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Service Delivery Gaps and Non-Technical Electricity Losses : the Mediating Role of Customer Experience in ENEO Cameroon S.A.

Nweshi Prisca[1] | Prof. Yongho Shiwoh Louis[2] | Dr. Penyia Elvis Che[1]

Affiliations

1.Kesmonds International University / Green Hope University, Cameroon
2.University of Bamenda, Cameroon

Corresponding Author:

Nweshi Prisca
Email:
akwaamah@kesmondsuniversity.org

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ABSTRACT

Non-technical losses (NTLs) remain a major challenge for electricity distribution systems in sub-Saharan Africa, affecting both utility revenues and service delivery. This study examines NTLs from a service delivery perspective by investigating the relationships among system reliability, service delivery gaps, customer experience, and NTL behaviours at ENEO Cameroon S.A. The study was guided by Service-Profit Chain Theory (Heskett et al., 1994), Service Quality Theory (Parasuraman et al., 1988), and Rational Choice Theory (Becker, 1968). A quantitative cross-sectional explanatory design was used. Data were collected from 210 frontline employees through a census and 200 customers selected using stratified random sampling in Douala and Yaoundé. Structural equation modelling using AMOS 29, confirmatory factor analysis, and mediation analysis using Hayes' PROCESS macro (Model 4, 5,000 bootstrap samples) were employed to analyze the data. The findings showed that system reliability and service delivery gaps were significantly related to customer experience, while customer experience significantly predicted NTL behaviours. Customer experience fully mediated the relationships between system reliability, service delivery gaps, and NTL behaviours. The study highlights the importance of customer experience in understanding non-technical losses and provides evidence that improvements in service reliability and service delivery may contribute to reducing NTL behaviours in the electricity distribution sector.

Keywords : non-technical losses, customer experience, service delivery gaps, system reliability, electricity theft, ENEO Cameroon, utility governance, mediation analysis, sub-Saharan Africa, SERVQUAL, rational choice theory, service-profit chain

1. INTRODUCTION

Electricity distribution utilities in developing economies face significant operational and financial challenges. These organizations are expected to maintain reliable electricity services while also protecting their revenues from losses. One of the major challenges is non-technical losses (NTLs), which result from human and organizational practices rather than physical losses in the electricity network. These practices include unauthorized electricity consumption, meter tampering, billing manipulation, and deliberate non-payment (Adewuyi & Ogunleye, 2023; World Bank, 2022). In sub-Saharan Africa, NTLs are reported to account for a substantial proportion of electricity distributed, resulting in revenue losses that can limit utilities company's ability to invest in infrastructure and improve service reliability (IEA, 2023; Adelaja et al., 2022).

ENEO Cameroon S.A. (The Energy of Cameroon), the country's main electricity utility, also faces the challenge of non-technical losses. Despite regulatory measures and efforts to control electricity fraud, NTLs continue to be a major concern, particularly in the highly populated urban areas of Douala and Yaoundé. NTL behaviour is often explained in terms of customer opportunism, illegal practices, and weak enforcement (Buatsi et al., 2023). Although these factors are important, this perspective may overlook the role of service conditions in shaping customers' decisions about electricity use and payment. Customers who experience unreliable supply, billing problems, delays in service, or poor responses to complaints may develop negative perceptions of the utility company, which could affect their willingness to comply with established electricity-use requirements.

Recent studies have increasingly considered the relationship between service delivery and customer behaviour. problems such as delays in connections, billing errors, poor handling of complaints, and unreliable electricity supply can weaken customer trust in the utility (Smith & Walker, 2023; Wirtz et al., 2022; Grönroos, 2021). Customer experience is particularly relevant because it reflects customers' overall assessment of their interactions with the service provider over time (Lemon & Verhoef, 2023; De Keyser et al., 2020). When customers consistently experience poor service, their perceptions of the utility may deteriorate, potentially affecting their willingness to comply with electricity-use and payment requirements. Customer experience may therefore provide an important link between service delivery conditions and NTL behaviours.

Although the relationship between service delivery and customer behaviour have been widely studied, empirical evidence from African electricity utilities remains scarce, particularly in Cameroon. This study therefore examines the relationships among system reliability, service delivery gaps, customer experience, and NTL behaviours at ENEO Cameroon. Specifically, the study seeks to: (1) examine the relationship between system reliability and customer

experience; (2) assess the relationship between service delivery gaps and customer experience; (3) examine the relationship between customer experience and NTL behaviours; and (4) determine whether customer experience mediates the relationships between service delivery factors and NTL behaviours.

The remainder of the paper is organized as follows. Section 2 reviews the relevant theoretical and empirical literature. Section 3 presents the conceptual model and hypotheses. Section 4 describes the methodology. Section 5 presents and discusses the findings. Section 6 provides policy recommendations, while Section 7 presents the conclusion, limitations, and directions for future research.

2. LITERATURE REVIEW

2.1 Non-Technical Losses: Conceptualization and African Context

Non-technical losses (NTLs) refer to electricity losses that result from human or administrative practices rather than physical losses in the distribution network. They include electricity theft, meter bypassing, illegal connections, billing errors, administrative mistakes, and deliberate non-payment (Adewuyi & Ogunleye, 2023). Recent studies have examined NTLs from broader institutional and customer-related perspectives, rather than viewing them only as technical or criminal problems (Kocaman et al., 2023; Adelaja et al., 2022). This perspective suggests that efforts to reduce NTLs should consider both enforcement measures and the quality of services provided to customers (Smith & Walker, 2023).

In sub-Saharan Africa, several factors have been associated with NTLs, these include weak enforcement systems, energy poverty, informal settlements, metering challenges, and the perceptions of unfair utility services (World Bank, 2022; IEA, 2023). In Cameroon, ENEO operates in an environment where electricity supply faces frequent challenges such as, aging infrastructure, and differences in service quality across neighborhoods remain major concerns. Such conditions may influence how customers perceive the utility and may also affect their willingness to comply with electricity-use and payment requirements (Buatsi et al., 2023).

2.2 Service Delivery Gaps in Utility Systems

Service delivery gaps occur when the service customers expect differs from the service they actually receive. These differences can relate to responsiveness, reliability, assurance, empathy, and other aspects of service quality (Parasuraman et al., 1988). In electricity distribution, service gaps may be observed through delays in new connections and meter installations, billing errors, poor complaint handling, unclear token generation processes, and inadequate communication with customers (Grönroos, 2021; Akdere et al., 2022). Studies applying the SERVQUAL framework in essential service settings have shown that poor service delivery can affect customer trust and perceptions of the service provider (Akdere et al., 2022; Al-Ababneh, 2023).

The consequences of poor service delivery extend beyond customer dissatisfaction. Electricity is an essential service, and customers often have few alternatives when the service is unreliable or when they experience persistent problems with the utility. Continued service difficulties may therefore influence payment behavior, reporting of unauthorized consumption, and other forms of compliance (Smith & Walker, 2023; Kocaman et al., 2023). This suggests that improving service delivery may be relevant to efforts aimed at reducing NTLs (IEA, 2023; Adewuyi & Ogunleye, 2023).

2.3 System Reliability and Compliance Behaviour

System reliability refers to the continuity, stability, and predictability of electricity supply and is a key measure of how well electricity distribution service performance (Andersen et al., 2022). Customers are more likely to evaluate a utility positively when electricity supply is reasonably stable and predictable. In contrast, frequent outages and voltage fluctuations may reduce customers' confidence in the utility and their perception of the value of the service received (Wirtz et al., 2022; De Witte et al., 2024).

Research also suggests that customers' perceptions of fairness can influence their willingness to comply with payment and service requirements. When customers believe that the quality of electricity supplied does not correspond with the service they expect, they may become less willing to pay or may be more accepting of unauthorized access to electricity (Andersen et al., 2022; Smith & Walker, 2023). System reliability may therefore be an important factor to consider when examining customer compliance and NTL behaviours.

2.4 Customer Experience as Mediating Construct

Customer experience (CX) refers to customers to how customers perceive their overall interactions with a service provider over time. This includes their experiences during initial contact, service delivery, billing, complaint handling, and the resolution of service problems (Lemon & Verhoef, 2023). Unlike a single assessment of satisfaction, customer experience develops from multiple interactions. It also captures customers' thoughts, feelings, and responses throughout the service process (De Keyser et al., 2020; Homburg et al., 2023).

In utility services, customer experience can help explain the relationship between service performance and why service performance affects customer behaviour. Customers who repeatedly experience unreliable electricity supply, billing problems, or slow responses to complaints may develop negative views of the utility. These experiences may affect trust, payment behaviour, and willingness to comply with service requirements (Lemon & Verhoef, 2023; Wirtz et al., 2022).

CX can also be linked to Becker's (1968) Rational Choice Theory. From this perspective, customers weigh the costs and benefits associated with

their decisions. When customers have negative experiences with a utility, they may perceive non-payment or unauthorized electricity use as more acceptable or beneficial. Thus, customer experience may provide a link between service conditions and NTL behaviours. Previous studies have also highlighted customer experience plays an important role in explaining the relationship between service quality and customer behavioural outcomes (Homburg et al., 2023; De Keyser et al., 2020).

3. THEORETICAL FRAMEWORK AND HYPOTHESES

3.1 Theoretical Foundations

This study draws on three theoretical perspectives to explain the relationship between service delivery, customer experience, and non-technical losses are connected in electricity distribution sector. First, Service-Profit Chain Theory (Heskett et al., 1994; Wirtz et al., 2022) provides a basis for understanding how the quality-of-service processes influences customer outcomes and, ultimately, organizational performance. In the context of ENEO Cameroon, the theory suggests that issues with system reliability and service delivery can shape customers' experiences and their subsequent behaviour toward the utility.

Second, Service Quality Theory (Parasuraman et al., 1988; Grönroos, 2021) explains how customers evaluate the quality of services they receive. The theory outlines five core dimensions of service quality, including reliability, responsiveness, assurance, empathy, and tangibles. These dimensions offer a useful framework for analyzing service delivery gaps and understanding how those gaps may affect customer experience in electricity distribution.

Third, Rational Choice Theory (Becker, 1968; Smith & Walker, 2023) provides a perspective for understanding why some customers engage in non-compliant electricity-use behaviours. The theory assumes that individuals weigh expected benefits and costs before making a decision. When applied to NTL behaviours, it suggests that customers may consider gains from non-payment or unauthorized electricity use alongside the possibility of detection and penalties. Poor experiences with the utility can shape how customers evaluate these choices and their willingness to comply with electricity-use and payment requirements.

3.2 Conceptual Model and Hypotheses

Based on these theoretical perspectives, the study proposes a model in which system reliability (SR) and service delivery gaps (SDG) influence non-technical loss behaviours (NTL) through customer experience (CX). In this model, customer experience serves as the mediating variable between service-related factors and NTL behaviours. Figure 1 presents the conceptual model, including the study variables and the proposed relationships among them.

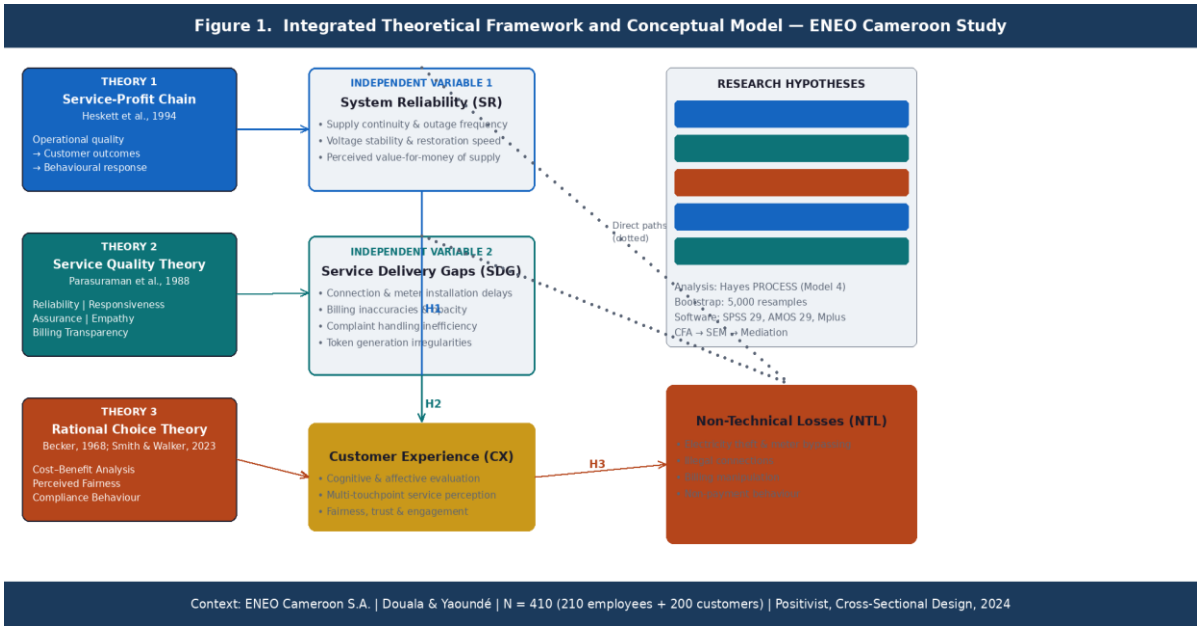


Figure 1. *Integrated Theoretical Framework and Conceptual Model. SR = System Reliability; SDG = Service Delivery Gaps; CX = Customer Experience; NTL = Non-Technical Losses. Solid arrows = hypothesised direct paths; dotted arrows = direct effects tested against mediated model. H1–H5 indicate research hypotheses*

Research Hypotheses

H1: System reliability has a significant positive effect on customer experience at ENEO Cameroon.

H2: Service delivery gaps have a significant negative effect on customer experience.

H3: Customer experience has a significant negative effect on non-technical loss behaviours.

H4: Customer experience significantly mediates the relationship between system reliability and NTL behaviours.

H5: Customer experience significantly mediates the relationship between service delivery gaps and NTL behaviours.

4. METHODOLOGY

4.1 Research Design and Philosophical Stance

The study adopted a quantitative, cross-sectional, single-case explanatory design grounded in a positivist approach (Creswell & Creswell, 2018). This approach was considered appropriate because the study tested the proposed hypotheses using statistical analysis. Data were collected from employees and customers of ENEO Cameroon at one point in time. Although the cross-sectional design does not allow changes over time or causal relationships to be established with certainty, it was appropriate for examining the relationships among service delivery conditions, customer experience, and NTL behaviours during the study period (Saunders et al., 2019). Focusing on ENEO Cameroon as a single case also made it possible to explore these relationships within a specific electricity distribution context, although the use of one utility may limit the generalization

of the findings to other distribution utilities companies.

4.2 Study Area, Population, and Sampling

The study was conducted in Douala in the Littoral Region and Yaoundé in the Centre Region. These two cities were chosen because they have a large share of ENEO Cameroon's customer base and a high concentration of electricity users. The study included two groups of respondents. The first group consisted of 210 frontline and technical employees of ENEO in the two cities. Because the number of employees in the defined population was manageable, all 210 employees were included in the study.No sampling was needed. The second group consisted of 200 customers drawn from residential, commercial, and industrial categories using stratified random sampling. The customer strata were based on the distribution of customer categories in the two cities. 410 respondents participated in the study.

The customer sample size of 200 was deemed sufficient for the planned structural equation modelling analysis based on commonly used sample size guidelines for models involving several latent constructs (Hair et al., 2019). The inclusion of all 210 employees also avoided the need to select a sample from the defined employee population. A response rate of 95.7% was obtained from employees and 94.3% from customers. The high response rates reduced the likelihood of substantial non-response bias in the study (Baruch & Holtom, 2008).

4.3 Instrumentation and Measurement

Data were collected using structured questionnaires prepared in English and French. Separate version of questionnaires was administered to employees and customers. The employee questionnaire focused on service delivery conditions, operational issues, and performance-related information. The customer questionnaire measured four core constructs: system reliability (SR, 6 items), service delivery gaps (SDG, 8 items), customer experience (CX, 7 items), and NTL behavioural tendencies (NTL, 5 items). Customer demographic and consumption-related information was also collected. All items were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

The system reliability and service delivery gap measures were adapted from Parasuraman et al. (1988) and Grönroos (2021). The customer experience items were adapted from Lemon and Verhoef (2023) and De Keyser et al. (2020). The NTL behavioral tendency scale was developed based on the work of Smith and Walker (2023) and was reviewed by three scholars with expertise in utility management.

Before the main data collection, a pilot study was conducted with 25 customers and 20 employees from a comparable ENEO operational district. The pilot test was used to assess the clarity of the questionnaire items and the reliability of the scales. Cronbach's alpha values ranged from .73 to .88, indicating acceptable internal consistency. Minor changes were made to some

items following the pilot exercise to improve their clarity within the study context. Table 1 presents the measurement framework and reliability results.

Table 1

Measurement Framework, Scale Sources, and Reliability Coefficients

Construct	Items	Scale Source	Cronbach α	AVE
System Reliability (SR)	6	Parasuraman et al. (1988); Andersen et al. (2022)	**.86**	**.61**
Service Delivery Gaps (SDG)	8	Grönroos (2021); Akdere et al. (2022)	**.88**	**.58**
Customer Experience (CX)	7	Lemon & Verhoef (2023); De Keyser et al. (2020)	**.84**	**.56**
NTL Behavioural Tendencies (NTL)	5	Smith & Walker (2023); developed inductively	**.79**	**.53**
Employee Service Conditions	9	Heskett et al. (1994); Wirtz et al. (2022)	**.83**	**.57**

Note. AVE = Average Variance Extracted. All α values exceed the .70 threshold (Nunnally & Bernstein, 1994). AVE ≥ .50 satisfies convergent validity criteria (Hair et al., 2019). n = 200 customers; n = 210 employees.

4.4 Analytical Approach

Data were analyzed in four main stages. First, SPSS Version 29 was used to run descriptive statistics and frequency distributions.

Which helps summarize respondents' demographic characteristics and how the main study variables were distributed. Second, confirmatory factor analysis (CFA) was performed in AMOS Version 29 to examine the validity of the measurement model. Model fit was evaluated using CFI, TLI, RMSEA, and SRMR. Convergent validity was checked using average variance extracted (AVE) and standardized factor loadings, of .70 or higher were considered acceptable. Discriminant validity was assessed by comparing AVE with the maximum shared variance.

Third, the structural model in AMOS was used to test hypotheses H1–H3. Fourth, the mediating

effects proposed in H4 and H5 were tested using Hayes' PROCESS Macro (Model 4). The analysis used 5,000 bootstrap samples and bias-corrected 95% confidence intervals. An indirect effect was considered statistically significant when its confidence interval did not include zero (Hayes, 2022).

Common method bias was also checked using Harman's single-factor test and the marker variable technique, following Podsakoff et al. (2012). As a final check, Mplus Version 8.10 was used to determine whether the main findings remained consistent across the statistical analyses.

5. RESULTS AND DISCUSSION

5.1 Sample Profile

Table 2summaries the demographic characteristics of both customer and employee respondents. Among the customers, 62.5% (n = 125) were residential customers, while the rest of the respondents were drawn from the commercial and industrial categories. The largest age group fell within 31–45 years making up (48.5%), of the samples. In addition, 67.5% of the customers had attained at least a secondary level of education.

The employee sample was predominantly male accounting for (71.9%). More than half of the employees (58.6%) held technical diplomas, while 54.3% had worked also worked with ENEO for six years and above. All these characteristics provide an overview of the two respondent groups and their backgrounds. Overall, both the customer and employee samples broadly aligned with the target populations identified for the study.

Table 2

Demographic Profiles of Customer and Employee Samples

Characteristic	Category	Customers n (%)	Employees n (%)
Customer Type / Gender	Residential / Male	125 (62.5)	151 (71.9)
	Commercial / Female	54 (27.0)	59 (28.1)
	Industrial / —	21 (10.5)	—
Age Group	18–30 years	46 (23.0)	38 (18.1)
	31–45 years	97 (48.5)	92 (43.8)
	46–60 years	57 (28.5)	71 (33.8)
	Above 60 / —	—	9 (4.3)
Education	Primary/None	12 (6.0)	—
	Secondary	123 (61.5)	76 (36.2)

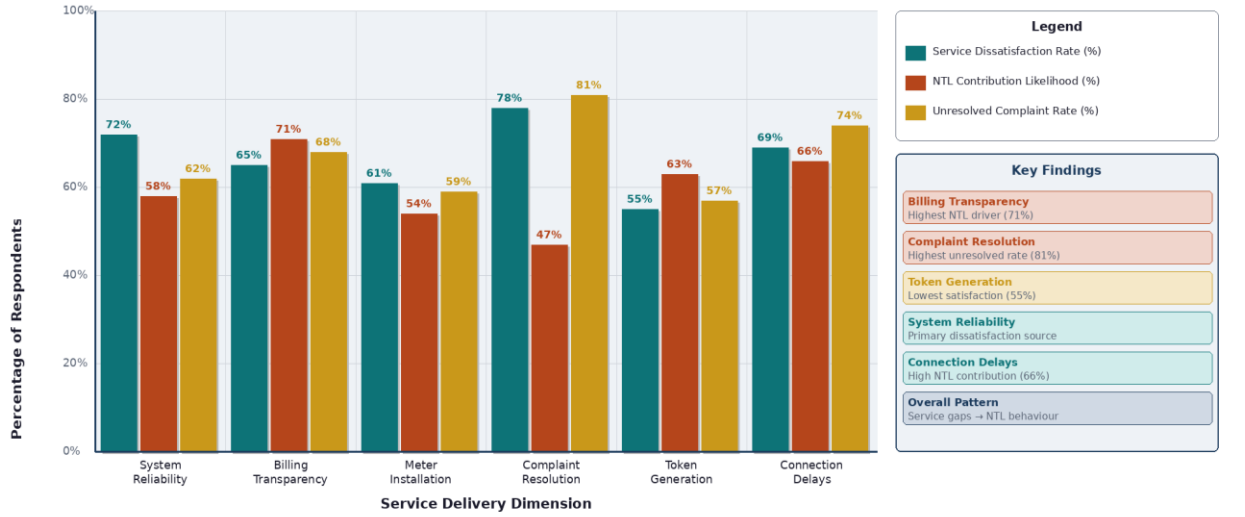
Characteristic	Category	Customers n (%)	Employees n (%)
	Tertiary/University	65 (32.5)	134 (63.8)
Service Tenure (Empl.)	Less than 3 years	—	48 (22.9)
	3–5 years	—	48 (22.8)
	6–10 years	—	72 (34.3)
	Above 10 years	—	42 (20.0)

Note. — = *not applicable to this sample stratum. Percentages rounded to one decimal place.*

5.2 Service Delivery Performance Profile

Table 3 shows a descriptive statistic for the study constructs. System reliability had a mean score of 2.41 (SD = 0.79), indicating generally negative perceptions of how reliable the electricity supply was. Service delivery gaps had a higher mean score of 3.68 (SD = 0.83), which suggests that customers did not notice gaps in the services provided by the utility company. Customer experience had a moderate-low mean score of 2.58 (SD = 0.71), while NTL behavioral tendencies on the other hand, recorded a moderate mean of 3.12 (SD = 0.88). Overall, these results suggest that customers had less favorable experiences with reliability and service delivery, alongside moderate levels of reported NTL-related behavioral tendencies. Figure 2 shows a visual summary of the key service delivery dimensions and how they relate to NTL behaviours in this study.

Figure 2. Service Delivery Performance Deficits and Non-Technical Loss Incidence — ENEO Cameroon (N = 410)



Note. Percentages derived from structured questionnaire responses (N = 200 customers; N = 210 employees). Items recoded to binary dissatisfaction/likelihood indicators. NTL contribution likelihood reflects employee assessment of correlation between each service delivery deficit and non-technical loss incidence in operational zones.

Figure 2. *Service Delivery Performance Deficits and Non-Technical Loss Incidence across Six Dimensions, ENEO Cameroon (N = 410). Complaint Resolution showed the highest unresolved complaint rate (81%) while Billing Transparency demonstrated the highest NTL contribution likelihood (71%). Items recoded to binary dissatisfaction/likelihood indicators for visual comparison.*

Table 3

Descriptive Statistics and Construct Intercorrelations (N = 200 Customers)

Construct	M	SD	α	1	2	3	4
1. System Reliability (SR)	2.41	0.79	**.86**	—			
2. Service Delivery Gaps (SDG)	3.68	0.83	**.88**	−.52**	—		
3. Customer Experience (CX)	2.58	0.71	**.84**	.61**	−.58**	—	
4. NTL Behavioural Tendencies (NTL)	3.12	0.88	**.79**	−.44**	.49**	−.63**	—

*Note. M = mean; SD = standard deviation; α = Cronbach's alpha. Scale: 1 (low) to 5 (high). For SR and CX, higher scores indicate more positive perceptions; for SDG and NTL, higher scores indicate greater gaps/tendencies. **p < .01 (two-tailed).*

5.3 Structural Model Results and Hypothesis Testing

The measurement model fit to the data well. The fit indices were CFI = .94, TLI = .93, RMSEA = .058 (90% CI [.042, .071]), SRMR = .061, and $\chi^2/df = 2.31$. All factor loadings were above .70 and statistically significant at $p < .001$. This supports convergent validity. Discriminant validity was also established, as the AVE values were higher than the maximum shared variance for all pairs of constructs. Common method bias did not indicate a major issue. In Harman's single-factor test, one factor explained 24.3% of the total variance. Table 4 presents the structural path coefficients and the results from testing the hypothesis H1 to H5

Table 4

Structural Model Path Coefficients and Hypothesis Testing Results

Path	β	SE	p	95% CI	Decision
H1: SR → CX	**.48**	.06	<.001	[.36, .60]	**Supported ✓**
H2: SDG → CX	**−.41**	.07	<.001	[−.55, −.27]	**Supported ✓**
H3: CX → NTL	**−.55**	.06	<.001	[−.67, −.43]	**Supported ✓**
H4: SR → CX → NTL (Ind.)	**−.26**	.05	<.001	[−.37, −.16]	**Supported ✓**
H5: SDG → CX → NTL (Ind.)	**.23**	.05	<.001	[.14, .33]	**Supported ✓**
SR → NTL (Direct)	**−.09**	.07	.241	[−.23, .05]	n.s. (full mediation)
SDG → NTL (Direct)	**.11**	.07	.118	[−.03, .25]	n.s. (full mediation)

Note. β = standardized path coefficient; SE = standard error; CI = bias-corrected bootstrap confidence interval (5,000 resamples); Ind. = indirect effect via CX; n.s. = not significant. Full mediation confirmed when direct paths are non-significant while indirect paths are significant (Hayes, 2022).

5.4 Discussion of Findings

All five research hypotheses were supported. For H1 system reliability is significantly and positively linked with customer experience. (β = .48, p < .001) This means that customers who got more reliable electricity supply tend to report more positive experiences with Eneo. This finding is consistent with Wirtz et al. (2022) and Andersen et al. (2022) and backs the Service-Profit Chain idea that operational performance can shapes customer outcomes. Given the relatively low mean score for system reliability (M = 2.41) electricity supply remain a major concern for customers in the eneo setting. Which likely contribute to less favourable customer experiences.

H2 was also supported. It shows that service delivery gaps were significantly and negatively related to customer experience. (β = −.41, p < .001) issues such as delays in connections, unclear billing, slow complaint handling, and difficulties with token generation related services appeared to drive more negative views

of the utility. The finding lines up with previous research on service gaps in utility contexts (Akdere et al., 2022; Grönroos, 2021) and it extends this evidence to the Cameroonian electricity sector. Service delivery gaps recorded a fairly high mean score (M = 3.68), indicating that customers experienced has a considerable problem with service delivery. This indicates that improving administrative and customer-facing processes could matter just as much as fixing technical supply problems for improving CX.

H3 (β = −.55, p < .001) shows a significant negatively link between customer experience and NTL behavioral tendencies. This was the strongest path in the structural model. Customers who reported poorer experiences were more likely to show attitudes and behaviours associated with non-compliant electricity use. The result backs the argument from Rational Choice Theory and Service-Profit Chain Theory that customer experiences can be related to subsequent behavioral decisions. It also points to the idea that NTL behaviours should not be looked only from the perspective of enforcement and individual behaviour; service conditions and how customers' experience the utility matters as well.

H4 and H5 also received support. The findings shows that customer experience acts as a mediator between the service-related variables and NTL behaviours. For system reliability, the indirect effect through customer experience was significant (β = −.26, 95% CI [−.37, −.16], p < .001). For service delivery gaps, the indirect effect was also significant (β = .23, 95% CI [.14, .33], p < .001). Because the direct effects of system reliability on NTL behaviours (β = −.09, p = .241) and service delivery gaps on NTL behaviours (β = .11, p = .118) were not significant, this fits the pattern of full mediation. In other words, customer experience appears to be the main pathway linking service-related conditions to NTL behaviours. The result also highlights the need for ENEO to consider customer experience in its approach to non-technical losses, and not just focusing on technical fixes and enforcement.

6. POLICY AND MANAGERIAL RECOMMENDATIONS

The findings suggest that cutting non-technical losses at ENEO Cameroon will likely take more than enforcement but quality of services received by customers matters as well. Since customer experience significantly mediated the relationships between service-related factors and NTL behaviours, improvements in reliability and service delivery should be accompanied by measures aimed at improving customers' overall experience. The recommendations below focus on customer experience, service delivery, and operational processes.

R1: R1: Strengthen Customer Experience Management

ENEO needs a dedicated Customer Experience Management Unit (CXMU) responsible for monitoring and improving customers' experiences across different service points. One option is to create a Customer Experience Index

(CEI) using measures such as electricity reliability, billing satisfaction, complaint resolution time, and the quality of customer interactions. Customer experience indicators could also be incorporated into the performance evaluation of regional managers. That way, customer experience becomes part of service performance not just a customer service issue. The recommendation is supported by the mediation findings, which show that customer experience plays a key role in linking service conditions to NTL behaviours

R2: Eliminate Service Delivery Backlogs Through Process Reform

The mean score for service delivery gaps was fairly high (M = 3.68) indicates that this area requires management attention. ENEO should review the processes involved in new connections, meter installation, billing complaints, and other customer requests to identify and reduce unnecessary delays. Clear service standards could be established for different types of customer requests, with progress monitored through digital tracking systems. Delayed applications could be automatically flagged for follow-up, while billing complaints could be handled through a dedicated resolution process with clearly defined response targets. Improving these processes would help reduce some of the service problems identified by customers and may contribute to better customer experiences.

R3: Accelerate Smart Metering and Billing Transparency

Billing errors and lack of clarity in billing were identified as key factors associated with NTL behaviour in the study. ENEO should therefore strengthen the use of smart meters with remote reading and give customers easy access to information on their electricity consumption. Mobile applications or SMS-based services can allow customers to track usage and identify unusual changes Billing statements also need to clearly show consumption, taxes, adjustments, and other charges in both English and French. More transparency in billing should reduce worries about unfair charges and builds more confidence in the utility.

R4: Prioritize Infrastructure Reliability Investment in High-NTL Zones

System reliability linked strongly to customer experience (β = .48), while its mean score of 2.41 was the lowest among the study variable. ENEO should therefore give priority to areas with frequent outages and other supply problems, especially in Douala and Yaoundé. Outage data could be used to pinpoint feeders and locations with high SAIFI and SAIDI values that need urgent attention and to guide infrastructure investment. Predictive maintenance, transformer monitoring, and rapid-response teams can also help cut down how often the frequency and duration of power interruptions. These measures should improve the supply reliability and, in turn, lead to better customer experiences.

R5: Combine Anti-Fraud Measures with Service Improvements

The mediation results demonstrate that customer experience plays a key role in the link between service-related factors and NTL behaviours. ENEO should therefore combine electricity theft control with improvements in service delivery. Enforcement and customer service functions need to work together, while maintaining clear roles for each department so that customers can raise service concerns without feeling that their complaints will automatically lead to punitive action. Where appropriate, the utility company could also consider options such as payment plans, reasonable reconnection terms, and community-based electricity awareness programmes in areas with high levels of losses. These steps could encourage more customers to comply while still maintaining the necessary enforcement of electricity regulations.

7. CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

This study investigated how system reliability, service delivery gaps, customer experience, and non-technical loss (NTL) relate to each other at ENEO Cameroon. The results reveal that system reliability was positively linked to customer experience (H1: $\beta = .48$, $p < .001$), while service delivery gaps were negatively related to customer experience (H2: $\beta = -.41$, $p < .001$). Customer experience was also significantly and negatively related to NTL behavioral tendencies (H3: $\beta = -.55$, $p < .001$). The mediation analysis found that significant indirect effects for both service-related pathways (H4 and H5), while the corresponding direct effects were not statistically significant. These results are consistent with full mediation, suggesting that customer experience is an important pathway linking service conditions with NTL behavioural tendencies.

The findings contribute to the literature by combining Service-Profit Chain Theory, Service Quality Theory, and Rational Choice Theory to explain NTL behaviour in the context of an African electricity utility. They also highlighted that customer experience deserves attention when looking at how customers' responses to electricity service conditions. From a management view, the results suggest that efforts to reduce NTLs should not rely only on enforcement. Improving electricity reliability, billing processes, complaint handling, and other customer-facing services may also be important for encouraging compliance.

A number of limitations should be considered when interpreting the findings. First, the cross-sectional design means that the study cannot establish definitive causal relationships or show how customer experiences and NTL behaviours change over time. Second, the study was limited to one utility and two cities, which restricts the extent to which the findings can be generalized to ENEO's operations across Cameroon or to other electricity utilities in sub-Saharan Africa. Third, the study relied on self-reported measures of NTL behavioural tendencies. Some respondents may be reluctant to disclose non-compliant behaviour, social desirability bias cannot be ruled out. Future studies could address this limitation by combining survey

responses with available utility records, such as actual NTL rates, billing disputes, and complaint-resolution data. Finally, the study did not examine factors that could influence the strength of the relationship between customer experience and NTL behaviours, such as income, local social norms, and enforcement intensity.

Future research could use longitudinal designs to examine whether changes in service reliability and service delivery are followed by changes in customer experience and NTL behaviours over time. Comparative studies across other electricity utilities and regions in sub-Saharan Africa would also help determine whether the findings apply beyond ENEO Cameroon. Qualitative research studies could add further insight into how customers interpret service problems and how these experiences affect their decisions about electricity use and payment. Future researchers could also test whether factors such as income, enforcement intensity, and cultural or community norms change the relationship between customer experience and NTL behaviours. Combining objective utility records with customer survey data would further strengthen future research on service quality, customer experience, and NTLs.

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CONFLICTS OF INTEREST

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