distributed among males and females and both adults and children. However, in terms of purchase responsibility, electricity customers are distributed among adult males and females who utilitize elelctricity either at home or workplace or both.

Sampling Procedure

Based on the sample size determination method by Krejcie and Morgan (1970), 545 electricity customers were used as the sample for the study. To select the sample, a convenience sampling technique, which involves the selection of respondents for a study because of the ease of their availability (Saunders et al., 2012), was used. More importantly, the convenience sampling technique was used because of the absence of a sampling frame.

According to Saunders and colleagues, even though this sampling technique is criticised as being less credible, it can be used when the convenient samples have the characteristics to meet the objectives of the study. This is corroborated by Donyei (2007) that it aids researchers in meeting practical criteria including easy accessibility and availability of respondents. In the context of this study, the respondents that were conveniently sampled fulfilled these criteria as they were customers in the electricity market of Ghana and so could provide credible responses bordering on the quality of service and power theft which was the purpose of the study. Thus, the use of the convenience sampling technique is deemed to be appropriate in this study.

Data Collection Instrument

The instrument used to collect data for this study was an online questionnaire. The instrument started with an introductory statement. The introductory statement specified the purpose of the study as solely for academic purposes. Respondents were encouraged to give frank responses by assuring them of confidentiality and anonymity of their responses. Participation was voluntary. The questionnaire had three sections; A, B and C. Section A comprised demographic characteristics of the respondents. These characteristics included sex, age, monthly income, type of electricity consumer and the region they were located.

Section B consisted of the five service quality dimensions which were 20 in total. The dimensions were measured using a five-point Likert scale. The scale had one as its lowest point and five as its highest point. The breakdown of the dimensions are as follows; reliability – four indicators, responsiveness – four indicators, empathy – three indicators, tangibles – four, and assurance – five indicators. In Section C, the reasons for power theft consisted of 10 items and were also measured on a five-point likert scale with one being the lowest point and five, the highest.

Data Collection Procedures

The data was collected using an online survey. The online survey tool, Google Forms was used to design and distribute the questionnaire to the targeted respondents. Electricity consumers who were accessible to the researcher were contacted mostly by WhatsApp to submit responses. The data collection spanned a period of eight weeks; from 11th June, 2022 to 31st July, 2022.

Data Processing and Analyses

Data that was obtained from the electricity consumers was prepared and processed using SPSS 21 and SmartPLS 3 statistical software. Processing of the background characteristics of the respondents was done using the SPSS. Its analysis was done in frequencies and percentages. Data processing to obtain answers to the research questions set in the study was done with SmartPLS 3. Research questions one and two were analysed using mean, standard deviation, excess kurtosis and skewness. Research question three was answered using a partial least square structural equation model.

Obtaining an answer to research question three followed a-three step order. That is; specifying the model in the SmartPLS; assessing the outer model; and lastly, assessing the inner model. The outer model assessment consisted of assessing the indicator reliability (indicator loadings) construct reliability (Cronbach's alpha, rho_A and composite reliability), convergent validity (average variance extracted-AVE) and discriminant validity (Fornell-Larcker). In the inner model assessment, collinearity (variance inflation factors-VIF); coefficient of determination (R^2); predictive accuracy (Q^2); effect size (f^2); predictive power (PLS_predict); and significance of the relationship between service quality and power theft were carried out (Benitez et al., 2020; Hair et al., 2014, 2017, 2019; Henseler et al., 2015; Shmueli et al., 2019).

Data Source

The study sourced primary data through the administration of a three-part online questionnaire; mostly WhatsApp.

Ethical Considerations

Ethical consideration permeates every aspect of research up to preparation of the final report. Conducting research involves not only expertise and diligence but honesty and integrity (Burns & Grove, 2001; Polit & Hungler, 1999). Ethical considerations are vital to every study especially those involving human participants because of the influence on the researcher's ability to acquire and retain participants (Polit & Hungler ,1999).

The study was carried out taking into account the ethical principles of negotiating access, objectivity, confidentiality, willingness of participation and avoidance of harm. Prior to the administration of the questionnaire, the researcher informed prospective respondents of the purpose of the study and sought their permission to respond to the online questionnaire. This enabled the researcher to acquire permission for the needed access. The questionnaire was thus distributed based on voluntary participation. The promise of anonymity and confidentiality of respondents was adhered to (Saunders et al., 2012).

Chapter Summary

This chapter described the research methods used in the phenomenon under investigation. The research approach; research design; population, sample and sampling technique; data collection instrument; data collection procedures; data processing and analyses; and ethical considerations were highlighted in this section.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The broad objective of this study was to evaluate customer satisfaction and power theft in the electricity market of Ghana using the SERVQUAL approach and Partial Least Squares Structural Equation Modelling. In this chapter, the results of this research are reported and discussion of the results made. The results of the demographics of the respondents are first presented. This is followed by results of research questions one and two. The results of the Partial Least Squares Structural Equation Modelling analyses follow. This comprises the results of assessments of the outer and inner models which includes an answer to research question three.

Respondents' Socioeconomic Characteristics

Table 3 below displays the following socioeconomic characteristics of respondents of the study: sex distribution, monthly incomes, age groups, types of electricity consumers and regional distribution.

It can be observed from the table that the female respondents, 221(40.6%), were less than the male respondents who numbered 324(59.4%).

In terms of income, respondents who had a monthly income of < GH¢ 700 were 150(27.5%). Those with a monthly income of between GH¢ 700-1,500 were 124(22.8%). Also, 231(42.4%) of the respondents received a monthly income of between GH¢ 1,501 -3,500 while 40(7.3%) had an income of > GH¢ 3,500. Thus, majority of the respondents had an income of

GH¢ 1,501-3,500. This was followed by GH¢ 700-1,500; < GH¢ 700; and > GH¢ 3,500 respectively.

Table 3: Socioeconomic Distribution of Respondents

Sex	**Frequency**	**Percent**
Female	221	40.6
Male	324	59.4
Monthly Income	**Frequency**	**Percent**
< GH¢ 700	150	27.5
GH¢ 700-1,500	124	22.8
GH¢ 1,501-3,500	231	42.4
> GH¢ 3,500	40	7.3
Age group	**Frequency**	**Percent**
< 18 years	4	0.7
18-28 years	220	40.4
29-39 years	269	49.4
40-50 years	45	8.3
> 50 years	7	1.3
Type of Electricity Consumers	**Frequency**	**Percent**
Residential & Government	120	22.0
Residential & Private	56	10.3
Residential	349	64.0
Other	20	3.7
Region	**Frequency**	**Percent**
Western North	15	2.7
Western	211	35.9
Greater Accra	106	19.4
Central	66	12.1
Ashanti	61	11.2
Eastern	29	5.3
Volta	15	2.8
Upper East	15	2.8
Northern	10	1.8
Bono	10	1.8
Oti	9	1.7
Bono East	6	1.1
Ahafo	4	0.7
North East	3	0.6

Source: Field data (2022)

For age groups, respondents under 18 years were four. This represented 0.7% of the respondents. Respondents in the age bracket of 18-28 years were 220 which represented 40.4%. Two hundred and sixty-nine (269) representing 49.4% of the respondents belonged to the age bracket, 29-39 years. Respondents between 40-50 years and > 50 years numbered 45(8.3) and seven (1.3%) respectively. The table shows that the age group with the most populous respondents were 29-39 years. The second most populous age group was 18-28 years. The age groups 40-50 years; > 50 years; and < 18 years followed in a descending order.

There were four types of consumers: (1) residential only (2) residential and government (3) residential and private business (4) other. It is observed that residential and government; residential and private; residential only; and other electricity consumers are 120(22.0%); 56(10.3%); 349(64.0%); and 20(3.7%) respectively of the respondents. In this regard, Table 3 shows that the majority of the respondents are “residential only” electricity consumers. Residential and government electricity consumers come second. Residential and private electricity consumers follow next and least number of respondents were “other” electricity consumers.

Table 3 ends with the regional distribution of the respondents. It is evident from the table that the top five regions in which the respondents were based are Western (211; 35.9%); Greater Accra (106; 19.4%); Central (66; 12.1%); Ashanti (61; 11.2%); and Eastern (29; 5.3%). The regions with the lowest number of respondents are Oti, Bono East, Ahafo and North East. They respectively obtained a frequency of 9(1.7%); 6(1.1%); 4(0.7%); and 3(0.6%).

Research Question 1

What is the level of customer satisfaction in the electricity market of Ghana?

To answer research question one on the satisfaction of customers in the electricity market of Ghana, their views on the service quality within the electricity market were sought. The views on the service quality in the electricity market which has been presented in Table 9 denoted customer satisfaction. The table is a presentation of the service quality using the dimensions of reliability, responsiveness, empathy, tangibles and assurance. The responses were analysed using mean, standard deviation, excess kurtosis and skewness. The interpretation of the mean values is subject to the assertion of Awang et al. (2010) that on a scale of 1 to 5, mean values up to 2.32 show low agreement; values from 2.33 to 3.66 show moderate agreement; and values from 3.67 to 5 show high agreement.

From Table 9, it is realised that with a mean of 2.545, the respondents moderately agreed with REL1 (The company handles customer complaints effectively and with sincere interest). Also, the respondents had a moderate agreement (3.062) with REL2 (The company keeps accurate client records (bills, residential and business info). In addition, there was a moderate agreement due to the mean of 2.442 with the statement contained in REL3. Similarly, REL4 (The Company addresses clients' requests promptly) was moderately agreed with considering its mean of 2.356. Considering the mean of 2.601, the respondents moderately agreed with the reliability of the providers of electricity in Ghana.

Furthermore, RES1; RES2; RES3; and RES4 which contained the responsiveness statements "Employees of the company are always willing to

assist customers"; "The company actively looks out for customer needs"; "The company distributes monthly bills without delays"; and "The company makes information easily obtainable by customers" were all moderately agreed with as their mean values ranged between 2.407 and 3.055. Overall, the respondents were in moderate agreement (2.762) that the electricity providers are responsive.

Again, it can be observed from Table 7 that EMP1 (2.591); EMP2 (3.389); and EMP3 (3.035) which contained the statements, "The company gives the necessary individual attention to clients"; "Their operating hours are convenient for customers"; and "The company appreciates how important electricity is in the lives of their customers" were moderately agreed with. This is reflected in the overall mean of 3.005 when it comes to the empathy of the utilities.

Concerning the tangibles of the utilities in Ghana, the respondents again were in moderate agreement (3.529). Particularly, "The physical environments of the company offices are clean" (TAN1) had a mean of 3.728 showing a high agreement. "The employees are neat and always professionally dressed" (TAN2) also had a mean of 3.626. This indicates a moderate agreement with the statement. The statement, "The Company has modern equipment, including meters" (TAN3) yielded a mean of 3.413 which implies a moderate agreement. With a mean of 3.347, the last statement, "The electricity bills and meters are easy to read" (TAN4) was also moderately agreed with.

Table 4: Electricity Customer Satisfaction Based on Service Quality

	Service Quality	Mean	Std. Deviation	Excess Kurtosis	Skewness
	Reliability				
REL1	The company handles customer complaints effectively and with sincere interest	2.545	1.142	-0.583	0.304
REL2	The company keeps accurate client records (bills, residential and business info)	3.062	1.207	-0.822	-0.089
REL3	When the company promises to repair a fault at a certain time, it does it.	2.442	1.224	-0.808	0.39
REL4	The company addresses clients' requests promptly	2.356	1.171	-0.548	0.525
Mean		***2.601***	***1.186***	***-0.690***	***0.283***
	Responsiveness				
RES1	Employees of the company are always willing to assist customers	2.84	1.194	-0.797	0.103
RES2	The company actively looks out for customer needs	2.407	1.157	-0.523	0.494
RES3	The company distributes monthly bills without delays	3.055	1.46	-1.381	-0.021
RES4	The company makes information easily obtainable by customers	2.747	1.174	-0.692	0.195
Mean		***2.762***	***1.246***	***-0.848***	***0.193***
	Empathy				
EMP1	The company gives the necessary individual attention to clients	2.591	1.151	-0.619	0.302
EMP2	Their operating hours are convenient for customers	3.389	1.231	-0.684	-0.477

Table 4 contiuned

EMP3	The company appreciates how important electricity is in the lives of their customers	3.035	1.28	-0.966	-0.039
Mean		***3.005***	***1.221***	***-0.756***	***-0.071***
	Tangibles				
TAN1	The physical environments of the company offices are clean	3.728	1.072	-0.06	-0.69
TAN2	The employees are neat and always professionally dressed	3.626	1.078	-0.255	-0.516
TAN3	The company has modern equipment, including meters	3.413	1.132	-0.486	-0.404
TAN4	The electricity bills and meters are easy to read	3.347	1.25	-0.745	-0.424
Mean		***3.529***	***1.133***	***-0.387***	***-0.509***
	Assurance				
ASU1	The employees are courteous	3.062	1.104	-0.522	-0.157
ASU2	The employees, mainly engineers on the field, do not extort money from customers	2.675	1.374	-1.155	0.263
ASU3	The employees are competent; once they show up, they are able to fix faults	3.589	1.115	-0.336	-0.571
ASU4	There is proper communication before scheduled power cuts	2.292	1.277	-0.715	0.613
ASU5	Any disconnection done is fair and reasonable	2.861	1.307	-1.045	0.047
Mean		***2.896***	***1.235***	***-0.755***	***0.039***
	Service Quality	**2.959**	**1.204**	**-0.687**	**-0.013**

Source: Field data (2022)

Lastly, with a mean value of 2.896, the respondents moderately agreed with the assurance of the utilities. Individually, the statements "The employees are courteous" (ASU1); "The employees, mainly engineers on the field, do not extort money from customers" (ASU2); "The employees are competent; once they show up, they are able to fix faults" (ASU3); "There is proper communication before scheduled power cuts" (ASU4); and "Any disconnection done is fair and reasonable" (ASU5) were moderately agreed with since they were within the range, 2.292 – 3.589. Most importantly, with a mean of 2.959, the respondents agreed that the quality of service provided by the utilities is moderate.

Research Question 2

What are the reasons for power theft in the electricity market of Ghana?

Research question two sought to provide an answer to what could be the reasons of power theft in the electricity market of Ghana. The results to this research question are contained in Table 10. Observation from the table brings to light that the respondents highly agreed (3.850) to the possible reasons for power theft in the electricity market of Ghana. This followed the respondents' high agreement with POT1 (Customers' inability to pay for the electricity); POT2 (Customers' suspicion of inaccurate billing); POT3 (Connivance of the employees of the electricity company); POT4 (Dissatisfaction with the services of the electricity company); and POT5 (Lack of education of customers on the impact of electricity theft). The least mean value of these statements is 3.62.

Table 5: Reasons for power theft by electricity customers

	Power Theft	**Mean**	**Std. Deviation**	**Excess Kurtosis**	**Skewness**
POT1	Customers' inability to pay for the electricity	4.029	1.042	0.004	-0.84
POT2	Customers' suspicion of inaccurate billing	3.928	1.03	0.099	-0.786
POT3	Connivance of the employees of the electricity company	3.62	1.053	-0.075	-0.518
POT4	Dissatisfaction with the services of the electricity company	3.859	1.084	-0.092	-0.714
POT5	Lack of education of customers on the impact of electricity theft	3.894	1.119	0.031	-0.846
POT6	Lack of prosecutions and severe penalties	3.886	1.061	-0.196	-0.697
POT7	Electricity theft is simply an accepted social norm	3.985	1.087	0.176	-0.899
POT8	It is easy to get the illegal connection done even without the help of the workers of the electricity company	4.084	1.096	0.343	-1.058
POT9	Poor governance of the country	3.343	1.22	-0.691	-0.32
POT10	Poor provider-customer relations	3.87	1.105	0.006	-0.804
	Mean	**3.850**	**1.090**	**-0.040**	**-0.748**

Source: Field data (2022)

Additionally, with a minimum mean value of 3.343, there was a high agreement with power theft factors "Lack of prosecutions and severe penalties" (POT6); "Electricity theft is simply an accepted social norm" (POT7); "It is easy to get the illegal connection done even without the help of the workers of the electricity company" (POT8); "Poor governance of the country" (POT9); and "Poor provider-customer relations" (POT10).

PLS SEM Results

Results of outer model assessment

The outer model assessment involved reliability and validity assessments. Reliability of the outer model is in two folds; indicator reliability (indicator loadings) and construct reliability (Cronbach's alpha, rho_A and composite reliability) which can be pictured from Table 11. According to the table, the indicators were reliable and can be confirmed from Figure 4. This is because even though Hair et al. (2019) recommends 0.708 as the threshold for indicator reliability there is a condition that indicator loadings as low as 0.4 are acceptable as long as their presence do not affect the construct reliability and validity of the model (Benitez et al., 2020). In this study, the loadings of the following indicators were expunged from the model because they were below 0.708 and their presence affected the reliability and validity of the outer model: ASU3, REL2, RES3, POT1, POT5, POT6, POT7, POT8 and POT9.

Table 6: Indicator Reliability, Construct Reliability and Convergent Validity

	Indicator Loadings	**Cronbach's Alpha**	**rho_A**	**Composite Reliability**	**AVE**
ASU1	0.778	0.729	0.736	0.830	0.550
ASU2	0.728				
ASU4	0.719				
ASU5	0.739				
EMP1	0.834	0.736	0.752	0.850	0.654
EMP2	0.743				
EMP3	0.845				
POT2	0.721	0.718	0.741	0.823	0.540
POT3	0.614				
POT4	0.814				
POT10	0.774				
REL1	0.817	0.801	0.802	0.883	0.716
REL3	0.843				
REL4	0.877				
RES1	0.864	0.777	0.785	0.871	0.694
RES2	0.874				
RES4	0.757				
TAN1	0.738	0.761	0.765	0.848	0.582
TAN2	0.803				
TAN3	0.776				
TAN4	0.732				

Source: Field data (2022)

The Cronbach's alpha, rho_A and composite reliability displayed in Table 11 are indicative of the reliability of the constructs in the outer model. The conservative Cronbach's alpha values are above 0.7 just like the liberal composite reliability values. The rho_A, which is thought to be a good compromise between the two aforementioned extreme measures of reliability and so an approximately exact measure of construct reliability is also above 0.7.

Therefore, construct reliability was also achieved (Hair et al., 2019; Wong, 2019). Furthermore, there is no AVE value from the table that is below 0.5. This shows that each of the constructs converge to explain the variance of their indicators. Thus, convergent validity was met (Hair et al., 2014, 2019).

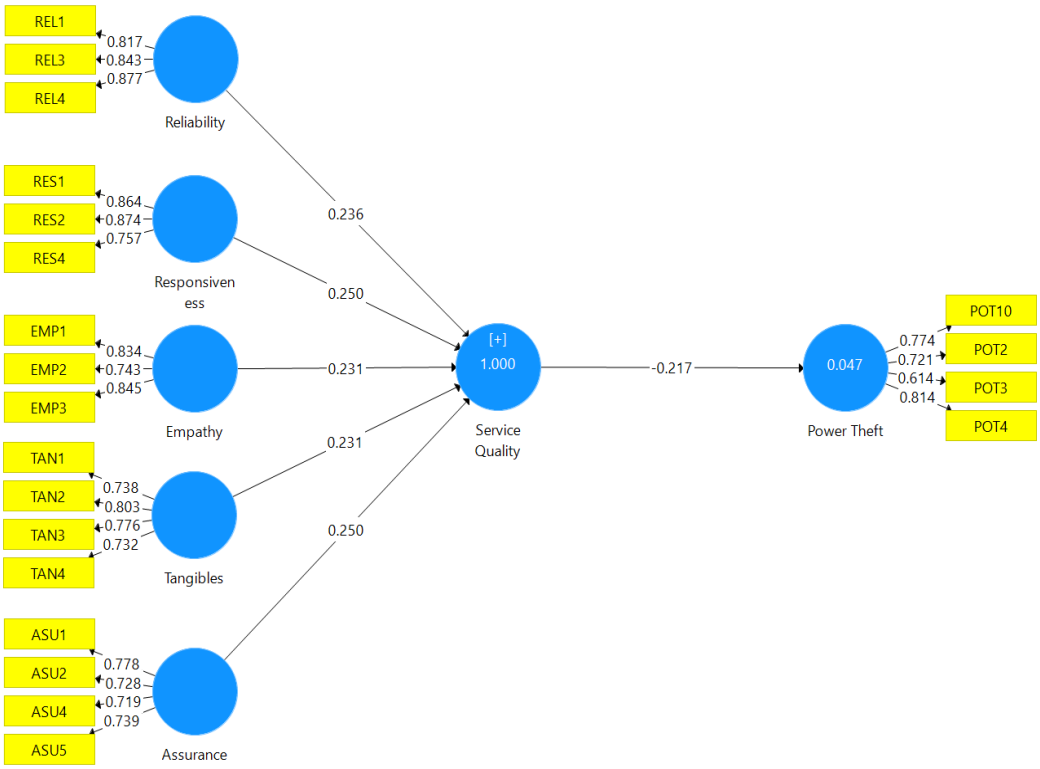

Figure 4: Output of the outer model

Source: SmartPLS algorithm output based on Field data (2022)

Discriminant validity was ascertained using the Fornell-Larcker method which can be observed from Table 12. The constructs in the outer model have discriminant validity in that according to Fornell and Larcker (1981), discriminant validity is present when the square root of the AVE (bold and italicised) of each of the constructs is greater than its correlation with all other constructs in the model. This shows that empirically, the constructs in the outer model are distinct from each other.

Table 7: Discriminant validity (Fornell-Larcker)

	1	2	3	4	5	6
1.Assurance	***0.742***					
2.Empathy	0.649	***0.809***				
3.Power Theft	-0.210	-0.195	***0.735***			
4.Reliability	0.601	0.647	-0.173	***0.846***		
5.Responsiveness	0.692	0.728	-0.127	0.746	***0.833***	
6.Tangibles	0.581	0.607	-0.204	0.388	0.538	***0.763***

Source: Field data (2022)

Results of inner model assessment

In Table 13, a presentation of the collinearity (VIF), coefficient of determination (R^2), predictive accuracy (Q^2) and effect size (f^2) of the inner model. From the table, collinearity was not present in the inner model. This is against the background that the VIF of the model is 1.000 which is less than the recommended VIF threshold of 3 to determine there is no problem with collinearity (Hair et al. 2019). The coefficient of determination in this model as observed from Table 13 is 0.047. While generally, coefficient of determination values 0.25, 0.50 and 0.75 are considered to be weak, moderate and substantial (Hair et al., 2014, 2019), Hair et al. (2017) indicate that depending on the discipline, R^2 of 0.2 can be considered as high. Hair et al. (2017) specifically include consumer behaviour studies especially customer satisfaction research as part of studies in which R^2 of 0.2 is high. Based on the foregoing, the R^2 value obtained in this study is acceptable.

Further from Table 13, the Q^2 value provides the predictive validity of service quality on power theft. Since the Q^2 value is greater than zero, it is

deemed that the endogenous construct (service quality) accurately predicts the exogenous construct (power theft). Regarding the strength of the predictive accuracy of service quality, the 0.023 value indicates that it is small (Hair et al. 2019). Effect size, f^2, tells whether a construct has substantive impact on another construct. In this study, the magnitude of the effect size of service quality on power theft which is 0.050 can be said to be small. The effect size is small as according to Benitez et al. (2020), if it is within 0.020 – 0.150 range.

Table 8: Co-linearity, Coefficient of Determination, Predictive Accuracy and Effect Size

	VIF	**R^2**	**Q^2**	**f^2**
Service Quality -> Power Theft	1.000	0.047	0.023	0.050

Source: Field data (2022)

Table 14 highlights evidence of the predictive power of the model using PLS_predict. According to Shmueli et al. (2019), the predictive power of a model follows two steps. First, the Q^2_predict for each indicator of the exogenous construct must be greater than zero. This shows the indicators outperform the most naïve benchmark such as predicting the mean or median of the dependent variable (power theft). When this condition is met, the root mean squared error (RMSE) of the PLS is compared with that of linear model (LM). If the PLS_RMSE of a model is less than the LM_RMSE for majority of all the indicators; majority of the indicators; minority of the indicators; or none of the indicators, it means the model has high; medium; low; or no predictive power. From the table, it is observed that the model has a high predictive power as all the PLS_RMSE indicators are less than the LM_RMSE.

Table 9: Predictive Power

Indicator	Q^2_predict	PLS_RMSE	LM_RMSE	PLS_RMSE – LM_RMSE
POT2	0.021	1.021	1.036	-0.015
POT3	0.007	1.051	1.057	-0.006
POT4	0.027	1.071	1.078	-0.006
POT10	0.032	1.089	1.113	-0.024

Source: Field data (2022)

Research Question 3

What is the relationship between customer satisfaction and power theft in the electricity market of Ghana?

The outer and inner model assessments culminated in providing an answer to the research question, what is the relationship between customer satisfaction and power theft in the electricity market of Ghana? The answer to this question can be found in Table 15 which depicts the relationship between service quality and power theft. Observation from the table reveals that the beta of the relationship between service quality and power theft is -0.217 at 5% significance level ($p<0.05$). The relationship yielded a T value of 5.631 which can be confirmed from Figure 5. The beta connotes that there is a negatively significant relationship between service quality and power theft. What this portends is that a unit increase in service quality reduces power theft by 21.7%.

Table 10: Relationship between Service Quality and Power Theft

Path	Beta	Std. Error	T value	P Value
Service Quality -> Power Theft	-0.217	0.039	5.631	0.000

2-tailed test; $p<0.05$

Source: Field data (2022)

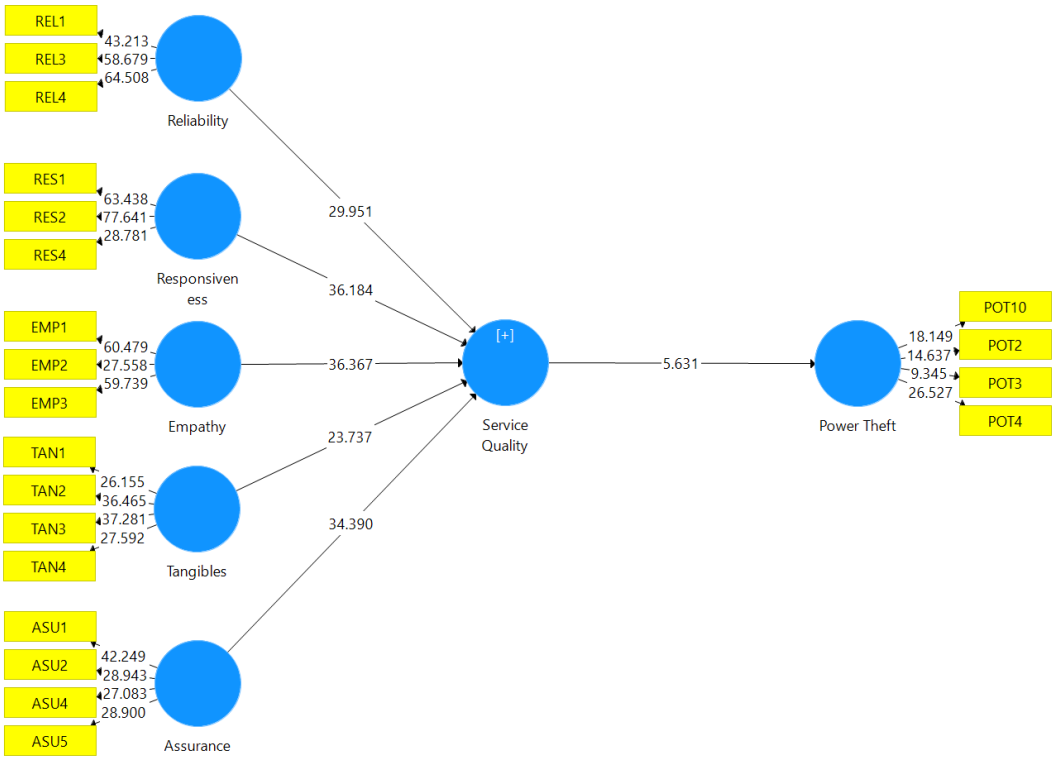

Figure 5: Output of the inner model

Source: SmartPLS bootstrapping output based on Field data (2022)

Discussion

Objective 1: Ascertain the level of customer satisfaction in the electricity market of Ghana

The service quality dimensions of reliability, responsiveness, empathy, tangibles and assurance were used to determine customer satisfaction in the context of Ghana to address objective 1 of the research. To meet the objective, the research question posed was what is the level of customer satisfaction in the electricity market of Ghana? It was established that all the five dimensions of service quality were not highly rated. This low rating reflects the reality on the ground in Ghana given reports and complaints on radio, internet and print-media regarding extortion by staff of the electricity company, wrongful billing,

delayed billing, dumsor and destruction of appliances due to erratic voltage in the electricity mains (Antwi, 2015 & NewsGhana, May, 2023).

According to Adom (2018), tariffs increased by more than six times within the first decade of the millennium at GH¢0.12857/KWh compared to all previous averages. Ghanaians have been unhappy with the high cost of electricity they have had to pay since the gradual phase out of subsidies which has caused an astronomic increase in electricity tariffs and this is reflected in the findings.

Danso-Wiredu, Dadson and Amoako-Andoh (2016) captured significant impacts of Ghana's electricity market inadequacies that are consistent with the low rating of the SERVQUAL dimensions in this study. Their study found out that funeral activities and other social events are negatively affected. This was attributed to the lack of service reliability and responsiveness. Again, they found out that as a result of poor services, small businesses have been crippled and human lives have been lost.

On the international front, the findings of this study are consistent with those revealed by Saini (2018), Ali and Amir (2020), Chodzaza and Gombachika (2013) as well as Arthur et al. (2016). However, they were in contrast to the findings of Ong et al. (2023).

According to Saini (2018), unsatisfactory services based on reliability, responsiveness, empathy, tangibles and assurance by utilities in India made electricity customers unsatisfied. Ali and Amir (2020) also revealed Malaysian customers dissatisfaction with the empathy, responsiveness, assurance and reliability of their service provider. Similarly, Chodzaza and Gombachika (2013) discovered that in Malawi, industrial customers reported low perceptions

of tangibles, reliability, responsiveness, assurance and empathy of the utilities. In the case of Arthur et al. (2016), the electricity company performed poorly in terms of tangibles, reliability, responsiveness, assurance and empathy. However, Ong et al. (2023) demonstrated that the customers of a national electric company in Philippines were satisfied with the tangibility, responsiveness and empathy of the electric company as these dimensions were highly rated.

In addition to the individual dimensions not being highly rated, service quality in general was not highly rated. As a result of the low quality of service in the electricity market, the customers were not satisfied with the electricity service as in the case of Usman (2013), Winther (2012) and Banza (2019). Usman (2013) for example discovered that there was dissatisfaction among customers of electricity distribution companies in Nigeria. Concerning the study of Winther (2012), it was evinced that the quality of service offered by the utilities in rural communities in Tanzania and India were poor. Similarly, Banza (2019) found that the quality of electrical service provided in households in Democratic Republic of Congo was poor.

However, the finding did not reflect the position of the International Bank for Reconstruction and Development/The World Bank in their 2016 report where they discovered that the service quality regulation available to guide companies was comprehensive and adequate for establishing the framework for service quality. If at all the regulation was comprehensive, the implementation must have some problems as can be deduced from outcome of the study. The finding was also not in sync with the revelations by Drosos et al. (2020), Indian Institute of Management (2015), American Customer Satisfaction Index (2019),

and J. D. Power (2019) as they also revealed satisfaction of customers of utilities because of the quality of service they provided in the respective study areas. As indicated earlier, customer satisfaction is a product of many contexts and variables.

Objective 2: Identify the reasons for power theft in the electricity market of Ghana

The question that was answered to meet objective two was what are the reasons for power theft in the electricity market of Ghana? Following the analyses of the data, the results portrayed that reasons attributed to power theft rated high among customers in the electricity market of Ghana. The reasons for the high power theft included customers' inability to pay for electricity; suspicion of inaccurate billing; lack of education on the impact of electricity theft; and lack of prosecution and severe penalties for culprits of power theft. Other reasons included acceptance of power theft as a social norm; ease of illegal electricity connection; and poor-provider customer relations.

The high rate of power theft discovered corroborates what pertains in the literature; in the literature, there is a widespread engagement in power theft by the customers of utilities. For instance, Gupta et al. (2022) revealed the rampant and continuous growth of power theft in India. Solo and Tongpangkumla (2013), also discovered that power theft was rampant in rural areas of India and that it was only after an intervention it reduced. Also, with several power theft cases detected by all electricity distribution companies, Jamil and Ahmad (2014) brought to the fore that power theft was dominant in Pakistan. In addition, the report by Japan International Cooperation Agency (2017) provided evidence of high distribution loss which included power theft

in Addis Ababa. In Ghana, Yakubu and Narendra (2017) identified several power theft cases in Ghana involving consumers, workers and licensed sales.

Additional support to power theft by customers in the electricity market was provided by Onat (2018) with the revelation of a huge amount of illegal electricity use in Turkey. Banza (2019) made a similar revelation of high electricity theft in households in Democratic Republic of Congo. In the study of Banza, the theft of electricity was on a scale such that some entire neighbourhoods used electricity through illegal connection. Further, Winther (2012) revealed that electricity customers rural Tanzania and India engaged in illegal electricity practices. It is not only rural communities that have been found to be engaging in power theft. Households in urban areas such as Lagos have also been found by Obafemi et al. (2021) to be having a power theft rate that is high.

Objective 3: Determine the relationship between customer satisfaction and power theft in the electricity market of Ghana

What is the relationship between customer satisfaction and power theft in the electricity market of Ghana? This question led to objective three. The findings in this study established that there was a statistically significant relationship between customer satisfaction and service quality in the electricity market of Ghana. This discovery is consistent with those of Mirza, Rizvi and Bergland (2021) who concluded that service quality parameters in Pakistan reduced the share of distribution losses. A similar finding was made by Ibáñez et al. (2006) in their study of service quality, customer satisfaction, trust, perceived switching costs and loyalty of Spanish residential energy customers as they revealed that service process quality had an effect on satisfaction and

loyalty of the customers. It was concluded that with the loyalty of the customers, power theft would be prevented. However, this is inconsistent with the study of Hatmann and Ibáñez (2007) as they found that quality of core and peripheral services did not significantly relate to customer satisfaction and loyalty.

Concerning the direction of the relationship between customer satisfaction and power theft in the electricity market of Ghana, it was negative. With a negative beta coefficient, this study established a statistically negative relationship between customer satisfaction and power theft. This negative relationship is in line with the study of Arthur et al. (2016) who espoused that service quality has a negative impact on customer satisfaction hence, advocated an improvement in service quality. This negative relationship is unsurprising because customer satisfaction based on the service quality of utilities in Ghana was not high and according to the study of Yakubu and Narendra (2017), poor quality of service of the utilities was a reason for consumers to engage in energy theft. It was again corroborated by the findings of Yakubu et al. (2018) that poor quality of service was a motivating factor for electricity theft in Ghana.

Chapter Summary

The results of the analysed data were presented in this section of the research report to provide answers to the research questions of the. Research question one showed that service quality in the electricity market of Ghana was not high. Research question two showed that power theft in the electricity market was high. Regarding the relationship between service quality and power theft which was the aim of research question three, it was revealed that there was a statistically negative relationship.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter of the research report comprises the summary of the study, key findings, conclusions, recommendations and directions for future studies. The summary is made up of the purpose of the study, objectives of the study, research questions and the research methods employed in carrying out the study. Also, the key findings, conclusions and recommendations made are based on the key findings of the study.

Summary

This study had the purpose of evaluating customer satisfaction and power theft in the electricity market of Ghana using the Servqual approach and Partial Least Squares Structural Equation Modelling. In view of this, the study had the following specific objectives:

i. ascertain customer satisfaction in the electricity market of Ghana.
ii. identify the reasons for power theft in the electricity market of Ghana.
iii. determine the relationship between customer satisfaction and power theft in the electricity market of Ghana.

The following research questions were answered to achieve the objectives of the study:

i. What is the level of customer satisfaction in the electricity market of Ghana?
ii. What are the reasons for power theft in the electricity market of Ghana?

iii. What is the relationship between customer satisfaction and power theft in the electricity market of Ghana?

The quantitative research approach was used for the study since it allowed for the quantification of large data obtained for the study to help make accurate predictions about relationships between service quality and power theft and enabled generalisation of the research findings. To this end, the descriptive research design was adopted to describe the level of customer satisfaction, reasons for power theft and the relationship between customer satisfaction and power theft. With a population of 5,426,242 electricity customers in Ghana, 545 customers were used as the sample based on the sample size determination method by Krejcie and Morgan (1970). The convenience sampling technique was used to draw the sample.

The data collection instrument used for this study was an online questionnaire. The questionnaire started with an introductory statement. The introductory statement specified the purpose of the study as solely for academic purpose. Respondents were assured of confidentiality and anonymity of their responses and were encouraged to give frank responses. Participation was voluntary. The questionnaire had three sections; A, B and C. Section A comprised demographic characteristics of the respondents. Section B consisted of the five service quality dimensions of reliability, responsiveness, empathy, tangibles and assurance that was used to measure customer satisfaction. The total number of items in this section was 20. Section C had 10 power theft items (reasons for power theft). The items in both Sections B and C were measured using a five-point Likert scale with one as the lowest point and five as the highest point.

To collect the data, electricity consumers who were accessible to the researcher were contacted by email and WhatsApp to submit responses voluntarily. The data collection spanned a period of eight weeks; it started from 11th June, 2022 and ended on 31st July, 2022. The data that was obtained was prepared and processed using SPSS 21 and SmartPLS 3 statistical software. Processing of the background characteristics of the respondents was done using the SPSS. Its analysis was done in frequencies and percentages. Data processing to obtain answers to the research questions set in the study was done with SmartPLS 3. Research questions one and two were analysed using mean, standard deviation, excess kurtosis and skewness. Research question three was answered using a partial least square structural equation model. The study ensured the necessary ethical considerations.

Key Findings

The key findings established in the study are that:

1. Customers in the electricity market of Ghana did not highly rate the ability of utilities to perform the promised service dependably and accurately. This could be as a result of frequent power outages and billing inaccuracies.
2. Customers in the electricity market of Ghana did not rate highly the willingness of utilities to help customers and to provide prompt service. This could be due to administrative bureaucracies which prolong fault maintenance and meter acquisition.
3. Utilities in the electricity market of Ghana were not highly rated by their customers in terms of providing care and individualised attention to customers. Perhaps, consumers are not well-sensitized

and are not confident about the available help lines and office contacts through which they can reach out and feel cared for.

4. Customers in the electricity market of Ghana did not highly rate the appearance of physical facilities, equipment, personnel and materials of the utilities. This could be as a result of negative halo effect where the consumers project their dissatisfaction to other aspects of the utility companies even when the physical facilities, equipment and appearance of personnel of the companies are not in a poor state.
5. Customers did not highly rate that utilities in the electricity market of Ghana have employees that are knowledgeable, courteous and exude trust and confidence. Since some consumers reported collusion by some staff of the utility companies, it can be understood why the company staff are not trusted.
6. Customers did not highly rate the service quality of utilities in the electricity market of Ghana. Unreliable power supply and instable voltage in the grid could account for this low rating.
7. The reasons for power theft were affirmed and rated high. This indicates that consumers must have experienced or witnessed electricity theft and they believe that the suggested reasons are true.
8. There was a negatively significant relationship between service quality and power theft among electricity consumers in Ghana. This is in line with other electricity theft studies which have established that where there is customer dissatisfaction, power theft is high for many reasons including rationalizing and normalising the crime.

Conclusions

This study concludes that the service provided by electricity companies in Ghana is not of high quality, hence leads to customers in the electricity market of Ghana dissatisfied. Specifically, the customers show their dissatisfaction through their low rating of the responsiveness, reliability, empathy, tangibles, and assurance of the electricity companies. Additionally, electricity consumers believe that there are reasons that influence power theft including cost, customer dissatisfaction and ease of illegal connection. The final conclusion is that when customers are not highly satisfied with the service provided by utilities it results in power theft. Hence, customers in the electricity market should be provided service that is of high quality so that power theft will be reduced in the electricity market of Ghana.

Recommendations

Following the discoveries made in this study, it is recommended that electricity companies in Ghana should enhance the experience of their customers by improving the quality of service they provide so that power theft is reduced. To do this, they should ensure that: 1) they perform the services they promise dependably and accurately; 2) they are willing to help their customers and also, provide prompt services; 3) they provide care and individualised attention to electricity customers; 4) they have appealing physical facilities, equipment, personnel and materials; and 5) employ people who are knowledgeable, courteous and exude trust and confidence.

In addition to improving the quality of service to enhance the customer satisfaction of their customers, electricity companies in Ghana should invest heavily in power theft prevention strategies. Such strategies should include

technology that detect illegal use of electricity as soon as it occurs and using technology that make power theft difficult to perpetrate. Civic education should also be employed to resocialise electricity customers on the impact of electricity theft so that the perception that electricity theft is normal and justified would be corrected. In addition, the electricity companies should ensure the prosecution of illegal electricity customers to serve as a deterrent to other customers.

Directions for Future Studies

This study was cross-sectional and so service quality and power theft over a period could not be investigated. This could limit the potential of the study to interpret the causal relationship between the endogenous construct (service quality) and exogenous construct (power theft). Future studies should be longitudinal so that service quality and power theft in the electricity market in Ghana over time can be studied.

More so, the focus of this study was the responsiveness, reliability, empathy, tangibles, and assurance dimensions of service quality. Other service quality dimensions such as process quality, functional quality and technical quality of the services of electricity companies in Ghana should be further investigated in order to have a holistic view of the service quality situation in the electricity market of the country. Furthermore, the use of individual consumers without considering their households could bias the results since more than one respondent from a particular household could be respondents in the study. Future studies should draw responses based on the households of respondents such that households are restricted to only one response to the questionnaire.

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APPENDIX

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

INSTITUTE FOR OIL AND GAS STUDIES

AN EVALUATION OF CUSTOMER SATISFACTION AND POWER THEFT IN THE ELECTRICITY MARKET OF GHANA: A SERVQUAL APPROACH.

Dear respondent, the purpose of this survey is to collect data for the evaluation of the relationship between customer satisfaction and power theft in the electricity market of Ghana. Your response will be a valuable source of information for the study and it will be used for academic purposes only. Your participation in the study is greatly appreciated though voluntary. Confidentiality and anonymity of the responses you will provide are assured.

SECTION A: Demographic Data of Respondent. Please tick [√] as appropriate.

1. Sex: a. Male [ ] b. Female [ ]

2. Age: a. below 18 [ ] b.18 – 28 [ ] c. 29 – 39 [ ] d. 40 – 50 [ ] e. above 50 [ ]

3. Monthly Income (GH₵): a. less than 700 b. 700 – 1,500 c. 1,501 – 3,500 d. above 3,500

4. Please indicate which type of electricity consumer you are:

a. Both Residential and Government institution [ ] b. Both Residential and Private enterprise [ ] c. Residential Only [ ] d. Other [ ]

5. In which region of Ghana are you located? Please tick **only one region**).

Greater Accra Region	[1]	Northern Region	[9]
Ashanti Region	[2]	North East Region	[10]
Eastern Region	[3]	Savannah Region	[11]
Volta Region	[4]	Upper East Region	[12]
Oti Region	[5]	Upper West Region	[13]
Western Region	[6]	Bono Region	[14]
Western North	[7]	Bono East Region	[15]
Central Region	[8]	Ahafo Region	[16]

SECTION B: Service Quality

This section looks at Service Quality which is a product of customer's perception and expectations. Using the scale provided: 1 = the lowest and 5 = the highest, please score **[√]** the quality of service of your electricity provider (the electricity company) on the 20 items indicated under the 5 dimensions below:

No	There is a total of 20 items under 5 different dimensions	Scale				
		1	2	3	4	5
Reliability (the ability to perform the promised service dependably and accurately)						
1	The company handles customer complaints effectively and with sincere interest					
2	The company keeps accurate client records (bills, residential and business info)					
3	When the company promises to repair a fault at a certain time, it does it.					
4	The company addresses clients' requests promptly					

Responsiveness (the willingness to help customers and to provide prompt service)						
5	Employees of the company are always willing to assist customers					
6	The company actively looks out for customer needs					
7	The company distributes monthly bills without delays					
8	The company makes information easily obtainable by customers					
Empathy (the provision of caring, individualized attention to customers)						
9	The company gives the necessary individual attention to clients					
10	Their operating hours are convenient for customers					
11	The company appreciates how important electricity is in the lives of their customers					
Tangibles (the appearance of physical facilities, equipment, personnel and materials)						
12	The physical environments of the company offices are clean					
13	The employees are neat and always professionally dressed					
14	The company has modern equipment, including meters					
15	The electricity bills and meters are easy to read					
Assurance (the knowledge and courtesy of employees and their ability to convey trust and confidence)						
16	The employees are courteous					
17	The employees, mainly engineers on the field, do not extort money from customers					
18	The employees are competent; once they show up, they are able to fix faults					
19	There is proper communication before scheduled power cuts					
20	Any disconnection done is fair and reasonable					

SECTION C: Factors influencing electricity theft

Electricity theft is the act of unlawfully utilizing electricity by individuals, private and government institutions including illegal connection, meter tampering, non-payment of bills, bribing officials in order to underpay bills etc. Several factors are known to influence power theft. Using the scale provided, 1 = lowest and 5= highest, please indicate in your view, to what extent the following factors influence electricity theft:

No.	Factors	Scale				
		1	2	3	4	5
1	Customers' inability to pay for the electricity					
2	Customers' suspicion of inaccurate billing					
3	Connivance of the employees of the electricity company					
4	Dissatisfaction with the services of the electricity company					
5	Lack of education of customers on the impact of electricity theft					
6	Lack of prosecutions and severe penalties					
7	Electricity theft is simply an accepted social norm					
8	It is easy to get the illegal connection done even without the help of the workers of the electricity company					
9	Poor governance of the country					
10	Poor provider-customer relations					

THANK YOU