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Service Quality and Customer Loyalty among Active Internet Subscribers in Northeastern Nigeria

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Abstract

The aim of this study was to investigate the effect of service quality on customer loyalty among active internet subscribers of telecommunication companies in Northeastern Nigeria. The study used convenience; assurance; security; and internet speed as the dimensions of Independent Variable (Service Quality) on the Dependent Variable (Customer Loyalty). The methodology adopted in the study was quantitative research approach using online questionnaire distributed to 400 active internet subscribers within Northeastern states of Nigeria. The result of the study revealed that convenience (β= 0.050, S.E= 0.043, C.R= 1.140 and p= 0.254) has no positive and significant effect on customer loyalty, while assurance (β= -0.104, S.E = 0.036, C.R= -2.908 and p= 0.004) and security (β= 0.717, S.E = 0.068, C.R= 10.535 and p= 0.000) have positive and significant effect on customer loyalty.

Keywords: ***assessing, effect, loyalty, subscribers..***

Introduction

Customer loyalty is an important strategic outcome in service organisations because it reflects a customer's willingness to continue using a provider, recommend the provider to others and resist attractive alternatives. In telecommunications, loyalty is particularly important because customers can compare competing networks continuously and can change providers when service experiences no longer meet their expectations. For this reason, service quality is not only an operational concern; it is also a relationship-management issue that can influence retention and long-term customer value (Ribeiro et al., 2024; Yudiana et al., 2023). Information and communication technologies have become essential to communication, education, commerce, financial services and other digital activities. In Nigeria, the National Bureau of Statistics (NBS, 2024) reported 164,368,292 active internet subscriptions in the first quarter of 2024. The same report provides state-level and zonal data, allowing the size of the internet-subscriber population in Northeastern Nigeria to be established from official statistics. The increasing use of internet-enabled telecommunications services makes service quality an important customer-level issue, particularly in relation to convenience, assurance and security.

The Nigerian telecommunications market is competitive, giving subscriber access to multiple network providers. Customers may reconsider their provider when they experience persistent service interruptions, slow internet performance, inconvenient service processes, inadequate support or concerns about the protection of personal and transaction information. Customer literature identifies switching as an important challenge for telecommunications operators because subscriber loss can weaken customer retention and the stability of the customer base (Khandelwal & Sakalle, 2024).

The Nigerian Communications Commission (NCC) also publishes industry statistics on subscriptions, teledensity and operator performance. These official statistics provide sectorial context, but they do not by themselves explain why individual subscribers remain loyal to a particular provider. The present study therefore focuses on customer-level perceptions of service quality and their relationship with customer loyalty. The relevant issue for this study is whether the service quality experienced by active internet subscribers is associated with their willingness to continue patronizing their network

providers. Accordingly, the study examines customer-level perceptions rather than macroeconomic indicators. Official NBS (2024) data show substantial differences in active internet subscriptions across the six Northeastern states. These statistics established the size of the potential subscriber population, but they do not identify the service-quality factors associated with loyalty or switching at the individual customer level. The study therefore treats the effect of service quality on customer loyalty as an empirical question to be tested using subscribers perceptions.

The theoretical justification for this study is the Service Quality (SERVQUAL) model developed by Parasuraman et al. (1988). The original model comprises tangibles, reliability, responsiveness, assurance and empathy. This study adopts a convenience, assurance and security and service quality model because internet telecommunications are predominantly experienced through digital interfaces and network performance. Convenience captures the ease and effort involved in accessing and managing services; assurance captures confidence arising from competence, credibility and customer support; and, security captures protection of personal and transaction information. These three dimensions constitute the modified service-quality framework used in this study, referred to as Convenience, Assurance and Security (CAS).

The rationale for examining CAS is that each dimension represents a distinct part of the customer's service experience. A subscriber may find a service convenient but insecure, secure but slow, or technically fast but difficult to access or obtain support for. Examining the dimensions separately therefore provides a more precise basis for understanding which aspects of service quality are associated with customer loyalty. The study consequently investigates the individual effects of convenience, assurance and security on customer loyalty among active internet subscribers in Northeastern Nigeria.

Problem Statement

Previous research has demonstrated the importance of customer loyalty, with the service industry acknowledging it to be a crucial element (Ahmed, 2020; Ali & Alfayez, 2024; Khanh, Phong & Cao, 2020). The significance of customer loyalty has made service marketing industries, including telecommunications sector, paying attention towards acquiring and maintaining customers every day. Hence, customer loyalty challenges were stressed in the report of NCC (2024) on Mobile Network Porting (MNP) disclosed that 60,383 subscribers switched networks within one year due to service quality concerns. Therefore, maintaining service quality is pivotal in maintaining subscriber loyal which- in turn- made government enforced sanction against operator, who failed to comply with Quality of Service (QoS) Regulations of July, 2024 (NCC, 2024). Even though, the current statistics released by NBS (2026) reported that the active internet subscriptions in Northeastern Nigeria in the fourth quarter of 2025 accounted for 18,537,828. This figure provides the population basis used for the sample-size calculation and proportional allocation in this study.

The available official statistics establish the size of the telecommunications market in the study area, but they do not identify the reasons why individual subscribers remain loyal or switch providers due to the fact that customers today have more options, more knowledge about services and costs, and the ability to move between businesses to the fierce competition (Arowosaye et al., 2024). This distinction creates the empirical problem addressed by the study. The research therefore focuses on subscribers' perceptions of convenience, assurance and security and examines whether these dimensions are statistically associated with customer loyalty.

Previous studies have linked service quality with customer loyalty in banking, hospitality, healthcare, retailing, electronic commerce and telecommunications. For example, Adzinyo et al. (2024) examined service quality and customer retention in Ghanaian hospitality; Arif and Vemaraju (2024) examined customer loyalty in digital banking; Etuk et al. (2024) examined e-service security and customer loyalty in Nigeria; and Ribeiro et al. (2024) investigated customer experience, loyalty and churn in telecommunications. These studies provide useful evidence, but they differ from the present study in sector, country, construct specification, measurement approach or geographical context. In particular, evidence that jointly examines convenience, assurance and security among active internet subscribers in Northeastern Nigeria remains limited.

The gap is therefore both contextual and conceptual. Contextually, the study focuses on Northeastern Nigeria rather than a national sample or another country. Conceptually, it examines four service-quality dimensions together rather than treating service quality only as the traditional SERVQUAL configuration. Empirically, it tests the separate effects of convenience, assurance and security on customer loyalty. This combination provides the basis for the present investigation.

Objectives of the Study

The general objective of this study is to examine the effect of service quality on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria. The specific objectives are to:

i. examine the effect of convenience on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria;

ii. determine the effect of assurance on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria; and,

iii. assess the effect of security on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria.

Literature Review and Theoretical Framework

Conceptual Review

This chapter reviews relevant literature on service quality and customer loyalty. It presents the conceptual review, theoretical review, empirical review, identified research gaps, and the conceptual framework underpinning the study. The review provides a theoretical and empirical foundation for

examining the effect of service quality on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria.

Customer Loyalty

Customer loyalty refers to a customer's enduring commitment to continue patronizing a preferred service provider despite the availability of competing alternatives. It is reflected in repeat patronage, resistance to switching, positive word-of-mouth communication, and willingness to maintain a long-term relationship with an organization. Consumer loyalty is indicated by the tendency that customers have to continue and enhance positive and sustainable relationships with service providers, including repeated use of the service (Dinh et al., 2022). This clarifies customer commitment to repurchase or continue using a preferred product or service consistently in the future despite situational influences and marketing efforts that may encourage switching behaviour. This definition remains one of the most influential conceptualizations of customer loyalty in marketing literature. Contemporary researchers emphasized that loyalty extends beyond repeat purchasing behaviour to include emotional attachment, trust, advocacy, and commitment. Anderson (2025) observed that loyal customers are more likely to forgive occasional service failures, recommend the service provider to others, and maintain long-term relationships when they perceive consistent service value. Similarly, Ramadani and Azhar (2025) concluded that customer loyalty is strengthened when service providers consistently deliver reliable, secure, convenient, empathetic, and responsive services that meet customer expectations.

In the Nigerian telecommunications industry, customer loyalty is particularly important because subscribers can easily switch between network providers through mobile number portability and multiple SIM ownership because NCC's implementation of Mobile Number Portability allows users to switch between network providers, has made this particularly feasible (Arowosaye et al., 2024). Consequently, telecommunications operators increasingly focus on improving service quality as a means of strengthening customer retention and reducing subscriber switching behaviour.

For the purpose of this study, customer loyalty is measured through four behavioural indicators: continued patronage, intention to repurchase or continue using the service, positive word-of-mouth recommendation, and resistance to switching to competing telecommunications providers. These measures were adopted and supported from the studies of (Ajina et al., 2023; Anser et al., 2021; Gautam et al., 2023).

Service Quality

Service quality has remained one of the most widely researched constructs in marketing, services management, and relationship marketing because of its influence on customer satisfaction, customer retention, competitive advantage, and organizational performance. The concept of service quality has been defined from different perspectives. Service quality was described as the gap between customers' expectations of a service and their perceptions of the actual service received (Eryigit & Fan, 2021; Parasuraman et al., 1988). This perspective suggests that customers evaluate service quality by comparing expected performance with experienced performance. Where perceived performance meets or exceeds expectations, customers are more likely to express satisfaction and remain loyal. More recent scholars have expanded this perspective, for instance, Yudiana et al. (2023) conceptualized service quality as an organization's ability to consistently deliver services that satisfy customer expectations through convenience, assurance and security, and other value-creating attributes. Similarly, Khandelwal and Sakalle (2024) argued that service quality represents customers' overall evaluation of service excellence based on their cumulative experiences with a service provider rather than isolated service encounters. Within the service industries, the significance of high-quality services in fostering customer loyalty cannot be over-emphasized (Madueke & Eyupoglu, 2024). This could be extended beyond interpersonal interactions to digital service performance. Subscribers evaluate service quality based on factors such as network reliability, service security, accessibility, convenience, responsiveness to complaints, and the competence of customer support personnel. Consequently, service quality within internet-enabled telecommunications services encompasses both technical performance and functional service delivery.

The SERVQUAL model originally proposed five dimensions: reliability, assurance, tangibles, responsiveness and empathy. In internet-based telecommunications, customers interact extensively with digital platforms and network infrastructure, making some traditional dimensions less directly suited to the present context. This study therefore retains assurance and replaces tangibles, reliability, responsiveness and empathy with convenience, and security. Accordingly, service quality is operationalized through three dimensions: convenience, assurance and security (CAS)

Convenience

Convenience has become an increasingly important dimension of service quality in technology-driven service industries because customers value services that are easy to access, simple to use, and available whenever required. Parasuraman et al. (2002) conceptualized convenience as the reduction of customers' time and effort throughout the service process. Building on this perspective, Harriet et al. (2024) argued that convenience reflects customers' ability to access services quickly and efficiently without unnecessary complexity or delays. Similarly, Tummala et al. (2024) demonstrated that convenience significantly improves customer satisfaction and loyalty by simplifying customers' interactions with service providers. Within the Nigerian telecommunications industry, convenience includes ease of SIM registration, seamless data subscription, user-friendly mobile applications, accessible self-service platforms, convenient digital payment channels, and efficient account management systems. These attributes reduce customers' effort and improve their overall service experience.

Given the digital nature of telecommunications services, this study replaces the traditional SERVQUAL dimension of tangibility with convenience. Consequently, convenience is

operationally defined as the extent to which subscribers can easily access, use, and manage telecommunications services with minimal time, effort, and difficulty.

Assurance

Assurance represents the ability of a service provider to inspire customer confidence through competence, professionalism, credibility, courtesy, and trustworthiness. Customers are more likely to remain loyal when they believe that employees possess the knowledge and skills required to deliver quality services and resolve service-related problems effectively. Parasuraman et al. (1988) described assurance as employees' knowledge, courtesy, and ability to inspire trust and confidence among customers. Contemporary studies have broadened this definition by emphasizing customer security, privacy protection, and organizational credibility. Adzinyo et al. (2024) maintained that assurance strengthens customers' confidence in service providers, thereby increasing customer commitment and long-term loyalty. Likewise, Arif and Vemaraju (2024) found that customers who perceive higher levels of assurance are more willing to continue patronizing service providers despite competitive market alternatives. In the telecommunications sector, assurance extends beyond employee competence to include data privacy, transaction security, network integrity, transparent communication, and effective complaint resolution. As digital transactions continue to increase, subscribers increasingly evaluate telecommunications providers based on their ability to safeguard personal information and deliver secure, trustworthy services.

Accordingly, this study defines assurance as the ability of telecommunications providers to inspire subscribers' confidence through competence, credibility, secure service delivery, and effective customer support.

Security

Security has become an indispensable dimension of service quality in the telecommunications industry because customers increasingly depend on digital platforms for communication, financial transactions, cloud services, and information exchange. As the digital ecosystem continues to evolve, customers expect telecommunication service providers to protect their personal information, communication networks, and online activities against unauthorized access, cyberattacks, identity theft, and data breaches. Consequently, security is no longer viewed merely as a technical function but as a strategic service quality attribute that enhances customers' confidence in the reliability and integrity of the network (Balaji & Senthilkumar, 2024; Serrato-Cherres, 2026). Recent literature further suggests that security encompasses the provider's ability to guarantee confidentiality, privacy, authentication, data integrity, and continuous protection of customers' information through effective cybersecurity measures and secure network infrastructure. These security mechanisms reduce customers' perceived risks, strengthen trust, and improve their overall evaluation of service quality, particularly in technology-driven service environments where digital interactions dominate customer experiences (Aljedaiah & Alali, 2026; Kaur et al., 2025).

Drawing from these contemporary perspectives, this study conceptualizes security as the extent to which a telecommunication service provider protects customers' personal information, digital communications, and online transactions through effective privacy protection, secure network systems, and proactive cybersecurity measures. When customers perceive that their information and digital activities are adequately protected, they are more likely to develop confidence in the service provider and sustain long-term patronage (Serrato-Cherres, 2026).

Conceptual Framework

This conceptual framework is guided by the popular Service Quality (SERVQUAL) which was proposed by the works of (Parasuraman et al., 1988; Rabbani et al., 2024). It is comprises of Convenience, Assurance and Security (CAS) dimensions of service quality in relation to customer loyalty. These SERVQUAL components were formulated and tested in various sectors in marketing and other areas of human endeavours. For instance, (Parasuraman et al., 1988) confirmed their suitability in areas such as: tourism, retail businesses, telecommunications and so on. Based on the above, this study conceptualized and theorized SERVQUAL model to assess the effect of service quality on customer loyalty among active internet subscribers in Northeastern Nigeria.

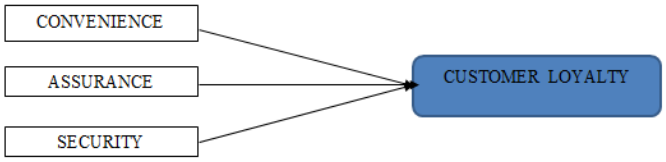

Figure 1 *Conceptual Framework*

Source: (Parasuraman et al., 1988; Rabbani et al., 2024)

Empirical Review

Customer loyalty has continued to attract considerable scholarly attention because of its strategic importance to organizational sustainability, competitiveness, and long-term customer retention across different sectors of the economy. Numerous empirical studies such as (Dinh et al., 2022; Rabbani et al., 2024; & Ribeiro et al., 2025) have investigated the concept from diverse industrial and geographical contexts, providing evidence of its relevance in enhancing organizational performance and customer relationship management.

Recent empirical evidence demonstrated that customer loyalty remains a fundamental determinant of business success across various industries. For instance, Denni (2024) examined customer loyalty within the online food delivery industry in the United States and reported that customer loyalty significantly influences the sustainability and competitiveness of online food delivery platforms. Likewise, Alejandra et al. (2024) investigated institutional loyalty development in Lima, Peru, using a structural equation modelling approach. Their findings indicated that customer loyalty plays a significant role in strengthening institutional loyalty-building initiatives.

Similarly, Forelli and Ordonez (2025) explored customer loyalty challenges in Mexico's tourism and hospitality industry. The study established that customer loyalty substantially contributes to the growth and sustainability of tourism enterprises. In the same vein, Stefanuto et al. (2025) assessed customer loyalty in Brazil's retail e-commerce sector and found that timely service delivery, particularly meeting promised delivery schedules, significantly enhance customer loyalty among online shoppers.

Further empirical evidence was presented by Kim et al. (2024), who investigated customer loyalty within Cambodia's retail sector. Their findings underscored customer loyalty as a critical factor influencing retail business success and customer retention. Likewise, Emin (2025) examined customer loyalty in the French airline industry and concluded that loyal customers contribute significantly to organizational competitiveness and long-term profitability. Similarly, Rubin et al. (2025) investigated customer loyalty within the banking sector in the Philippines. The study revealed that customer loyalty remains an important driver of sustained customer relationships and organizational performance. In another related study, Tangchua and Vanichchinchai (2025) examined customer loyalty in the business-to-business electrical and electronics industry across Europe. Their findings showed that customer loyalty exerts a positive influence on organizational performance and strengthens long-term business relationships among industrial customers. Further empirical evidence has also emerged from different regions of Asia, where customer loyalty has been recognized as a key determinant of business success. Yiming et al. (2024) investigated customer loyalty within China's fast-food industry from the perspective of university students in Hangzhou City, Zhejiang Province. The findings demonstrated that customer loyalty positively influences customers' behavioural intentions and contributes significantly to the growth and competitiveness of fast-food businesses.

In Pakistan, Ashiq (2024) examined electronic customer loyalty among online shoppers and established that e-loyalty remains an essential factor for sustaining long-term relationships between online retailers and consumers. Similarly, Chowdhury et al. (2024) assessed customer loyalty in fast-food restaurants across Asia and found that customer loyalty significantly enhances repeat patronage and organizational performance within the industry. Likewise, Ajina et al. (2023) explored customer loyalty in Jordan's banking sector and reported that customer loyalty positively affects customers' willingness to maintain long-term relationships with financial institutions. In another Pakistani study, Tariqu et al. (2024) investigated customer loyalty in online business and concluded that customer loyalty serves as a major driver of customer retention and sustainable business performance.

Empirical evidence from Africa also supports the importance of customer loyalty across different service industries. For example, Godadaw et al. (2023) examined customer loyalty in Ethiopia's electronic banking sector and reported a significant positive relationship between customer loyalty and continued use of electronic banking services.

Overall, the reviewed international studies consistently demonstrated that customer loyalty has been widely investigated across diverse sectors, including online food delivery, institutional management, tourism and hospitality, e-commerce, retailing, aviation, banking, manufacturing, fast-food services, online business, electronic banking, and hospitality. These studies collectively provide strong empirical evidence that customer loyalty remains an indispensable element for improving organizational performance, customer retention, competitive advantage, and long-term business sustainability across different countries and economic environments. Although customer loyalty has been extensively investigated in different parts of the world, empirical evidence from Nigeria remains relatively limited, particularly within the telecommunication industry. Existing Nigerian studies have mainly concentrated on sectors such as online retailing, manufacturing, and food and beverage businesses, with comparatively less attention given to active internet subscribers of telecommunications companies. For instance, Okon and Etuk (2024) examined customer loyalty in Nigeria's online shopping environment and confirmed that customer loyalty remains an important determinant of customers' continued patronage and positive behavioural intentions. Similarly, Abdul-Qadir et al. (2021) investigated customer loyalty among food and beverage companies in Kaduna State and found that maintaining customer loyalty contributes significantly to organizational growth and sustained competitive advantage.

Despite these valuable contributions, the Nigerian telecommunication industry has received relatively little empirical attention in the context of customer loyalty, even though the sector plays a pivotal role in promoting digital communication, financial inclusion, business transactions, education, and national economic development. Compared with industries such as banking, hospitality, retailing, aviation, and electronic commerce, empirical studies focusing on customer loyalty within Nigeria's telecommunications sector remain inadequate. One notable exception is the study conducted by Musa and Abubakar (2023), which examined brand loyalty in the telecommunications industry in Northwestern Nigeria. Their findings expanded the understanding of customer loyalty within the sector and provided a useful foundation for subsequent studies on telecommunication services in Nigeria. Nevertheless, the scope of their investigation was limited to a specific geographical region and primarily emphasized brand loyalty rather than the broader service concept of customer loyalty among active internet subscribers. A critical review of the available empirical literature further revealed that previous studies have examined customer loyalty across different countries, industries, and service contexts.

However, only a few have specifically focused on active internet subscribers of telecommunications companies, particularly within Northeastern Nigeria. Consequently, there remains insufficient empirical evidence explaining customer loyalty among active internet subscribers in this region. This gap in the literature provides a strong justification for the present study. Accordingly, this research seeks to contribute to the existing body of knowledge by examining customer loyalty

among active internet subscribers of telecommunications companies in Northeastern Nigeria. The findings are expected to enrich the empirical literature, provide practical insights for telecommunication service providers, and offer useful recommendations for policymakers and other stakeholders interested in improving customer retention and service delivery within Nigeria's telecommunications industry for effective value perception.

Theoretical Review

This study is anchored on the SERVQUAL Model. This theory explains how customers evaluate service quality on loyalty toward service providers. The Service Quality (SERVQUAL) model was developed by Parasuraman et al. (1985, 1988) to explain how customers evaluate service quality. The model represents service quality as the discrepancy between a customer's expectations of service offering and the customer's perceptions of the service received Parasuraman et al. (1985). The model proposes that customers assess service quality by comparing their expectations before receiving a service with their perceptions after experiencing the service. The SERVQUAL model initially acknowledged ten dimensions of service quality (tangible, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding, knowing customers, and access). Subsequently, these ten dimensions were suppressed into five (reliability, responsiveness, tangible, assurance and empathy (Parasuramann et al., 1988). SERVQUAL is a multidimensional research instrument designed to measure consumer expectations and perceptions of service quality (Parasuraman et al., 1985). The model has become one of the most widely applied frameworks for measuring service quality across banking, healthcare, hospitality, education, aviation, and telecommunications (Parasuraman et al., 1985). Its popularity stems from its ability to identify service gaps that influence customer satisfaction, retention, and loyalty. Although the SERVQUAL model remains highly influential, scholars have argued that its original dimensions may not fully capture the realities of digital and technology-driven services. In internet-based telecommunications, customers interact primarily with digital platforms, network infrastructure, and mobile applications rather than physical facilities. Consequently, the tangibility dimension contributes less to customers' service evaluations than the convenience with which digital services can be accessed and utilized.

Recognizing this limitation, recent researchers have modified SERVQUAL to suit contemporary digital environments by incorporating context-specific dimensions. Although the Service Quality (SERVQUAL) model remains one of the most influential frameworks for assessing service quality, recent studies have questioned its continued applicability across modern service environments. One of the major criticisms is that the model assumes customers' expectations remain stable over time. However, contemporary consumers constantly adjust their expectations as technologies evolve, market competition intensifies, and service innovations emerge. Consequently, measuring service quality through the gap between expectations and perceptions may not always provide an accurate reflection of customers' evaluations (Arli et al., 2024). Another limitation concerns the universal application of the five SERVQUAL dimensions. Recent systematic reviews indicate that industries such as telecommunications, healthcare, financial technology, and e-commerce often require additional dimensions, including digital security, privacy, system reliability, and technological efficiency. This suggests that the original SERVQUAL dimensions are insufficient for evaluating service quality in technology-driven environments (Sutrisno et al., 2024).

Furthermore, scholars argued that SERVQUAL places greater emphasis on customers' subjective perceptions while giving limited attention to objective service performance indicators such as network reliability, cybersecurity, and digital infrastructure. As digital service delivery continues to expand, these technological factors have become increasingly important determinants of customers' quality evaluations (Arli et al., 2024). Consistent with this perspective, the present study replaces tangibility, reliability, empathy, and responsiveness with convenience and security, thereby operationalizing service quality through Convenience, Assurance and Security (CAS). This modification reflects the realities of internet telecommunications services in Nigeria and provides a more suitable framework for examining customer loyalty among active internet subscribers.

Methodology

Introduction

This chapter presents the procedures used to conduct the study. It explains the research design, study area, population, sample-size determination, sampling procedure, sources of data, research instrument, measurement of variables, hypotheses, data-collection procedure, and procedures used to assess the instrument. Quantitative research design is appropriate because the study collected responses from active internet subscribers and used statistical procedures to examine the effect of service-quality dimensions on customer loyalty.

Research Design

The study employed a quantitative research design in order to assess the effect of service quality on customer loyalty among active internet subscribers in Northeastern Nigeria. The study utitlized the subscribers of four selected telecommunications companies: Airtel; Glo; MTN; and, 9 mobile, who are characterized with switching behaviour in Northeastern Nigeria.

Population of the Study

The population of this study consists of all active internet subscribers of the four major telecommunications operators operating within Northeastern Nigeria. These subscribers constitute the unit of analysis because the study specifically focuses on customers who regularly access internet services and are therefore capable of evaluating the quality of services provided by their network operators. According to the National Bureau of Statistics (2026), the total number of active internet subscribers within the study area is 18,537,828. Active internet subscribers were deliberately selected because they frequently

interact with network services and are more likely to provide informed assessments of service quality and customer loyalty.

Sample Size Determination

The sample size was determined using the Taro Yamane formula:

n = N / [1 + N (e2)]

where:

n= sample size

N = Population size (18,537,828)

1 = constant

e = measurement error (0.05)

n = 18,798,523 / [1 + 18,798,523(0.052)] = 399.9905 ≈ 400 subscribers

Therefore, the calculated sample size was approximately 400 respondents, and 400 respondents were retained as the final sample size. Taro Yamane's formula was considered appropriate because it is one of the most common used formulae that are accepted and adopted for sample size determination. Therefore, the resulting sample of 400 respondents also provides an adequate number of observations for the planned regression analysis.

Sampling Technique

This study used two sampling techniques: proportionate stratified sampling and simple random sampling. Proportionate stratified sampling was used because the population comprised subscribers of different network providers with different subscriber shares; it ensured that each provider was represented in the sample according to its population proportion. The sample of 400 was allocated proportionately among six Northeastern states that constituted the geographical coverage of the study rather than a separate sampling technique. Within the provider strata in each state, simple random sampling was used to give eligible subscribers an equal opportunity of selection.

Table 1 Respondents Proportional Allocation Table

S/No.	Network Provider	Percentage of Active Subscribers	Sample Allocation
1.	Airtel	35.0/100 x 400	= 140
2.	Globacom	10.0/100 x 400	= 40
3.	MTN	54.0/100 x 400	= 216
4.	9Mobile	1.0/100 x 400	= 04
5.	Total		= 400

Source: (Survey, 2026).

Sources of Data

The primary data is usually the data that is collected and assembled by the researchers of a current research problem. Some experts such as (Awang et al., 2023) referred to primary data as "first-hand" data structures. The study collected data using primary source through administering a structured online questionnaire to the active internet subscribers within northeastern Nigeria. Primary source of data was considered appropriate because it provides first-hand information directly related to the research objectives. Similarly, secondary source of data was obtained from scholarly journal articles, textbooks, conference proceedings, reports published by the Nigerian Communications Commission (NCC), publications of the National Bureau of Statistics (NBS), and other credible academic and institutional sources. These materials were utilized to support the literature review and provide contextual information for the study.

Questionnaire

Data were collected using a structured questionnaire developed from measurement scales adopted from previous empirical studies. The questionnaire was used in order to provide a standardized means of collecting quantitative data from a relatively large number of respondents. It comprised two sections. Section A collected demographic information, including gender, age, educational qualification, occupation, and monthly income. Section B contained items measuring convenience, assurance and security, and customer loyalty. Responses were recorded on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Variable Identification and Measurement

The study comprises one dependent variable and four independent variables. Customer loyalty is the dependent variable, while convenience, assurance and security are the independent variables. Customer loyalty is operationalized through continued use or patronage, intention to continue using the network, willingness to recommend, positive word-of-mouth and satisfaction-related indicators reflected in the questionnaire. The independent variables are measured through respondents' perceptions of service convenience, assurance and security. All items are rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The measurement items and their sources are presented as follows:

Table 2 Variable Identification and Measurement

Name	Variables	Proxies	Items	Sources
CSL1	Customer Loyalty	Repurchase intention	I make repeat purchases to this telecommunications company	Anser et al. (2021)
CSL2		Repurchase intention	In the future, I intend to use this telecommunications company.	(Ajina et al., 2023)
CSL 3		Repurchase intention	Brand reputation influences my purchase decision.	(Gautam et al., 2023)

Name	Variables	Proxies	Items	Sources
CSL 4		Repurchase intention	I am willing to pay more for my preferred brand compared to a competitor's	(Gautam et al., 2023)
CSL 5		Willingness to Recommend	I recommend this telecommunications company to someone who seeks my advice.	(Gautam et al., 2023)
CSL 6		Willingness to Recommend	The brand name is important to me when I choose this telecommunication network	(Gautam et al., 2023)
CSL 7		Word-of-mouth	I say positive things about this telecommunication network to other people.	(Anser et al., 2021)
CSL 8		Word-of-mouth	I will advise my friends to use this telecommunication network.	(Ajina et al., 2023)
CSL 9		Satisfaction	My data subscription is worth the price I paid for it	(Gautam et al., 2023)
CSL10		Satisfaction	My overall experience of purchasing through this network was very satisfying.	(Anser et al., 2021)
SCT1	Service Quality	Security	I feel the risk of using this telecommunications company is minimal	(Rahmawati et al., 2020).
SCT2		Security	I believe my financial information is protected when using this network	(Rahmawati et al., 2020).
SCT3		Security	I am confident that the security of this company supports my comfort as a subscriber	(Rahmawati et al., 2020).
SCT4		Security	Only authorized users can access the services provided by this service provider	(Agarwal & Dhingra, 2023).
SCT5		Security	Data is protected from attacks while it is hosted	(Agarwal & Dhingra, 2023).
SCT6		Security	Data is safe from natural disaster while it is hosted	(Agarwal & Dhingra, 2023).
SCT7		Security	Employees do not use and share data without permission	(Agarwal & Dhingra, 2023).
SCT8		Security	Data encryption is used in transactions	(Agarwal & Dhingra, 2023).
SCT9		Security	This network is free from transaction frauds	(Abu-Taieh et al., 2022).
SCT10		Security	My personal information is not leaked by this service provider	(Abu-Taieh et al., 2022).
ASR1	Service Quality	Assurance	This telecommunications company offers prompt services	(Parasuraman et al., 1988)
ASR2		Assurance	Customer service requests are duly followed up by the company	(Parasuraman et al., 1988)
ASR3		Assurance	Telecommunication company is promptly reacting to problems	(Parasuraman et al., 1988)
ASR4		Assurance	Telecommunication company has been managing its security policy	(Parasuraman et al., 1988)

Name	Variables	Proxies	Items	Sources
ASR5		Assurance	I can contact the service provider anytime when I encounter a problem	(Parasuraman et al., 1988)
ASR6		Assurance	This Telecom munication company is able to meet the needs and desires of customers according to the type of complaint	(Parasuraman et al., 1988)
ASR7		Assurance	I can easily convey comments, suggestions, criticisms, questions, or complaints to this Telecom munication company	(Parasuraman et al., 1988)
ASR8		Assurance	This Telecom munication company always provides notifications about bonuses, events, and current rates	(Parasuraman et al., 1988)
ASR9		Assurance	This Telecom munication company responds to customer complaints promptly	(Parasuraman et al., 1988)
ASR10		Assurance	Telecommuni cation company can be trusted in providing prompt services	(Parasuraman et al., 1988)
CVC1	Service Quality	Convenience	My mobile network provider makes it easy for me to choose the services that best meet my communicati on needs.	(Parasuraman et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC2		Convenience	It is easy to obtain information about data plans, voice tariffs, and other services from my network provider.	(et al., Parasuraman et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC3		Convenience	I can subscribe to new services or recharge my account quickly and conveniently.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC4		Convenience	Customer service channels (physical offices, app, website, or call centre) are easy to access whenever I need assistance.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC5		Convenience	The locations of the provider's service centres are convenient for me.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC6		Convenience	The provider's mobile app or online platform allows me to complete transactions without difficulty.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC7		Convenience	I can activate internet bundles or other services within a short time	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC8		Convenience	The provider enables me to use its teleco mmunication services with minimal time and effort.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)

Name	Variables	Proxies	Items	Sources
CVC9		Convenience	When I experience service problems, they are resolved quickly and conveniently.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)
CVC10		Convenience	Overall, my mobile network provider makes using its services convenient and hassle-free.	(Berry et al., 2002; Seiders et al., 2007; Colwell et al., 2008)

Research Hypotheses

These hypotheses were derived as a result of reviewing the literature works of Parasuramann et al. (1988) and Ribeiro et al. (2024) which was reported in the conceptual framework.

H_1: Convenience has a positive and significant effect on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria.

H_2: Assurance has a positive and significant effect on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria.

H_3: Security has a positive and significant effect on customer loyalty among active internet subscribers of telecommunications companies in Northeastern Nigeria.

Data Collection Procedure

The data-collection procedure followed a sequence of preparation, administration, screening and coding. The final instrument was administered to eligible active internet subscribers across Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States. Before completing the questionnaire, respondents would be informed of the purpose of the study and the voluntary nature of participation. Only respondents who agreed to participate were included. Confidentiality should be maintained, and the information collected will be used for academic purposes. After retrieval, the questionnaires were screened for completeness and consistency, coded and entered into IBM SPSS Statistics for data cleaning and analysis.

Analysis and Interpretation

Reliability of the Instrument

The reliability of the research instrument was evaluated using Cronbach's Alpha coefficient to determine the internal consistency of the measurement scales. Cronbach's Alpha is another way of assessing reliability of items because it reveals the extent to which items measuring the same construct produce consistent results. An alpha coefficient of 0.70 indicates acceptable reliability, while values exceeding 0.80 reflect good internal consistency (Hair et al., 2019).

Table 3 Reliability Test Result

CONSTRUCT	ITEMS	CRONBACH'S ALPHA
Customer Loyalty	12	0.863
Convenience	04	0.945
Assurance	07	0.943
Security	08	0.943

Source: (Survey, 2026)

The reliability analysis was conducted separately for customer loyalty, convenience, assurance and security. Cronbach's Alpha coefficients were 0.863, 0.945, 0.943 and 0.943 respectively. Using the study's stated criterion of 0.70 or above, all four constructs demonstrated acceptable internal consistency. Customer loyalty (0.863) showed good internal consistency, assurance (0.943) showed excellent internal consistency, convenience (0.945) showed excellent internal consistency, and security (0.943) showed excellent internal consistency which they all met the acceptable threshold.

Method of Data Analysis

The data analysis was conducted with the aid of Structural Equation Model - Analysis of Moment Structure (SEM-AMOS, 23.0). Structural Equation Modeling (SEM) is a Second-Generation Method of Multivariate Analysis Technique developed to overcome some limitations in Ordinary Least Squares (OLS) regression especially when dealing with the constructs (Awang et al., 2023). This tool of analysis was used because of the nature of its significance especially when the model has become more complicated with the increased number of variables and it involves constructs rather than variables (Awang et al., 2023). Prior to data analysis, the demographic characteristic of the respondent was summarized, analyzed and presented using same (SEM-AMOS, 23.0). Similarly, it was used to estimate the statistical effects of convenience, assurance and security on customer loyalty. The regression coefficients, significance levels, model fit statistics and related diagnostic results were used to evaluate the hypotheses of the study.

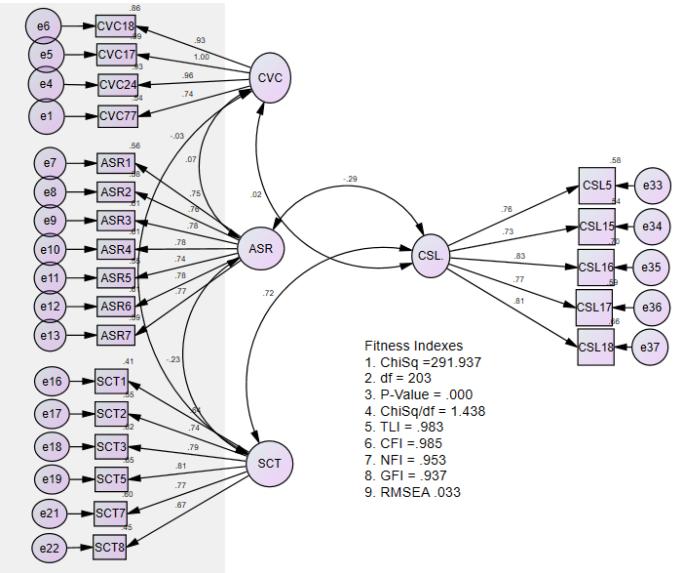

Figure 2 *Model's Standardized Estimate*

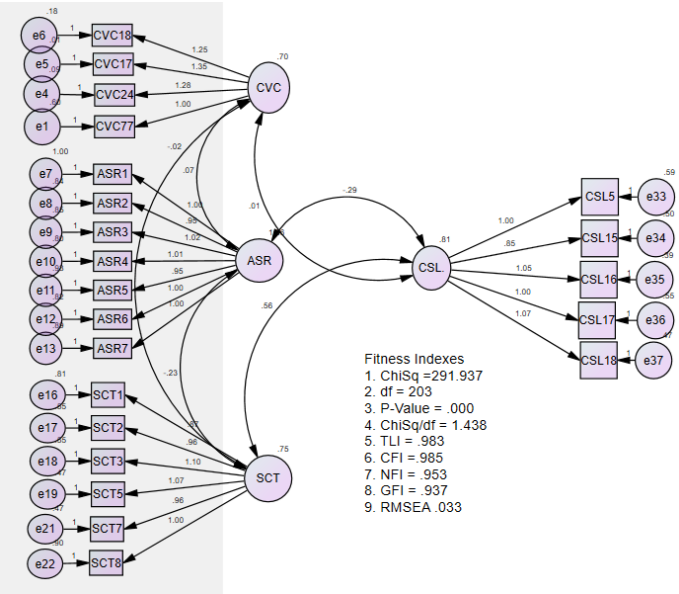

Figure 3 *Model's Unstandardized Estimate*

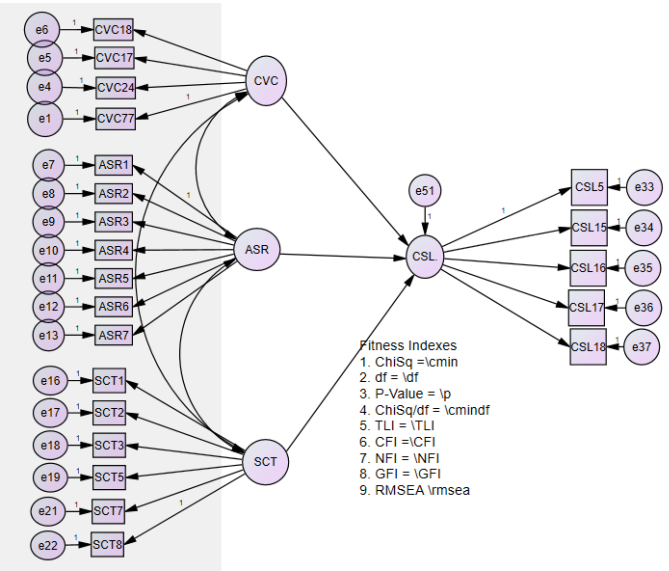

Figure 4 *Model's Direct Estimate*

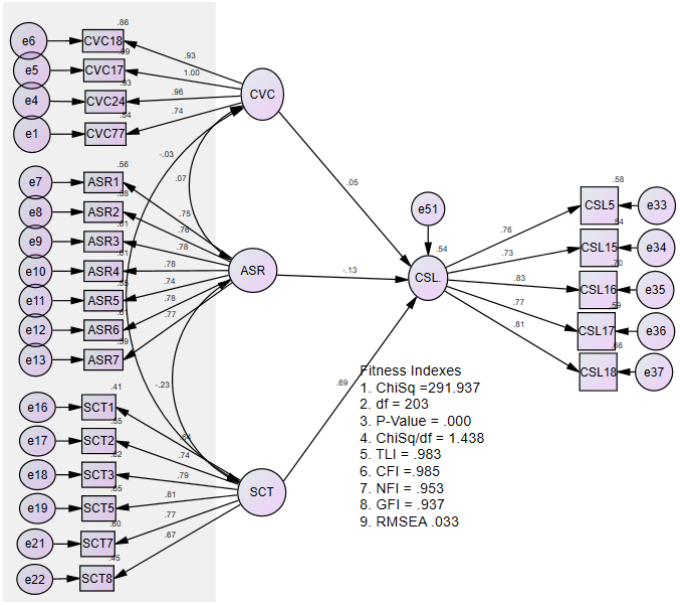

Figure 5 *Model's Factor Loadings and Adjusted R2*

Table 4 Convergent and Discriminant Validity

Constructs	Proxies	Factor Loading	Internal Reliability	CR (Above 0.6)	AVE (Above 0.5)
Customer Loyalty	Customer Loyalty	0.75	0.908	0.888	0.613
		0.73			
		0.84			
		0.77			
		0.82			
Service Quality	Convenience	0.74	0.945	0.951	0.830
		0.96			
		1.00			
		0.93			
	Assurance	0.77	0.908	0.908	0.585
		0.78			
		0.74			
		0.78			
		0.78			
		0.76			
		0.75			
		0.78			
	Security	0.81	0.868	0.878	0.548
		0.79			
		0.75			
		0.63			

Discriminant Validity

Discriminant validity is used to assess whether constructs are distinct and no redundant from the model of the study. These redundant constructs are found when there is high rate of collinearity in the model of investigation. Therefore, the need for discriminant validity test is useful in this study so that the

constructs should be free from high rate of overlapping among themselves. For this reason, this study established a discriminant validity table where the diagonals were written in bold to indicate that they are the square roots of the Average Variance Extracted (AVE) of the pooled factor loadings of a particular construct. On the other hand, the correlation coefficients were used to relate the pair of the constructs.

Table 5 The Discriminant Validity among Constructs

Constructs	Convenience	Assurance	Security
Convenience	0.911		
Assurance	0.073	0.765	
Security	-0.029	-0.233	0.740

Source: (Researcher's Computation, 2026)

The results obtained from table 26 above indicated that the Discriminant Validity of the above constructs is achieved if the square root of its AVE exceeds its correlation value with other constructs in the model (Abdul Rahim et al., 2022; Baharum et al., 2023; Rahlin et al., 2022, 2023). Thus, this can be understood by having bold numbers in the diagonals to be greater than that of figures in their rows and columns. Therefore, this study revealed that all the constructs have achieved Discriminant Validity Assessment.

The Assessment of Normality for all constructs

Before examining the structural model of this study, it is important to evaluate the normality of all the constructs of the study so that effective execution of SEM-AMOS would be achieved. Since SEM-AMOS uses tools for the parametric-statistics to model research studies, the researcher must make sure he confirms the normality distribution of every item that measure its corresponding construct. Based on Awang (2023), the study brought mean, standard deviation, variance, skewness and kurtosis. Besides, skewness values must line from -1.5 to 1.5 as satisfactory as recommended by Awang (2023).

Table 6 The Evaluation of Normality Distribution Table

Construct	Mean	Standard Deviation	Variance	Skewness	Kurtosis
CSL5	3.64	1.182	1.398	-0.704	-0.314
CSL15	3.67	1.039	1.079	-0.655	-0.095
CSL16	3.77	1.134	1.287	-0.818	-0.111
CSL17	3.72	1.167	1.361	-0.729	-0.275
CSL18	3.68	1.181	1.395	-0.721	-0.303
CVC77	3.68	1.142	1.305	-0.389	-1.018
CVC24	3.63	1.119	1.251	-0.215	-1.236
CVC17	3.60	1.135	1.288	-0.157	-1.300
CVC18	3.62	1.131	1.279	-0.210	-1.270
SCT1	3.61	1.178	1.378	-0.820	-0.221
SCT2	3.71	1.114	1.241	-0.753	-0.016
SCT3	3.71	1.210	1.464	-0.705	-0.449
SCT5	3.75	1.157	1.338	-0.838	-0.067
SCT7	3.66	1.078	1.162	-0.750	0.095
SCT8	3.55	1.285	1.652	-0.556	-0.773
ASR1	2.65	1.506	2.267	0.367	-1.337
ASR2	2.60	1.406	1.976	0.490	-1.118
ASR3	2.68	1.473	2.170	0.375	-1.290
ASR4	2.58	1.444	2.085	0.445	-1.228
ASR5	2.55	1.440	2.073	0.492	-1.150
ASR6	2.62	1.444	2.085	0.399	-1.252
ASR7	2.63	1.470	2.162	0.425	-1.256

Source: (SPSS, 25.0)

The values of skewness and kurtosis for all components in the model fall within the range between -1.5 and 1.5 which means their distribution does not depart from normality (Awang, 2023). Therefore, it has been clearly indicated that the data distribution have achieved the minimum requirement of normality distribution for adopting the parametric statistical analysis using SEM-AMOS. As soon the CFA assessment has been accomplished and the requirement for Validity. Reliability, and Normality distribution have all been ascertained, the study can step forward for testing the structural model.

Table 7 Overall Model Fit Indices

Name of category	Name of index	Level of acceptance	Present Level	Decision
Absolute Fit Index	RMSEA	RMSEA < 0.08	0.033	Achieved
	GFI	GFI > 0.85, Ideal if > 0.90	0.937	Achieved
Incremental Fit Index	CFI	CFI > 0.85, Ideal if > 0.90	0.985	Achieved
	TLI	TLI > 0.85, Ideal if > 0.90	0.983	Achieved
	NFI	NFI > 0.85, Ideal if > 0.90	0.953	Achieved
Parsimonious Fit Index	ChiSq /df	Chi-Square/ df < 5.0, Ideal if < 3.0	1.438	Achieved

Table 8 Hypotheses Testing

Regression Weights: (Group number 1 - Default model)			**Estimate**	**S.E.**	**C.R.**	**P**	**Label**
CSL.	<---	CVC	.050	.043	1.140	.254	par_22
CSL.	<---	SCT	.717	.068	10.535	***	par_23
CSL.	<---	ASR	-.104	.036			

According to the table above, hypotheses H_1 was not significant while H_2 and H_3 were statistically significant and in the directions of hypotheses. Hence, the Beta value Estimate (β), Standard Error (S.E), Critical Ratio (C.R), and P-value for the hypotheses were (β= 0.050, 0.717, and -0.104); (S.E = 0.043, 0.068, 0.036); (C.R = 1.140, 10.535, -2.908), and (p=

0.254, 0.000, and 0.004) respectively. The first hypothesis was not statistically significant due to lack of fulfilling the required beta values, Standard Error, Critical Ratio as well as p-value, while the two other hypotheses were statistically significant; these hypotheses were accepted due to their successful fulfillment of the requirement of beta values, Standard Errors, Critical Ratios as well as p-values.

Discussion of Findings

Convenience has no positive and significant effect on perceived value among active internet subscribers in northeastern Nigeria. This result has gone contrary to the results of (Pinaraswati et al., 2024) which found that convenience has positive and significant effect on perceived value. Therefore, it can be concluded that customer expectations of telecommunications service quality convenience was not in line with what is perceived by the subscribers in northeastern Nigeria.

Similarly, the result acquired from the findings of the effect of assurance on perceived value among active internet subscribers of telecommunication companies in northeastern Nigeria. It was clearly found that there was positive and significant effect of assurance on perceived value among active internet subscribers of telecommunication companies in northeastern Nigeria. This result is in line with the result of (Anhar et al., 2024; Dangaisoa et al., 2024) which also found that assurance has positive and significant effect on perceived value. Therefore, it can be concluded that customer expectations of telecommunications service quality assurance was in line with what is perceived by the subscribers in northeastern Nigeria.

Thus, the result from the findings of the effect of security on perceived value among active internet subscribers of telecommunication companies in northeastern Nigeria. It was clearly found that there is positive and significant effect of security on perceived value among active internet subscribers of telecommunication companies in northeastern Nigeria. This result is in line with the results of (Akpan & Etuk, 2024; Kokila & Vani, 2025) which still found that safety has positive and significant effect on perceived value. Therefore, it can be concluded that customer expectations of telecommunications service quality security was in line with what is perceived by the subscribers in northeastern Nigeria.

Conclusion

This study concluded that two proxies of service quality (assurance and security) have positive and significant effect on customer loyalty. However, only one proxy of service quality (convenience) has no positive and significant effect on customer loyalty.

Recommendations

The main objective of this study is to examine the effect of service quality and customer loyalty among active internet subscribers in Northeastern Nigeria. It has been found that service quality has significant effect on customer loyalty among active internet subscribers of telecommunication companies in Northeastern Nigeria. Based on the findings above, the following recommendations were made:

i. Telecommunication companies should provide adequate, convenient and stable service network to their subscribers within Northeastern Nigeria so that effective customer loyalty would be enhanced;

ii. Telecommunication companies should increase in providing prompt data service subscription to their subscribers within Northeastern Nigeria so that assured customer loyalty would be maximized;

iii. Telecommunication companies should increase strong security and safety measures to their subscribers so that cyberattacks would be minimized properly.

Recommendation for Further Studies

Future studies should incorporate perceived value as an intervening variable among service quality and customer loyalty among active internet subscribers in Northeastern Nigeria.

Managerial Implications

This study has provided empirical evidences that would assist telecommunications service providers in identifying the dimensions of service quality that most strongly affect customer loyalty. Such evidence can guide in formulating strategic decisions aimed at improving service delivery, enhancing customer satisfaction, reducing subscriber switching, and strengthening long-term customer relationships. Similarly, policymakers and government agencies like Nigeria Communications Commission (NCC) could be assisted by providing empirical information that can support the formulation, implementation, and evaluation of policies aimed at improving service quality standards, protecting consumers, and promoting sustainable growth within the telecommunications sector by strengthening regulatory frameworks that encourage improved network performance and maximum customer loyalty.

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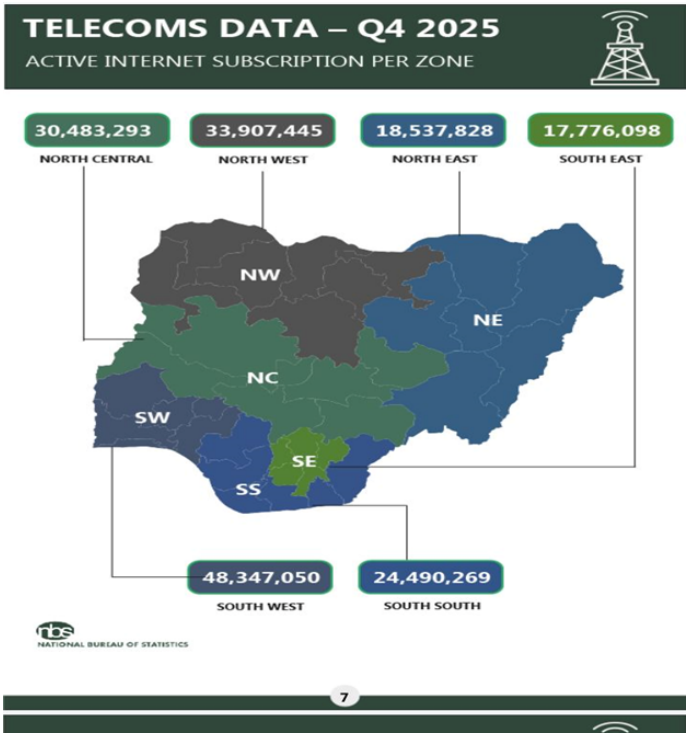
Appendix

A: Active Internet Subscription per Zone



B: Rotated Component Matrix 1

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
CVC5	.819					
CVC3	.796					
CVC4	.785					
CSL5	.758					
CVC2	.725					
ASR9	.669					
CVC1	.644					
CSL2	.624					
CSL3	.623					
ASR8	.616					
CSL6	.598					
CSL1	.515					
SCT8		.847				
SCT5		.845				
SCT3		.833				
SCT7		.813				
SCT10		.813				
SCT2		.805				
SCT9		.798				
SCT6		.771				
ASR5			.883			
ASR3			.868			
ASR7			.864			
ASR6			.857			
ASR1			.846			
ASR2			.845			
ASR4			.821			
CSL10				.961		
CSL9				.961		
CSL8				.943		
ISP4				.585		
CVC10					.938	
CVC9					.938	
CVC8					.876	
ISP1					.567	
NCV3						
NCV1						
ISP7						

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

D: Rotated Component Matrix 3

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
SCT5	.848					
SCT8	.847					
SCT3	.840					
SCT7	.825					
SCT10	.814					
SCT2	.812					
SCT9	.802					
SCT6	.756					
CVC5		.813				
CSL5		.805				
CVC3		.796				
CVC4		.765				
CSL2		.700				
CVC2		.661				
CVC1		.641				
ASR9		.619				
ASR8		.618				
ASR5			.877			
ASR7			.873			
ASR3			.869			
ASR6			.863			
ASR1			.855			
ASR2			.837			
ASR4			.822			
CSL9				.980		
CSL10				.980		
CSL8				.965		
ISP4				.544		
CVC9					.963	
CVC10					.963	
CVC8					.909	
ISP1					.528	
CSL3						.766
CSL6						.717
CSL1						.717

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

C: Rotated Component Matrix 2

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
CVC5	.792					
CVC4	.790					
CVC3	.754					
CSL3	.743					
CSL6	.728					
CVC1	.708					
CVC2	.704					
CSL5	.687					
CSL1	.633					
ASR9	.625					
CSL2	.579					
ASR8	.532					
ASR10						
ISP9						
NCV10						
SCT2		.848				
SCT7		.836				
SCT8		.827				
SCT5		.817				
SCT3		.790				
SCT10		.757				
SCT9		.751				
SCT6		.710				
SCT4	.571	.588				
NCV6						
ASR5			.882			
ASR7			.863			
ASR3			.860			
ASR6			.849			
ASR2			.845			
ASR1			.835			
ASR4			.810			
CVC6						
CSL9				.928		
CSL10				.928		
CSL8				.912		
ISP4				.562		
ISP2						
NCV5						
NCV2						
ISP8						
NCV9						
CVC9					.888	
CVC10					.888	
CVC8					.831	
ISP1					.584	
ISP3						
NCV3						
CSL4						
NCV7						
NCV1						
ISP7						-.721
SCT1		.515				.656
CVC7						
ISP5						
NCV4						
CSL7						
ISP10						
NCV8						
ISP6						

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.