



Assessment of Barriers to Customer Satisfaction in Urban Water Service Delivery: A Case Study of Ubungu District, Dar es Salaam, Tanzania

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Abstract

Despite sustained investments in Tanzania's urban water sector, challenges persist in ensuring consistent and high-quality service delivery, particularly in densely populated areas like Ubungu District, Dar es Salaam. This study uses a mixed-methods approach to investigate the key factors inhibiting customer satisfaction with water services in the district. Data was collected from 380 respondents where by 239 Ubungu residents and 141 DAWASA staff members also 11,710 service complaints retrieved from DAWASA's CRM system. Quantitative data were analyzed using SPSS through descriptive statistics, Pearson correlation, and multiple regression, while qualitative responses were assessed thematically by content analysis and researcher interpretations. Results indicate that responsiveness to customer complaints ($\beta = 0.464$) and water supply reliability ($\beta = 0.344$) significantly influence customer satisfaction. Assurance also plays a minor but notable role ($\beta = 0.127$). Spatial analysis revealed pronounced inequalities in service delivery, with peripheral areas experiencing prolonged complaint resolution times and greater dissatisfaction. Thematic analysis highlighted four primary barriers: inconsistent water supply, technical infrastructure failures, delayed complaint responses, and limited customer education. The findings underscore the urgent need for systemic reforms, including improved complaint handling, infrastructure upgrades, and community engagement strategies. The study contributes actionable insights to enhance urban water utility performance and support evidence-based policy development in Tanzania and similar urbanizing regions.

Keywords · DAWASA, Barriers, Customer satisfaction, Urban Water Service Delivery, Ubungu District.

1 Introduction

Access to safe and reliable water is a fundamental human right and a vital component of sustainable urban development, as emphasized in Sustainable Development Goal 6 (SDG 6), which aims to "ensure availability and sustainable management of water and sanitation for all" (Kassa et al., 2017). In rapidly urbanizing regions such as Dar es Salaam, Tanzania, ensuring equitable and efficient water service delivery remains a persistent challenge. Despite substantial investments in water infrastructure and institutional reforms, many urban residents continue to report

dissatisfaction with the quality and reliability of water services (Teshome et al., 2020). This dissatisfaction compromises public health and well-being and undermines trust in water utilities.

Customer satisfaction is increasingly recognized as a key performance indicator for urban water utilities (Kundi, 2021). It reflects how well a service provider meets user expectations regarding supply reliability, complaint responsiveness, water quality, and communication. Studies have shown that frequent service interruptions, low water pressure, poor infrastructure maintenance, and inadequate response to

complaints significantly reduce customer satisfaction (Mengiste et al., 2020). In many developing countries, these technical and institutional shortcomings are further exacerbated by limited customer engagement and weak feedback mechanisms (Joseph et al., 2019).

In the Tanzanian context, there remains limited empirical evidence on the specific barriers to customer satisfaction within utility-managed areas. The Dar es Salaam Water and Sewerage Authority (DAWASA) is the primary institution responsible for water provision in the city, including the Ubungo District. This rapidly expanding urban zone includes planned and informal settlements. While DAWASA has made notable efforts to expand its service coverage, recurring complaints and performance reports indicate unresolved challenges in service delivery, particularly regarding equity and responsiveness (Mwandu et al., 2024)

This study aims to unpack the key barriers to customer satisfaction in urban water service delivery, focusing on the Ubungo District as a case study. The study seeks to identify institutional, infrastructural, and service-level factors influencing customer perceptions

integrating statistical, spatial, and thematic analyses. The central research question is: *What barriers inhibit customer satisfaction with water services in Ubungo District, Dar es Salaam?* Specifically, we (i) quantify the effects of responsiveness, reliability, and assurance on satisfaction; (ii) examine spatial inequities in complaints, response times, and satisfaction across wards; (iii) verify compliance of supplied water with TZS 789:2018 and compare laboratory results with user perceptions; and (iv) synthesize qualitative evidence to identify institutional and communication barriers using SERVQUAL, Institutional Resource-Based Theory, and Expectancy–Disconfirmation Theory. By answering this question, the study contributes to ongoing efforts to improve urban water governance in Tanzania. It aligns with Sustainable Development Goal 6 (SDG 6), which advocates clean water and sanitation for all by 2030 (United Nations, 2015).

2. Materials and Methods

2.1 Methodology

This study employed a mixed-methods

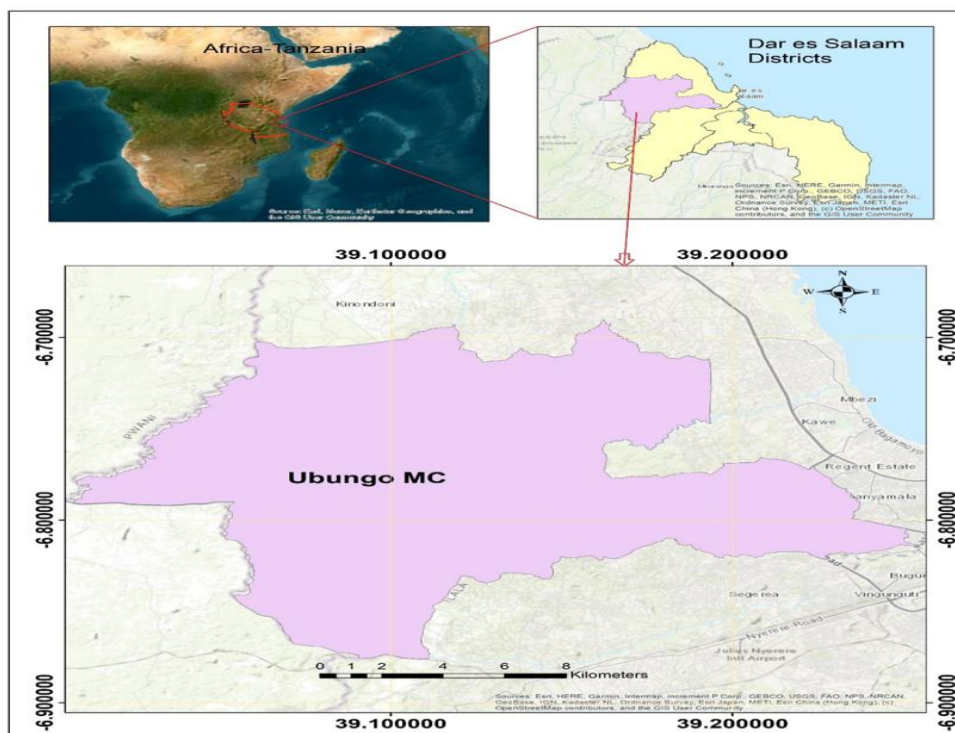


Figure 1: Study Area Map Showing Ubungo District

by employing a mixed-methods approach and methodology, integrating quantitative and qualitative

data sources to comprehensively assess water service delivery and customer satisfaction in Ubungo District. Quantitative data offered measurable insights into service quality parameters, while qualitative data helped uncover contextual and perceptual issues that water users and service providers faced.

2.2 Research Approach

A concurrent triangulation approach was used, whereby quantitative and qualitative data were collected and analyzed simultaneously. This allowed for the cross-validation of results and ensured a holistic understanding of water service quality and its impact on customer satisfaction.

2.3 Research Design

The research adopted a descriptive cross-sectional design. This design was appropriate for capturing the current status of water service quality and customer satisfaction across various customer categories at a specific time. It allowed for examining relationships between variables such as service reliability, responsiveness, water quality, and overall satisfaction.

2.4 Area of the Study

This study conducted in Ubungo District, located in Dar es Salaam, Tanzania. Geographically, Ubungo lies approximately between latitude 6.7000° S and longitude 39.2000° E. The district is characterized by high population density about 1,086,912 according to 2022 National census, and diverse socio-economic and water usage profiles. These attributes present both operational and infrastructural challenges for urban water service providers. Ubungo's dynamic urban environment makes it a representative case for investigating barriers to efficient and equitable water service delivery in rapidly growing cities. The spatial layout and contextual features of the study area are illustrated in Figure 1.

2.5 Target Population of the Study

The target population included residential, institutional, and commercial water users within Ubungo District and DAWASA staff members involved in operations, technical maintenance, and customer service. According to the 2022 National Census, Ubungo hosts over 193,701 households, all relying on DAWASA for water supply.

The figure displays two smartphones side-by-side, showing the DAWASA Customer Questionnaire interface. The left phone shows the welcome screen with the title 'Welcome to the Customers Research Questionnaire' and instructions to choose a preferred language (English or Kiswahili). The right phone shows the questionnaire form, titled 'DAWASA Customer Questionnaire', with the subtitle 'Exploring the Delivery of Water Services Quality to Enhance Sustainable Customer Satisfaction in Tanzania – A Case Study of Ubungo District'. The form includes a progress bar and a section titled 'Section A: General Information' with five questions: 1. Gender (radio buttons for Male, Female, Other), 2. Age Group (dropdown menu), 3. Type of Water Connection (dropdown menu), 4. How long have you been a DAWASA customer? (dropdown menu), and 5. What is your primary water source? (text input).

Figure 2: (a) Data Collection Online Form

2.6 Sample Size and Sampling Techniques for the Study

Using Slovin's formula, at a 95% confidence level and 5.23% margin of error (Tejada et al., 2012). A

offices, operational sites, and customer service desks. This flexible approach ensured that staff across all relevant divisions were reached, including technicians, engineers, and frontline customer care officers.

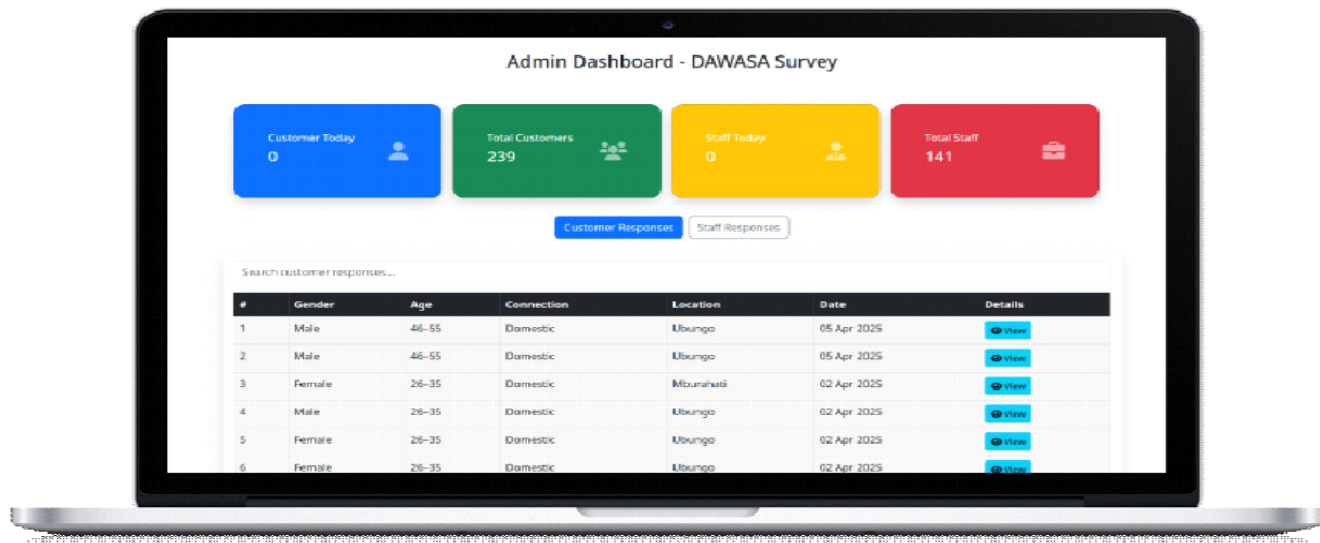


Figure 2(b) Admin Response Dashboard

minimum sample size of 360 was determined final sample comprised 380 where respondents: 239 Ubungo residents and 141 DAWASA staff members. Stratified random sampling was used for customers based on connection type (domestic, commercial, institutional), while purposive sampling was applied to select DAWASA staff based on their roles.

2.7 Data Collection Method

Data were collected using structured questionnaires for both customers and staff. These questionnaires included closed-ended questions for quantitative and open-ended questions for qualitative. Verified secondary data were obtained from DAWASA's Customer Relationship Management (CRM) system, comprising 11,710 complaint records between April 2024 and March 2025. Water quality data were collected from 20 sample points across the district. Digital links were shared with staff members accessible via email or internal WhatsApp communication groups as shown in figure 2. In-person distribution was prioritized during visits to DAWASA

2.8 Data Analysis Plan

Quantitative data were analyzed using SPSS Version 26. Techniques included descriptive statistically by, Pearson correlation, and multiple regression analysis. Complaint data were analyzed categorically, spatially, and temporally. Qualitative data were thematically coded using Braun and Clarke's six-step framework. Spatial patterns were visualized using QGIS to identify geographic inequalities in service delivery.

2.9 SERVQUAL-Based Model and Interactive Simulation

An interactive HTML-based simulation tool was developed to complement the quantitative evaluation of the SERVQUAL dimensions and provide a dynamic interpretation of their influence on customer satisfaction. This tool allows users, including researchers, utility managers, and policymakers, to simulate different service quality scenarios and observe their effect on the predicted satisfaction score (Y) in real time as shown in Figure 3.

The tool was built around the multiple regression user-centered interface, bridging the gap between

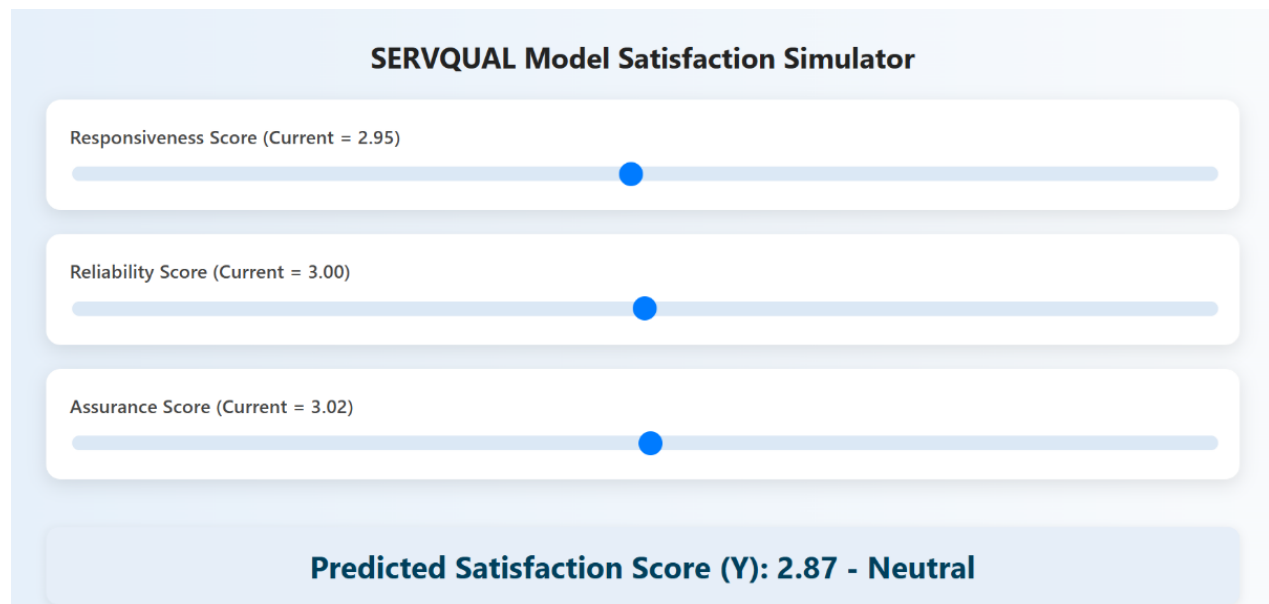


Figure 3: SERVQUAL Model Simulator

model derived from survey data, incorporating three key SERVQUAL dimensions: Responsiveness, Reliability, and Assurance. Users interact with the model by adjusting slider inputs representing perception scores (on a 1–5 scale) for each dimension. As inputs are modified, the tool calculates the corresponding standardized scores (z-scores), applies regression weights (β), and outputs a predicted satisfaction score on the original scale (0–5), along with an interpretive comment (e.g., “Neutral”, “Satisfied”).

This simulation serves several practical purposes:

- I. **Visualization:** It provides an intuitive way to understand how each service dimension contributes to overall satisfaction.
- II. **Sensitivity Testing:** Users can explore how small changes in performance (e.g., improving responsiveness from 2.95 to 3.5) impact satisfaction outcomes.
- III. **Stakeholder Engagement:** The tool can be used in community meetings or DAWASA planning workshops to communicate model insights more accessibly.

The integration of this simulation enhances the research by linking statistical findings with an applied,

technical analysis and actionable decision support.

2.10 SERVQUAL Theory

The SERVQUAL model, developed by Parasuraman et al. (1988), evaluated service quality across five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. These dimensions formed the basis of questionnaire items and were essential in identifying service quality gaps from the customer perspective (Parasuraman et al., 2017a).

2.11 Institutional Resource-Based Theory (IRBT)

The IRBT emphasizes the importance of institutional capacity, governance, and resource utilization in delivering high-quality services. This theory guided the analysis of DAWASA’s capabilities to their customers and staff as determinants of service quality outcomes, encompassing infrastructure, staffing, and operational efficiency (Mwandu et al., 2024).

2.12 Expectancy–Disconfirmation Theory

This theory posits that customer satisfaction results from comparing expected and actual service performance (Pizam & Milman, 1993). If performance meets or exceeds expectations, satisfaction occurs; otherwise, disconfirmation leads to dissatisfaction

(Muthwa & Matsiliza, 2024). This framework was used to interpret gaps between customer expectations and experiences in the Ubungo District.

privacy purposes (Komakech & van der Zaag, 2013).

3. Data Analysis and Results

Table 1: Summary of Demographic Characteristics (N = 239)

Variable	Category	Frequency	Percentage (%)
Gender	Female	141	59
	Male	98	41
Age Group (Years)	18–25	40	16.74
	26–35	97	40.59
	36–45	57	23.85
	46–55	30	12.55
	56 and above	15	6.28
Water Connection	Domestic	173	72.38
	Commercial	46	19.25
	Institutional	20	8.37

Source: Authors' Compilation (2025).

2.13 Conceptual Framework

The conceptual framework for this study illustrates the relationship between key service quality dimensions and customer satisfaction. The independent variables include consistency of water service delivery, responsiveness to complaints, and systemic barriers such as infrastructure and governance (Arora & Mishra, 2019). The dependent variable is sustainable customer satisfaction (Kimey, 2008). This framework guided both the literature; design of the data collection instruments and the interpretation of analytical results.

2.14 Ethical Considerations of the Study

The study adhered to ethical research practices outlined by the Water Institute Research and Ethics Committee. Approval was obtained prior to data collection. Informed consent was secured from all participants, and confidentiality was maintained throughout the study. Participants were informed about the voluntary nature of their involvement and their right to reject their data from being used. Data were anonymized to prevent user personal identification for

This section presents a comprehensive and triangulated analysis of the barriers inhibiting customer satisfaction in water service delivery in Ubungo District. The study employed descriptive statistics, inferential analysis (correlation and regression), spatial visualization using GIS, and thematic coding of qualitative responses. These multiple methods were used to uncover patterns and root causes of satisfaction and dissatisfaction among water consumers.

3.1 Interviews Demography

The demographic profile of participants included in the study consisted of both DAWASA staff and water service customers in the Ubungo District. Among the 380 respondents, 239 were customers and 141 were staff. Gender distribution and duration of service usage were analyzed to contextualize responses. Most customer respondents received DAWASA services for over two years, while staff respondents were drawn from departments including technical operations, maintenance, and customer service, demographic summary is shown in Table 1. This diversity provided a comprehensive perspective on service delivery and satisfaction.

3.2 Descriptive Statistics

Descriptive statistics provided an initial overview of customer responses related to core service quality dimensions: reliability, responsiveness, assurance, and overall satisfaction. Mean values and standard

moderately strong relationship between reliability and satisfaction ($r = 0.62$). Water quality also demonstrated a moderate, statistically significant correlation with satisfaction ($r = 0.42$) as shown in Table 3. This statistically confirms that improvements in timely response and service reliability will likely increase

Table 2: Water Service Experience Summary (Sample Size (N) =239)

Indicator	Response Option	Frequency	Percentage (%)
Supply Frequency	Daily	43	17.99
	3–5 times per week	94	39.33
	Once a week or less	72	30.13
	Less than once per week	30	12.55
Service Reliability	Very Reliable	12	5.02
	Reliable	52	21.76
	Neutral	81	33.89
	Unreliable	60	25.1
	Very Unreliable	34	14.23
Water Shortages	Experienced	178	74.48
	Not Experienced	61	25.52
Water Quality	Excellent	20	8.36
	Good	69	28.87
	Fair	86	35.98
	Poor	38	15.9
	Very Poor	26	10.88
Water Pressure	Low Pressure	155	64.85
	No Pressure Issues	84	35.15

Source: Authors' Compilation (2025).

deviations helped to understand the general sentiment across the surveyed population. A Likert scale (1 = Strongly Dissatisfied to 5 = Strongly Satisfied) was used (Muthwa & Matsiliza, 2024). Frequencies and percentages were computed using SPSS to provide an overview of the data and to highlight key trends across these variables (Trémolet & Rama, 2012). As shown in Table 2.

3.2.1 Correlation Analysis

Pearson's correlation was used to determine the strength and direction of associations between service quality variables and customer satisfaction (Diyammi, 2020). The results indicate a strong positive relationship correlation coefficients (r) between responsiveness and satisfaction ($r = 0.69$), and a

satisfaction levels. These findings align with earlier research in African urban utilities (Kassa et al., 2017) and similar studies in Dar es Salaam (Ngonyani, 2019).

3.2.2 Regression Analysis

A multiple linear regression analysis was performed to identify the most influential predictors of customer satisfaction with water services in Ubungo District. The model included three independent variables: responsiveness to complaints, reliability of water supply, and assurance derived from the SERVQUAL framework (Parasuraman et al., 2017b). These were regressed against customer satisfaction as the dependent variable.

Table 3: Correlation analysis matrix

	Satisfaction score	Reliability Score	Water Quality Score	Response Rating	Rating
Satisfaction Score	1	0.62	0.42	0.69	
Reliability Score	0.62	1	0.33	0.54	
Water Quality Score	0.42	0.33	1	0.41	
Response Rating Score	0.69	0.54	0.41	1	

Source: Authors' Compilation (2025).

Figure 4 presents a visual representation of the relative strength of these predictors. The R value of the model indicates that the selected independent variables explain a significant proportion of the variation in customer satisfaction. These results underscore the need for DAWASA to prioritize response mechanisms and reliability as part of its customer satisfaction improvement strategy.

3.2.3 Spatial Analysis

Spatial analysis was conducted to examine the geographic distribution of complaints and service experiences reported by residents of Ubungo District. This analysis integrated both structured CRM complaint data and responses from the customer questionnaire to uncover patterns related to service coverage, technical issues, response performance, and

**Figure 4.** Regression analysis

overall customer satisfaction across various wards and streets within the service area.

Each CRM complaint was geo-referenced based on the 'Area' (Ward) and 'Address' (Street or Landmark) provided. Where geographic coordinates were available, these were used for more accurate location

pipeline bursts, inaccurate billing, and aging infrastructure revealed that Kimara, Makoka, and Goba consistently ranked among the top wards across all categories.

This recurring pattern highlights ongoing systemic infrastructure challenges in these

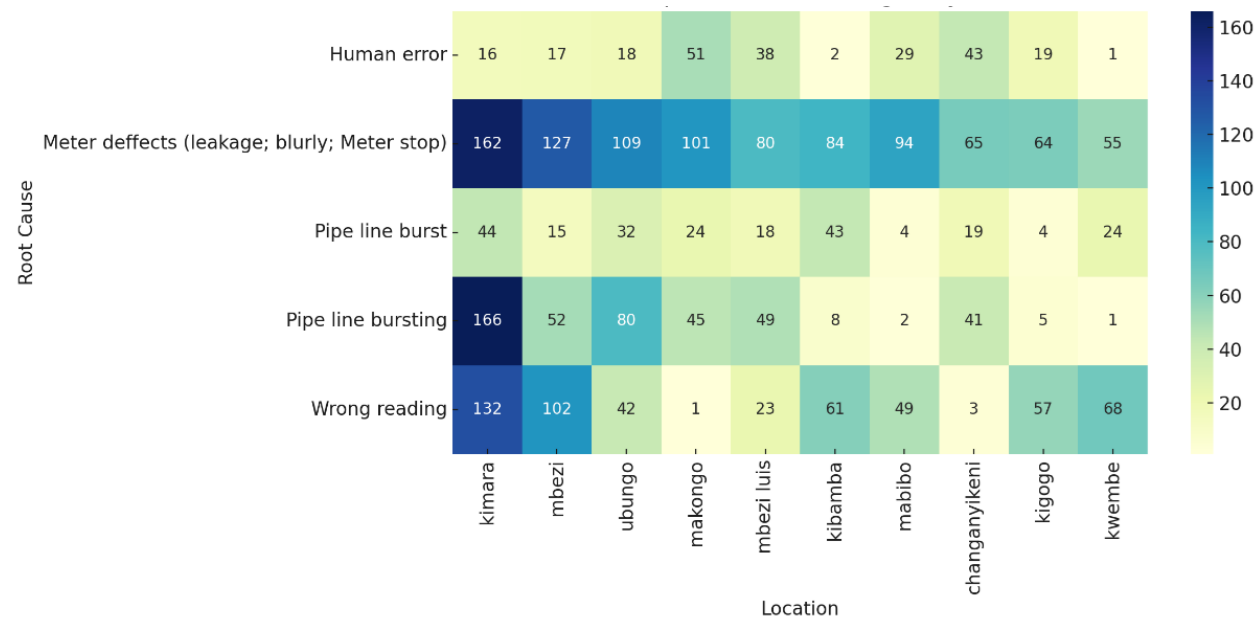


Figure 5: Spatial Distribution of Service Challenges

mapping. The customer questionnaire dataset similarly contained a location field identifying each respondent's residence or service area. These spatial attributes enabled cross-dataset alignment and analytical visualization using GIS tools. The spatial analysis revealed four key insights:

The comparison between CRM complaint records and survey responses indicated hotspots such as Kimara Baruti, Goba Mpakani, Kibamba CCM, and Mbezi Mwisho. These locations registered high levels of both complaint submissions and customer feedback. This dual engagement suggests a high frequency of service interaction and a greater awareness and willingness among residents to report service-related issues. Conversely, areas like Makoka showed lower engagement, potentially highlighting a gap in outreach and accessibility to reporting mechanisms. Examining the most frequent complaint types meter defects,

neighborhoods, requiring targeted technical and resource-based interventions as shown in figure 5. The analysis of average response times for addressing complaints showed considerable geographic variation. Peripheral areas such as Mbezi Mwisho, Kibamba, and Goba Mpakani experienced prolonged delays, averaging between 8.9 and 11.4 days. In contrast, more central locations such as Kimara and Manzese reported significantly shorter response times, often under four days. This discrepancy points to logistical inefficiencies and the need for decentralizing response units to improve service delivery in outlying zones. Customer satisfaction ratings, aggregated by location, showed marked differences across the district. Mburahati and Manzese recorded the highest satisfaction shares 50% and 39% of respondents, respectively, out of rating services on a five-point scale (Very High, High, Moderate, Low, Very Low), indicating relatively better service delivery. On the

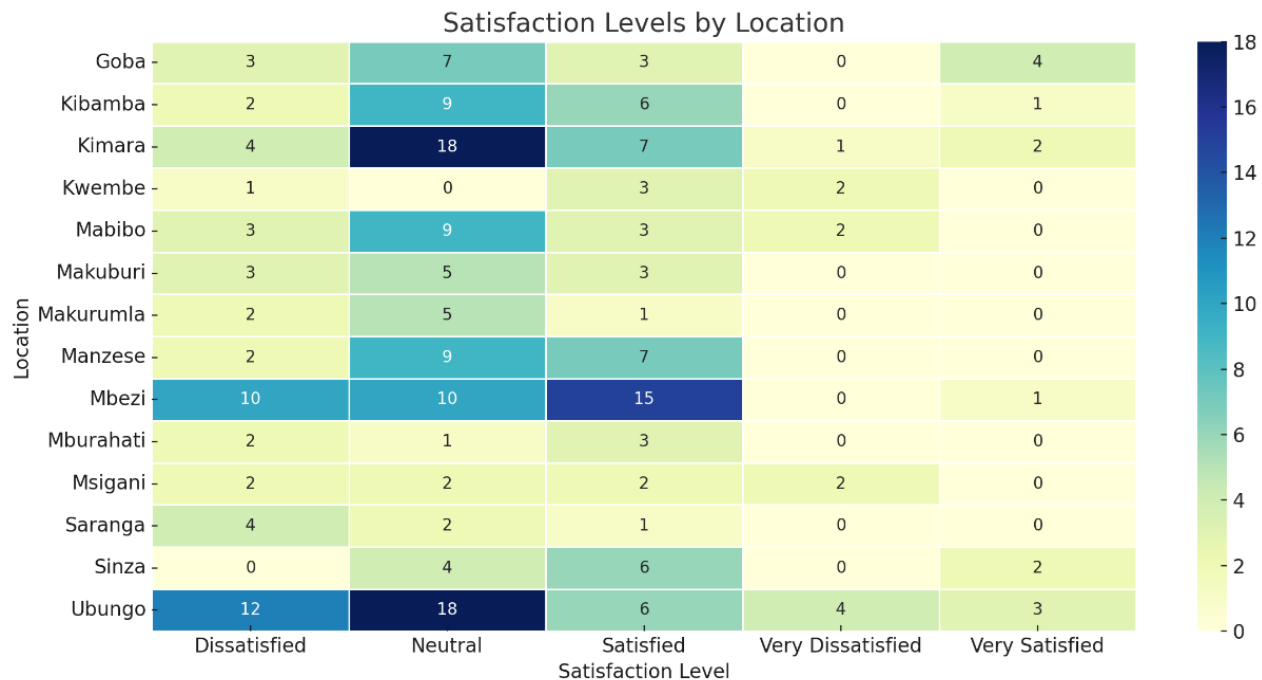


Figure 6: Customer Satisfaction by Location

other hand, areas such as Saranga and Makurumla recorded higher dissatisfaction levels, with over 57% of Saranga respondents reporting dissatisfaction. These patterns were consistent with previous findings related to delayed responses and recurring technical issues, emphasizing the spatial dimension of service inequality (Enang, 2021).

3.2.4 Spatial Inequities and Service Disparities

Spatial analysis revealed significant disparities in water service delivery across different areas of Ubungo District. The study identified clear patterns in complaint frequency, response times, and customer satisfaction by integrating geo-referenced CRM data and customer survey responses.

High complaint densities were observed in locations such as Kimara Baruti, Goba Mpakani, Kibamba CCM, and Mbezi Mwisho, indicating recurring technical issues and service disruptions in these wards. These areas also recorded longer response times, averaging 8.9 to 11.4 days, compared to less than four days in centrally located areas like Kimara and Manzese as shown in figure 6. This spatial variation suggests logistical challenges and limited resource allocation in peripheral zones. Customer satisfaction levels also varied geographically.

Mburahati and Manzese recorded the highest satisfaction rates, while Saranga, Makurumla, and parts of Goba showed the highest dissatisfaction.

These findings align with the distribution of technical faults and delayed complaint resolution, pointing to a strong correlation between location, infrastructure condition, and service experience. From a service quality perspective, these disparities reflect a failure to ensure equitable access and responsiveness across all service zones, which is a fundamental expectation under SDG 6. According to the Institutional Resource-Based Theory (IRBT), these patterns suggest that centralization of technical teams and uneven resource distribution contribute to unequal service outcomes (Mengiste et al., 2020). Addressing these inequalities will require decentralized technical response units, GIS-based monitoring systems, and targeted investment in high-pressure zones. Additionally, DAWASA should implement location-based performance tracking to prioritize underperforming areas and improve spatial equity in urban water service delivery.

3.3 SERVQUAL Model

The SERVQUAL model assessed the gap between customer expectations and their perceptions of water

Table 4: SERVQUAL Gap Scores by Dimension

SERVQUAL Dimension	Expectation Score	Mean Perception Score	Mean Gap Score	Respondent Count
Reliability	5	3	-2.00	78
Responsiveness	5	2.95	-2.05	213
Assurance	5	3.02	-1.98	216

Source: Authors' Compilation (2025).

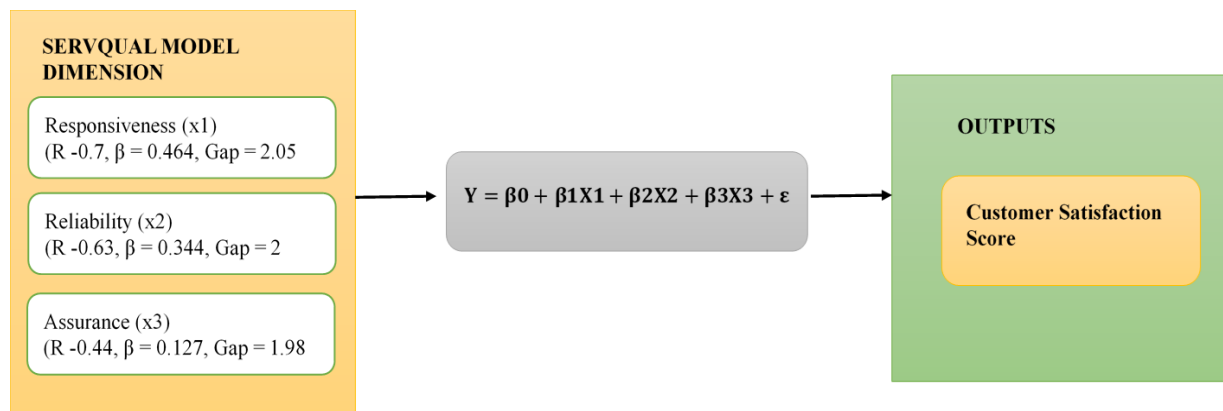
service delivery in Ubungo District. This model evaluates service quality across five dimensions (Kishiwa et al., 2018). However, this study emphasized three dimensions, Reliability, Responsiveness, and Assurance, due to their relevance to the DAWASA operational context and the nature of data collected. Customer expectations were assumed to be consistently high (score of 5), reflecting the ideal level of service delivery (Kassa et al., 2017). Perceptions were derived from questionnaire responses and mapped to a 5-point Likert scale. The SERVQUAL gap score was then calculated as shown in Table 4, by using:

$$Z\text{Satisfaction} = R_1.Z\text{responsiveness} + R_2.$$

$$Z\text{reliability} + R_3.Z\text{assurance} + \epsilon \quad (1)$$

Where:

- Z means the variables are standardized (z-scores)
- **R** = Correlation coefficient with satisfaction
- $R_1 = 0.70$, $R_2 = 0.63$, and $R_3 = 0.44$
- **β** = Standardized beta coefficient (strength of influence)
- **Gap Score** = Perception Score - Expectation Score (2)

**Figure 7.** SERVQUAL Model Design

These results align with the standardized beta coefficients from the multiple regression analysis in where responsiveness ($\beta = 0.464$), followed by reliability ($\beta = 0.344$), and assurance ($\beta = 0.127$).

The figure 7 summarizes the relationships among SERVQUAL dimensions, their statistical influence on customer satisfaction, and the computed perception expectation gaps. The following multiple regression equation describes the model (Equation 1):

- ϵ = Error term (unexplained variation)

The model in this study is based on key assumptions, including linearity, which assumes a direct relationship between SERVQUAL dimensions and customer satisfaction, and independence of errors, meaning that residuals are uncorrelated across observations. Since standardized (z-score) values were used, the intercept (β_0) is assumed to be zero, indicating that the dependent variable's mean aligns with the predictors' mean. The model also includes an error

term (ϵ) to capture unexplained variation arising from factors not included in the analysis or random measurement errors. A web-based HTML simulation tool was developed to enhance understanding and allow interactive exploration of the model. This tool enables users to adjust SERVQUAL dimension scores using sliders and observe their real-time effect on

in the SERVQUAL responsiveness dimension and align with the Institutional Resource-Based Theory (IRBT), which points to internal constraints like staff shortages, poor coordination, and centralized decision-making (Parasuraman et al, 1988). Addressing these gaps through decentralized response units, enhanced CRM systems, and improved staff conduct is crucial

Table 5: CRM Complaint Summary (April 2024 –March 2025)

Response Time Group	Number of Complaints	Percentage (%)
Same-day (0 days)	1873	15.99
Short (1-4 days)	5007	42.76
Average (~5 days)	851	7.27
Long (6-55 days)	3979	33.98
Total	11710	100

Source: Authors' Compilation (2025).

predicted customer satisfaction based on the standardized regression equation (Zozmann et al., 2022).

3.4 Responsiveness as a Key Barrier of Satisfaction

Responsiveness to complaints was the strongest predictor of customer satisfaction, with a standardized beta coefficient of $\beta = 0.464$ and a strong correlation of $r = 0.69$. Nearly half of the surveyed customers (46.9%) had submitted at least one complaint to DAWASA in the past 12 months, yet only 32.1% were satisfied with the response. Most complaints were submitted via phone calls (57.1%), followed by physical visits (28.6%), and a minority via SMS or online platforms (14.3%), indicating limited uptake of digital options.

The Customer Relationship Management (CRM) records between April 2024 and March 2025 show that 57.75% of complaints were resolved within four days, while 33.98% took between 6 and 55 days. Delays were common in peripheral wards such as Goba and Kibamba, highlighting geographic disparities in service responsiveness, as summarized in Table 5.

Thematic analysis confirmed these findings, with customers frequently reporting delays, poor follow-up, and negative staff attitudes. These issues reflect a gap

for improving public trust and satisfaction.

3.5 Thematic Analysis

A thematic analysis was conducted on qualitative data drawn from open-ended responses in customer surveys, staff interviews, and narrative entries recorded in DAWASA's CRM system. This analysis uncovered recurring patterns, perceptions, and context-specific challenges influencing customer satisfaction and water service delivery in Ubungu District. The process followed Braun and Clarke's (2006) six-step approach: familiarization with the data, generating initial codes, theme identification, theme review, definition and naming of themes, and final report production (Leticia, 2022).

The qualitative dataset included descriptive accounts of customer experience, justifications for complaints, and notes from staff on interventions. Text responses were reviewed multiple times, with key phrases coded and grouped to form overarching themes. Frequency analysis of keywords supported the identification of dominant concerns, with standard terms such as "water," "supply," "interruption," "leakages," and "pressure" appearing prominently across the data. From this analysis, four key themes emerged:

Theme 1: Interruption and Unreliability of Water Supply

The most frequently mentioned concern was the inconsistent nature of water availability. Keywords such as "water," "supply," and "interruption" appeared over 600 times combined, reflecting widespread dissatisfaction. Respondents in areas like Goba, Saranga, and Manzese described water services as irregular, unpredictable, or delayed. This pattern indicates a significant reliability gap, where households often went several days without water, undermining trust in the utility provider.

Theme 2: Infrastructure Failures – Leakages and Pressure Problems

Customers repeatedly reported leakages, low water pressure, and aging infrastructure issues. The keyword "leakages" appeared 125 times, and "pressure" 119 times, often cited alongside terms such as "old pipes" and "burst lines." These entries indicate systemic weaknesses in the physical infrastructure. Respondents emphasized that persistent technical faults compromised service quality and efficiency, suggesting a critical need for targeted investment in infrastructure upgrades.

Theme 3: Delayed Responses to Complaints

Many customers expressed frustration over delayed or absent responses to complaints. Phrases like "they never came," "no feedback," and "ignored calls" were commonly reported. These issues may not be evident in numerical service records but reflect deep concerns about institutional responsiveness. The perception of being neglected after submitting a complaint eroded public confidence and created skepticism toward DAWASA's commitment to resolving service issues.

Theme 4: Communication Gaps and Limited Customer Education

The final theme highlighted gaps in customer understanding of service procedures, complaint channels, and billing. Numerous respondents requested

better communication, transparency, and education, such as "clearer bills," "instructions on how to report problems," and "alerts before disconnection." These insights point to a need for strategic outreach programs, where DAWASA can proactively engage communities to enhance awareness, improve complaint reporting, and reduce conflicts due to misunderstanding.

These themes provide valuable insights beyond what statistical analysis alone can reveal. While some concerns align with the quantitative results, such as complaints about leakages and interruptions, the qualitative narratives illuminate emotional and relational dynamics, including customers' sense of neglect, frustration, or confusion. Addressing these themes holistically is vital for improving customer satisfaction, strengthening community relationships, and achieving equitable water service delivery.

3.5.1 Water Quality Perception

To validate these perceptions, water samples were collected from 20 distribution points across Ubungu District and tested in accordance with TZS 789:2018 standards. Laboratory analysis, as shown in Table 6, confirmed that all samples complied with national standards for key parameters, including turbidity, pH, conductivity, free residual chlorine, aluminum, and bacteriological safety. Specifically, *E. coli* and total coliform counts in all samples were 0 colonies per 100ml, indicating full compliance with microbial safety requirements.

These findings confirm that customers' concerns about water quality were not based on actual contamination, but rather on perceptual and situational factors such as brief turbidity after pipe bursts or psychological association with color and smell. According to the SERVQUAL model, this links to the assurance and tangibility dimensions, where trust in service safety and the physical condition of supply infrastructure shape perception (Teshome et al., 2020). Additionally, applying the Expectancy–Disconfirmation Theory (Pizam & Milman, 1993). even minor, temporary deviations from expected water

Table 6: Collected water quality point sample

Sampling Points	Turbidity (NTU)	pH	Conductivity (μ s/cm)	Free R. chlorine (mg/L)	Aluminium (mg/L)
STANDARDS (TZS 789 :2018)	5	6.5 - 8.5	1,500	0.2 - 0.5	0.2
Ubungo Msewe	2.27	7.83	215	0.43	0.02
Kimara Baruti	1.72	7.62	223	0.47	0
Kimara mwisho	0.93	7.66	227	0.41	0.03
Ubungo kibangu	2.43	7.69	220	0.36	0.02
Mbezi Tanesco	2.09	7.53	226	0.17	0.03
King'ongo restaulant	3.93	7.68	231	0.18	0.04
Saranga mwisho	3.42	7.71	224	0.19	0.02
Mbezi Makabe	4.39	7.65	221	0.16	0.02
Mbezi inn Pump	1.57	7.69	223	0.14	0.01
Kwembe Kanisani	4.02	7.61	218	0.16	0.00
Mabibo sokoni	3.21	7.61	215	0.20	0.02
Kibamba kibwegele	1.63	7.73	229	0.15	0.01
Temononi kwa Mfuhale	4.06	7.74	224	0.16	0.03
Makuburi Kanisani RC	1.37	7.47	234	0.15	0.01
Mawasiliano stand	2.4	7.69	222	0.23	0.01
Ubungo Maziwa	1.37	7.8	231	0.32	0.05
Sinza madukani	2.61	7.72	218	0.16	0.02
Msigani njiapanda	2.32	7.69	226	0.37	0.04
Kimara Gorani	2.14	7.45	210	0.22	0.01
Manzese Selikali ya Mtaa	2.09	7.61	213	0.43	0.04

Source: Authors' Compilation (2025).

appearance may lead to dissatisfaction, especially when not accompanied by timely communication or public clarification. While the actual water quality was compliant and safe, the lack of proactive communication from DAWASA may have left room for speculation, fear, or dissatisfaction.

4. Discussion of the Findings

This study aimed to identify and analyze the key barriers affecting customer satisfaction in urban water service delivery in Ubungo District, Dar es Salaam. The findings, supported by quantitative and qualitative evidence, revealed that responsiveness to complaints and the reliability of water supply and assurance are the most influential predictors of satisfaction.

4.1 Reliability of Water Supply

Reliability was the second most significant factor influencing customer satisfaction, with a regression coefficient of $\beta = 0.344$ and a correlation of $r = 0.62$. Only 18.3% of customers reported consistently receiving daily water, while over 60% experienced unreliable supply or low water pressure.

These findings align with prior studies showing that inconsistent urban water delivery is common in Tanzania (Kishiwa et al., 2018). Qualitative responses frequently cited terms like “*there is no water*” and “*the supply schedule is unclear*”, reflecting frustration over irregular schedules. Residents in Goba, Saranga, and Manzese noted frequent interruptions and delays, often relying on alternative sources like vendors or

boreholes. This highlights a significant gap in the reliability dimension of the SERVQUAL model (Parasuraman et al., 2017a) and reinforces negative disconfirmation as articulated by the Expectancy–Disconfirmation Theory, where unmet expectations for regular supply result in dissatisfaction (Lockwood et al., 2017). Spatial analysis also showed worse reliability in peripheral areas, pointing to systemic infrastructure issues. Addressing this requires targeted pipeline upgrades, pressure regulation, and public communication on supply schedules.

4.2 Assurance Perception

Assurance was the least influential among the three core service dimensions, with a regression coefficient of $\beta = 0.127$ and a correlation of $r = 0.42$. Although it did not emerge as the leading cause of dissatisfaction, it remains an essential aspect of customer confidence.

Survey responses showed that most customers rated assurance as moderate, with fewer complaints than supply reliability and complaint response. However, some residents in areas like Makurumla, Mbezi, and Kimara expressed concerns over occasional water clarity or taste changes, particularly following repairs or supply interruptions.

4.3 Systemic and Institutional Barriers

In addition to technical faults, the study found that systemic and institutional weaknesses within DAWASA significantly affect customer satisfaction in the Ubungo District. Key concerns included aging infrastructure, with frequent leakages and low pressure, especially in Kimara, Goba, and Saranga, often unresolved due to limited maintenance capacity. Communication gaps were also noted, as many customers lacked clear information on billing, reporting procedures, or supply schedules. Abrupt disconnections and lack of updates further eroded trust, particularly in peripheral areas. Respondents also reported delays caused by staff shortages, lack of tools, and poor follow-up, reflecting internal capacity constraints and centralized decision-making. These issues align with the Institutional Resource-Based Theory (IRBT), which links service quality to internal

resources and coordination. Addressing them requires decentralizing technical teams, equipping field staff, improving communication, and enhancing public awareness. Such reforms are crucial for achieving sustainable and equitable water service delivery.

5 Conclusions

The study concludes that responsiveness to complaints is the dominant determinant of customer satisfaction in Ubungo ($\beta = 0.464$; $r = 0.69$), followed by reliability of supply ($\beta = 0.344$; $r = 0.62$) and, to a lesser extent, assurance ($\beta = 0.127$; $r = 0.42$). Spatial analysis revealed systematic inequities, with peripheral wards experiencing longer complaint-resolution times and lower satisfaction, indicating the need for decentralized field teams and ward-level performance tracking. Laboratory testing confirmed compliance with TZS 789:2018 across sampled points; however, dissatisfaction often followed transient aesthetic changes after bursts or repairs (e.g., color, turbidity), underscoring the importance of proactive risk communication and public education rather than concerns about contamination. Thematic evidence identified four recurrent barriers intermittent supply, infrastructure failures (leakages/low pressure), delayed responses, and communication gaps which align with SERVQUAL and Institutional Resource-Based Theory interpretations and point to targeted pipe and pressure upgrades, strengthened complaint handling with defined service-level agreements and transparent CRM dashboards, and improved customer engagement. Finally, the interactive SERVQUAL simulator demonstrated practical decision-support value by translating incremental improvements in responsiveness and reliability into predicted gains in satisfaction, thereby supporting evidence-based planning and stakeholder dialogue.

6 Recommendation

Aligned to the study objectives, recommendations concentrate on four fronts. First, to address the strong influence of responsiveness on satisfaction, establish ward-level response teams with clear service-level targets (most complaints resolved within four days) and publish monthly CRM performance to strengthen

accountability. Second, to reduce spatial inequities revealed by the analysis, decentralize field crews and use a GIS dashboard with ward-level indicators (complaint volumes, response times, interruptions, and satisfaction) to prioritize underperforming areas. Third, to reconcile perceptions with verified compliance to TZS 789:2018, maintain routine water-quality monitoring and pair it with proactive risk communication, especially after bursts and repairs, to explain temporary aesthetic changes and reassure customers. Fourth, to tackle the qualitative barriers identified (intermittent supply, leakages/low pressure, delayed responses, communication gaps), implement targeted pipe and pressure upgrades, equip and train frontline staff, and expand low-cost digital channels (USSD/WhatsApp) alongside clearer billing and customer education. Together, these actions directly respond to the study's aims by improving responsiveness, promoting spatial equity, sustaining assurance, and removing institutional and communication obstacles to higher customer satisfaction

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The author declares no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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