



Analysis of Customer Satisfaction Using the Service Quality (SERVQUAL) and Importance-Performance Analysis (IPA) Methods at Perumdham, Grobogan Regency

Iriani¹ and M. Ibnu Ma'nail^{2*}

^{1,2} Industrial Engineering Department, Faculty of Science and Technology, University of Pembangunan Nasional Veteran Jawa Timur, Sidoarjo, Indonesia

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CORRESPONDING AUTHOR

*E-mail: irianiupn@gmail.com

A B S T R A C T

Perumdham Purwa Tirta Dharma in Grobogan Regency, as a clean water service provider, is expected to meet customer expectations; however, the high number of complaints received indicates that the quality of service provided is not yet optimal. This study aims to analyze customer satisfaction levels using the Service Quality (SERVQUAL) method and to identify service attributes that should be prioritized for improvement through Importance-Performance Analysis (IPA). The study employed a quantitative approach using a questionnaire distributed to 100 active customers selected via random sampling. The results of the SERVQUAL analysis showed that all five dimensions of service quality had negative gap values, with the Tangibles dimension exhibiting the largest gap (−2.158), followed by Assurance (−2.046), Reliability (−2.026), Empathy (−2.002), and Responsiveness (−1.982), indicating that the overall service received by customers still falls short of their expectations. The IPA mapping results identified five attributes in the top-priority quadrant: clarity of service information, provision of clean water, staff appearance, speed of complaint response, and staff courtesy in serving customers. These findings serve as the basis for the company to focus on improving these five attributes by enhancing staff competence, developing clearer standard operating procedures (SOPs) for handling complaints, and implementing a digital complaint system, thereby increasing customer satisfaction and loyalty.

Contribution to Sustainable Development Goals (SDGs):

SDG 6: Clean Water and Sanitation

SDG 9: Industry, Innovation and Infrastructure

SDG 11: Sustainable Cities and Communities

SDG 16: Peace, Justice and Strong Institutions

1. INTRODUCTION

1.1. Research Background

Clean water is a basic need that directly affects people's health, productivity, and quality of life; therefore, its availability is one of the indicators of successful public service [1]. In Indonesia, the provision of piped drinking water is largely carried out by Regional Public Water Supply Companies (PERUMDAM), which are responsible for ensuring the continuity, quality, and quantity of service to customers. As the population and demand

for clean water increase, public expectations regarding service quality have also risen—not only for sustainable water availability but also for the speed and accuracy in resolving service disruptions.

PERUMDAM Purwa Tirta Dharma in Grobogan Regency, as the provider of clean water services in its area, recorded customer growth of 386 connections during 2025 (612 new installations minus 226 disconnections), indicating steadily rising demand for services.



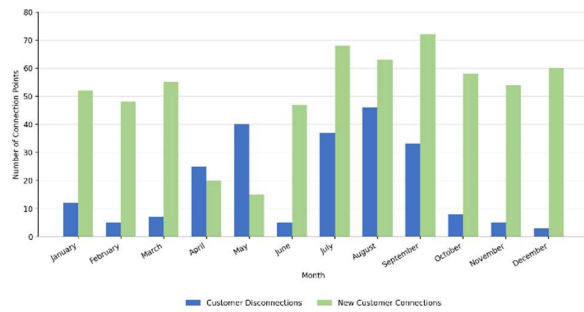


Fig 1. New Connections and Disconnections of Customer Connections in

However, this growth was accompanied by a high number of customer complaints, reaching 1,781 complaints throughout 2025, with water-flow disruption as the largest category.

Table 1. Categories and Number of Customer Complaints in 2025

Category	Number of Complaints	Percentage
Water Flow Disruption	806	45,26%
Water Meter & Accessories	337	18,92%
Connection / Enforcement	306	17,18%
Leakage / Pipe Issues	214	12,02%
Customer Administration	47	2,64%
Water Quality	37	2,08%
Others	34	1,91%
Total	1.781	100%

This finding is reinforced by the results of a pre-survey of 30 respondents across the five SERVQUAL dimensions, which showed the highest levels of dissatisfaction in the Responsiveness dimension — 83.3% of respondents felt staff had not provided clear solutions and 80% felt complaint responses were not fast — followed by Empathy (80% felt staff did not adequately understand customer needs) and Reliability (76.7% felt complaints were not well handled).

Table 2. Summary of Pre-Survey Results by SERVQUAL Dimension (Highest Dissatisfaction Items)

Dimension	Statement	Dissatisfied (%)
Responsiveness	Staff provide clear solutions to customer problems	83.3%
Responsiveness	Staff respond quickly to customer complaints	80.0%
Empathy	Staff understand customer needs well	80.0%
Reliability	Customer complaints are handled well by PDAM	76.7%

This condition is consistent with previous research in the clean water service sector, which also found the largest gaps in the reliability and responsiveness dimensions [11], [12]. Although studies on clean water service quality are relatively common, research specifically evaluating PERUMDAM Purwa Tirta Dharma in Grobogan Regency using an integrated SERVQUAL–IPA approach remains limited, making this study

important for filling that gap while providing measurable improvement recommendations.

1.2. Literature Review

1.2.1. Service Quality and the SERVQUAL Model

Customer service is a determining factor in organizational success, particularly in the public service sector, as it encompasses all efforts by service providers to optimally meet customer needs and expectations [1]. Service quality itself refers to the extent to which a service meets or exceeds customer expectations, and serves as an important indicator for assessing the performance of service organizations and public services [2]. The most commonly used approach to measuring service quality is the SERVQUAL model, which comprises five main dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy [3]. These five dimensions are used to identify gaps between customer expectations and perceptions of the service received, with the reliability and responsiveness dimensions often being the most dominant factors in public service sectors such as clean water provision [4].

1.2.2. The Gap Concept in Service Quality Measurement

The gap concept is used to measure the difference between customer expectations (expected service) and their perception of the service received (perceived service) [5]. The gap value is calculated using the equation:

$$SQ_i = \text{Perception}_i - \text{Expectation}_i \dots\dots\dots (1)$$

A negative gap value indicates that the service has not met customer expectations, whereas a positive value indicates that it has exceeded them [6]. Dimensions with the largest negative gap become the top priority for improvement, as they are considered to have the greatest influence on customer satisfaction [7]. This approach is widely applied in public service evaluation, including regional water utilities, as it directs organizations toward the aspects of service most in need of improvement [8].

1.2.3. Importance Performance Analysis (IPA)

Importance Performance Analysis (IPA) is used to evaluate the level of importance of a service attribute relative to its actual performance, enabling organizations to determine improvement priorities systematically [9]. The level of conformity is calculated using:

$$TK_i = (X_i / Y_i) \times 100\% \dots\dots\dots (2)$$

where X_i is the perception score and Y_i is the expectation score. IPA results are mapped into four Cartesian quadrants: Concentrate Here (high importance, low performance — top priority), Keep Up the Good Work (both importance and performance are high), Low Priority (both importance and performance are low), and Possible Overkill (low importance, high performance) [10]. This mapping helps organizations allocate improvement resources more precisely.

1.2.4. Relevant Previous Studies

Several previous studies have integrated SERVQUAL and IPA to evaluate service quality, particularly in the clean water provision sector. A study on PDAM Bantaeng found negative

gaps across all dimensions, especially Responsiveness and Empathy, with actual customer satisfaction below target [11]. Similar findings were reported for PDAM Tirta Manggar Balikpapan, where the Reliability and Responsiveness dimensions recorded the worst gaps, and IPA highlighted service accuracy and complaint handling as improvement priorities [12]. In other service sectors such as truck workshops, priority improvement attributes were also found in the Assurance dimension [13]. A study on water utilities in several major cities further confirmed that the largest negative gaps consistently occur in the Responsiveness and Empathy dimensions [14], consistent with findings at PDAM Tirta Tuah Benua, East Kutai, which identified Reliability and Responsiveness as the most critical dimensions [8]. Overall, these studies show a consistent pattern: the Responsiveness and Reliability dimensions repeatedly emerge as the main weak points in clean water services, making them an important reference for this study in evaluating the service quality of PERUMDAM Purwa Tirta Dharma.

Nevertheless, most of these previous studies stop at identifying the priority quadrant of IPA (Concentrate Here) without further elaborating on the operational root causes behind the low-performing attributes or providing a structured direction for improvement. Consequently, the resulting recommendations tend to remain general and difficult to translate into concrete managerial action. This study addresses that gap by extending the IPA analysis of the Concentrate Here quadrant using a 5W+1H approach (What, Who, When, Where, Why, and How) to systematically identify what specific service problem occurs, who is responsible, when and where it takes place, why it happens, and how it should be resolved. This approach represents the novelty of the present study, as it transforms IPA from a descriptive prioritization tool into an operational diagnostic framework that produces actionable and targeted improvement recommendations for PERUMDAM Purwa Tirta Dharma, Grobogan Regency.

Several international studies have also examined water utility service quality outside Indonesia. In Tanzania, a study by the Mbeya Urban Water Supply and Sanitation Authority found that service reliability — particularly frequent supply interruptions, delayed complaint responses, and inaccurate billing — was the strongest predictor of customer satisfaction [15], reinforcing the centrality of the Reliability dimension identified in the present study. In Europe, a customer-centered Water Utility Service Quality Index developed for Portuguese water utilities similarly emphasized reliability and responsiveness as the dimensions most closely linked to perceived service quality [16], while a composite indicator study on urban water supply in Spain identified billing accuracy and complaint handling as recurring weaknesses affecting user-perceived quality [17]. Beyond the water sector, a SERVQUAL–IPA study on Iraqi banking services also confirmed that combining gap analysis with Importance Performance Analysis effectively identifies service dimensions requiring urgent improvement [18], supporting the methodological approach adopted in this study.

1.3. Research Objective

This study aims to analyze the level of customer satisfaction at PERUMDAM Purwa Tirta Dharma, Grobogan Regency, using the Service Quality (SERVQUAL) method, and to identify the service attributes that should be prioritized for improvement sources is presented in Table 1.

through Importance Performance Analysis (IPA), further elaborated using a 5W+1H approach for the attributes in the Concentrate Here quadrant. The results of this study are expected to provide practical contributions for company management in formulating targeted and sustainable service-quality improvement strategies.

2. MATERIALS AND METHODS

2.1 Research Location and Population

This research was conducted at PERUMDAM Purwa Tirta Dharma, Grobogan Regency, Central Java, Indonesia. The population comprised all active customers of the company in 2025, totalling 33,000 customers.

2.2 Sampling Technique

Respondents were selected using simple random sampling, giving every customer in the population an equal probability of selection. The sample size was determined using Slovin's formula with a 10% margin of error:

$$N = \frac{n}{1 + n \cdot e^2}$$

$$n = \frac{33.000}{1 + 33.000 (0.1)^2} = \frac{33.000}{1 + 330}$$

$$n = \frac{33.000}{331} = 99,7 \approx 100 \text{ respondents}$$

A data-adequacy test confirmed that 100 respondents were sufficient to represent the population for both the expectation and perception instruments.

2.3 Questionnaire Development

The questionnaire was developed based on the five SERVQUAL dimensions — Tangibles, Reliability, Responsiveness, Assurance, and Empathy — comprising 25 items in total (5 items per dimension), adapted from prior service-quality studies. Each item was measured twice: once for the expected service level (importance) and once for the perceived actual performance. Responses were measured using a five-point Likert scale (1 = Very Poor to 5 = Very Good). The complete list of items and their dimension can be seen in Table 3.

Table 3. SERVQUAL Questionnaire Items by Dimension

Item	Statement	Adapted from
T1	The PDAM service office is clean and comfortable.	Yuliana et al., 2024
T2	PDAM provides adequate customer service facilities.	Yuliana et al., 2024
T3	PDAM staff are neat and polite when serving customers.	Maulana et al., 2024
T4	The equipment used in customer service is adequate.	Sakinah et al., 2024
T5	The service information provided by PDAM is easy for customers to understand.	Ali et al., 2024
R1	PDAM provides clean water to customers.	Yuliana et al., 2024
R2	Water distribution is carried out according to the established schedule.	Sakinah et al., 2024
R3	Water bills correspond to customers' actual usage.	Salam et al., 2024
R4	Customer complaints are handled well by PDAM.	Yuliana et al., 2024
R5	Customer service is carried out in accordance with applicable procedures.	Maulana et al., 2024
RS1	PDAM staff respond quickly to customer complaints.	Yuliana et al., 2024
RS2	PDAM staff are easy to contact when customers need assistance.	Sakinah et al., 2024
RS3	Information on water service disruptions is delivered quickly to customers.	Ali et al., 2024
RS4	PDAM staff provide clear solutions to customer problems.	Yuliana et al., 2024
RS5	Water service disruptions are handled quickly by PDAM.	Sakinah et al., 2024
A1	PDAM staff have good competence in providing service.	Maulana et al., 2024
A2	I feel safe and confident using PDAM's service.	Salam et al., 2024
A3	Information provided by PDAM staff is clear and easy to understand.	Ali et al., 2024
A4	PDAM staff are always polite when providing service.	Yuliana et al., 2024
A5	PDAM guarantees good service quality to customers.	Sakinah et al., 2024
E1	PDAM staff give attention to every customer.	Yuliana et al., 2024
E2	PDAM staff understand customer needs well.	Maulana et al., 2024
E3	PDAM accepts and follows up on customer criticism and suggestions.	Sakinah et al., 2024
E4	Service is provided to all customers without discrimination based on status or background.	Ali et al., 2024
E5	PDAM shows concern for customer complaints.	Yuliana et al., 2024

Note : T = Tangibles, R = Reliability, RS = Responsiveness, A = Assurance, E = Empathy.

2.4 SERVQUAL Gap Analysis

The gap between customer expectations and perceptions for each item was calculated using $SQ_i = \text{Perception}_i - \text{Expectation}_i$. A negative gap value indicates that the service received has not met customer expectations, while dimensions or items with the largest negative gap were treated as the top priority for improvement.

2.5 Importance Performance Analysis (IPA) Procedure

Items with a negative SERVQUAL gap (indicating unmet expectations) were carried forward into Importance-Performance Analysis (IPA) to determine improvement priorities. The IPA procedure consisted of the following steps:

Coordinate determination. For each item, a coordinate point was calculated using the mean perceived-performance score as the X-axis value and the mean expectation (importance) score as the Y-axis value.

Crosshair (axis) determination. The horizontal reference line ($\bar{X}$) was calculated as the grand mean of the performance scores across all 25 items, and the vertical reference line ($\bar{Y}$) was calculated as the grand mean of the importance scores across all 25 items:

$$\bar{X} = \sum \bar{X}_i / n \quad \text{and} \quad \bar{Y} = \sum \bar{Y}_i / n \quad (n = 25 \text{ items})$$

Based on the collected data, $\bar{X} = 2.41$ and $\bar{Y} = 4.45$, calculated manually using Microsoft Excel.

1. Quadrant mapping. Each item was plotted on a Cartesian diagram bounded by the $\bar{X}$ and $\bar{Y}$ reference lines, forming four quadrants: Quadrant I – Concentrate Here (high importance, low performance: top priority for improvement); Quadrant II – Keep Up the Good Work (high importance, high performance); Quadrant III – Low Priority (low importance, low performance); and Quadrant IV – Possible Overkill (low importance, high performance).

2.6 5W+1H Root-Cause Analysis for Priority Attributes

To address the limited depth of prior SERVQUAL–IPA studies, which typically stop at identifying the priority quadrant without explaining the underlying causes, this study extends the analysis of items in the Concentrate Here quadrant using a structured 5W+1H approach (What, Who, When, Where, Why, and How). For each priority attribute, the specific problem (What), the responsible party (Who), the timing/frequency of occurrence (When), the location or channel involved (Where), the underlying cause (Why), and the recommended corrective action (How) were identified based on customer complaint records, field observation, and internal input from PERUMDAM staff. This approach transforms the IPA priority quadrant from a descriptive ranking into an operational diagnostic tool with actionable managerial recommendations.

3. RESULT AND DISCUSSION

This study involved 100 active customers of PERUMDAM Purwa Tirta Dharma in Grobogan Regency, a sample size that met the data adequacy requirement based on the Slovin calculation.

3.1. Respondent Overview and Instrument Testing Results

Validity testing showed that all 25 statement items in both the expectation and performance instruments were valid (calculated $r > r\text{-table} = 0.1966$). Reliability testing also showed good results, with Cronbach's Alpha values of 0.832 for the expectation instrument and 0.948 for the performance instrument, both above the 0.70 threshold, confirming the instruments' suitability for use.

3.2. SERVQUAL Gap Results

Table 4. Mean Expectation and Performance Values by SERVQUAL Dimension

Dimension	Mean Performance	Gap	Mean Expectation
Tangibles	4,41	2,25	-2,158
Reliability	4,47	2,45	-2,026
Responsiveness	4,47	2,49	-1,982
Assurance	4,42	2,38	-2,046
Empathy	4,47	2,47	-2,002

Table 5. Five Attributes with the Largest Gap Values

Code	Statement	Gap Value
T5	Service information provided by PDAM is easy for customers to understand	-2,36
R1	PDAM provides clean water to customers	-2,35
A4	PDAM staff are always courteous in delivering service	-2,25
T2	PDAM provides adequate customer service facilities	-2,24
E3	PDAM receives and follows up on customer criticism and suggestions	-2,17

The SERVQUAL analysis results show that mean customer expectation scores ranged from 4.41 to 4.47, while mean performance scores were considerably lower, ranging from 2.25 to 2.49, on a scale of 5.00. All five dimensions yielded negative gap values, indicating that the service customers received did not meet their expectations. The Tangibles dimension recorded the largest gap (-2.158), followed by Assurance (-2.046), Reliability (-2.026), Empathy (-2.002), and Responsiveness with the smallest gap (-1.982).

At the attribute level, the largest gaps were found in clarity of service information (T5, gap -2.36), provision of clean water (R1, gap -2.35), staff courtesy (A4, gap -2.25), adequacy of service facilities (T2, gap -2.24), and follow-up on customer complaints/suggestions (E3, gap -2.17). These findings are consistent with research on PDAM Bantaeng and PDAM Tirta Manggar Balikpapan, which also found the largest gaps in dimensions related to reliability and tangible aspects of clean water service [11], [12].

3.3. Improvement Priorities Based on Importance Performance Analysis (IPA)

The grand mean values ($\bar{X} = 2.41$, $\bar{Y} = 4.45$) were used as the crosshair reference lines to map all 25 items into four quadrants (Fig. 2). The IPA mapping placed five attributes in Quadrant I (Concentrate Here) as top improvement priorities: T5 (clarity of service information), R1 (provision of clean water), T3 (staff appearance), RS1 (speed of complaint response), and A4 (staff courtesy). These five attributes have high importance to customers but their actual performance remains low. Conversely, attributes in Quadrant II — such as complaint handling (R4) and speed of disruption handling (RS5) — already show performance consistent with expectations and should be maintained.

These results indicate that PERUMDAM Purwa Tirta Dharma's improvement strategy should focus on enhancing the clarity of service information, ensuring the availability of clean water, and training staff attitude and appearance, rather than expanding resources on Quadrant IV attributes, which already perform well despite being considered less important by customers.

Table 7. Coordinate Points (Mean Performance and Mean Importance) per Item

Item	Mean Performance (X)	Mean Importance (Y)
T1	2.37	4.44
T2	2.10	4.34
T3	2.31	4.46
T4	2.35	4.32
T5	2.13	4.49
R1	2.10	4.45
R2	2.43	4.52
R3	2.55	4.37
R4	2.85	4.58
R5	2.30	4.44
RS1	2.40	4.47
RS2	2.46	4.49
RS3	2.34	4.40
RS4	2.58	4.37
RS5	2.65	4.61

Item	Mean Performance (X)	Mean Importance (Y)
A1	2.51	4.38
A2	2.32	4.41
A3	2.36	4.44
A4	2.25	4.50
A5	2.44	4.38
E1	2.44	4.43
E2	2.40	4.30
E3	2.50	4.67
E4	2.45	4.32
E5	2.58	4.66
Grand Mean	2.41	4.45

Table 8. Mapping of Attributes into the Four IPA Quadrants

Quadrant	Characteristics	Attributes Include
I – Concentrate Here (Top Priority)	High importance, low performance	T5, R1, T3, RS1, A4
II – Keep Up the Good Work	High importance, high performance	R4, RS5, E3, R2, E5
III – Low Priority	Low importance, low performance	T2, T4, R5, RS3, A2, A3, E2, T1
IV – Possible Overkill	Low importance, high performance	RS2, RS4, R3, A1, A5, E1, E4

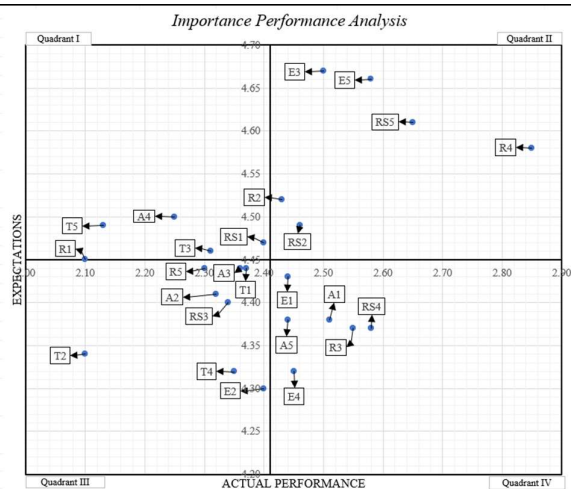


Fig. 2 IPA Cartesian Diagram

The IPA mapping placed five attributes in Quadrant I (Concentrate Here) as top improvement priorities: T5 (clarity of service information), R1 (provision of clean water), T3 (staff appearance), RS1 (speed of complaint response), and A4 (staff courtesy). These five attributes have high importance to customers but their actual performance remains low. Conversely, attributes in Quadrant II — such as complaint handling (R4) and speed of disruption handling (RS5) — already show performance consistent with expectations and should be maintained. These results indicate that PERUMDAM Purwa Tirta Dharma's improvement strategy should focus on enhancing the clarity of service information, ensuring the availability of clean water, and

training staff attitude and appearance rather than expanding resources on Quadrant IV attributes, which already perform well despite being considered less important by customers.

3.4. Root-Cause Analysis of Priority Attributes (5W+1H)

To deepen the discussion beyond simply ranking priority attributes, a 5W+1H analysis was conducted for each item in the Concentrate Here quadrant to identify the operational causes behind the observed gaps and to derive targeted, actionable recommendations, as summarized below.

Table 9. 5W + 1H T5 – Service information is easy for customers to understand

T5 – Service information is easy for customers to understand	
What	Customers find service information (e.g., disruption notices, billing/tariff explanations, procedures) difficult to understand.
Who	Customer service / information dissemination staff responsible for drafting and distributing service information.
When	Occurs mainly during service disruption announcements and tariff/billing communication.
Where	Information is delivered through service counters, printed notices, and community messaging groups.
Why	Information tends to use technical or administrative language and is distributed through channels that customers do not routinely monitor, without visual aids.
How	Simplify wording into plain language, add simple visual aids/infographics, and expand distribution to more accessible digital channels (e.g., WhatsApp broadcast, social media).

Table 10. 5W + 1H R1 – PDAM provides clean water to customers

R1 – PDAM provides clean water to customers	
What	Customers perceive water supply as insufficiently reliable/continuous.
Who	Distribution and technical operations division.
When	Occurs during peak-demand hours or in zones prone to pressure drops.
Where	Specific distribution zones with older pipe infrastructure.
Why	Aging infrastructure, limited network capacity in certain zones, and the absence of a proactive maintenance schedule.
How	Prioritize pipe network maintenance/replacement in the most-affected zones, install pressure monitoring, and adopt a scheduled (not only reactive) maintenance program.

Table 11. 5W + 1H T3 – PDAM staff are neat and polite when serving customers

T3 – PDAM staff are neat and polite when serving customers	
What	Staff appearance and courtesy during service are perceived as below customer expectations.
Who	Front-line customer service staff at service counters and in the field.
When	During direct, in-person service interactions.
Where	Service counters and field service visits.
Why	Absence of a standardized appearance/service protocol and limited customer-service training.
How	Establish and enforce service standards (dress code, greeting script) and conduct regular customer service training.

Table 12. 5W + 1H RS1 – PDAM staff respond quickly to customer complaints

RS1 – PDAM staff respond quickly to customer complaints	
What	Staff are perceived as slow to respond to customer complaints.
Who	Complaint-handling / call center staff.
When	During complaint intake and the follow-up period, particularly after service disruptions.
Where	Complaint channels: phone, walk-in counters, and digital/online reporting.
Why	Complaint tracking is largely manual, there is no defined response-time standard (SLA), and staff capacity is limited during peak complaint periods.
How	Implement a digital complaint-tracking system with a defined response-time SLA and allocate additional staff during periods of high complaint volume.

Table 13. 5W + 1H A4 – PDAM staff are always polite when providing service

A4 – PDAM staff are always polite when providing service	
What	Customers perceive a lack of courtesy during service delivery.
Who	Front-line staff handling direct customer interactions.
When	Especially when handling complaints or difficult service situations.
Where	Service counters and field service points.
Why	Absence of standardized customer-service etiquette training and potential staff workload/fatigue during high-complaint periods.
How	Conduct routine soft-skills/etiquette training and establish a short post-interaction customer feedback mechanism.

Overall, the 5W+1H analysis indicates that the root causes of low performance in the priority attributes are largely operational and

managerial in nature — including the absence of standardized service protocols, manual and untracked complaint handling, limited staff capacity during peak periods, and aging infrastructure in certain distribution zones — rather than isolated incidents. This deeper diagnostic view distinguishes the present study from prior SERVQUAL–IPA research, which generally stops at identifying priority attributes without explaining why the gaps occur or how management should act on them.

3.5. Comparison with International Studies

These findings align with international evidence: similar to the pattern found at Mbeya UWSA in Tanzania, where inaccurate billing and slow complaint response were identified as primary drivers of dissatisfaction [15], the present study likewise found that unclear service information and slow complaint handling were among the most critical weaknesses. This cross-country consistency suggests that the operational challenges identified through the 5W+1H analysis in this study mirror broader structural issues commonly reported in water utilities in both developing and developed regions [15, 16, 17], reinforcing the practical relevance of the improvement recommendations proposed here.

4. CONCLUSION

This study set out to analyze customer satisfaction toward PERUMDAM Purwa Tirta Dharma, Grobogan Regency, using the Service Quality (SERVQUAL) method and to identify priority service attributes through Importance Performance Analysis (IPA). The SERVQUAL analysis showed that customer satisfaction has not yet met expectations, as reflected in negative gap values across all five dimensions, with Tangibles recording the largest gap (–2.158), followed by Assurance (–2.046), Reliability (–2.026), Empathy (–2.002), and Responsiveness (–1.982), indicating a persistent gap between the service received and customer expectations across every dimension of service quality.

The IPA results further mapped all service attributes into four quadrants according to their relative importance and performance. Five attributes fell into Quadrant I (Concentrate Here) — clarity of service information (T5), provision of clean water (R1), staff appearance (T3), speed of complaint response (RS1), and staff courtesy (A4) — representing the top priorities for improvement, as they carry high importance to customers while their actual performance remains below expectations. Attributes in Quadrant II should be maintained at their current level; those in Quadrant III represent a lower priority for improvement; and those in Quadrant IV show performance that already exceeds their relative importance to customers, suggesting an opportunity to reconsider how resources are allocated across service attributes.

Beyond identifying these priority attributes, the 5W+1H root-cause analysis applied to the Concentrate Here quadrant revealed that the underlying causes of low performance are largely operational and managerial in nature, rather than isolated incidents — including the absence of standardized service protocols, manually tracked complaints without a defined response-time standard, and limited maintenance planning for aging infrastructure. This diagnostic depth constitutes the theoretical contribution of the present study, extending the

SERVQUAL–IPA framework from a descriptive prioritization tool into an operational diagnostic model that links customer-perceived service gaps to their organizational root causes. From a managerial standpoint, these findings give PERUMDAM Purwa Tirta Dharma's management a clear, evidence-based basis for allocating improvement resources, particularly toward simplifying customer communication, accelerating pipe network maintenance in the most-affected distribution zones, standardizing front-line service protocols, and adopting a digital, SLA-based complaint-tracking system, rather than distributing resources evenly across all service aspects. More broadly, the persistent negative gaps observed across all SERVQUAL dimensions suggest that regional water utility oversight bodies may benefit from mandating periodic, standardized customer-satisfaction evaluation as part of regional water utility performance reporting, so that service quality issues can be identified and addressed systematically rather than reactively.

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