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Analysis of Public Service Quality at PDAM Tirta Nusa Office of Natuna District, Indonesia

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ABSTRACT
Clean water services are a vital component of public services that significantly influence community quality of life, especially in archipelagic regions such as Natuna Regency, which face infrastructural limitations and geographical dispersion. This study aims to examine public service quality in clean water provision at PDAM Tirta Nusa, analyze service performance, and identify inhibiting factors. The study is based on the SERVQUAL framework by Parasuraman, Zeithaml, and Berry, encompassing tangibles, reliability, responsiveness, assurance, and empathy. A descriptive qualitative approach was employed, with data collected through in-depth interviews, observations, and documentation. Data were analyzed using an interactive model. The findings reveal that service quality is relatively adequate but not yet optimal, particularly in water distribution continuity, responsiveness to customer complaints, and limited distribution facilities. Key obstacles include limited human resources, inadequate infrastructure, and geographical constraints. The study recommends strengthening institutional capacity, improving infrastructure, and enhancing service management.

Keywords: Clean Water, Public Service Quality.

I. Introduction

Public service provision is a central function of government, ensuring societal welfare by directly addressing citizens' fundamental needs through the delivery of goods, services, and administrative support. In contemporary governance, the quality of public services has become a critical benchmark for assessing state performance, particularly in terms of effectiveness, accountability, efficiency, and transparency. As emphasized in the legal framework of public service delivery, public services represent a structured effort to fulfill citizens' rights in accordance with regulatory standards (Isbandono & Pawestri, 2019). In this context, service quality is not merely a technical outcome but reflects the extent to which public institutions meet or exceed community expectations. Increasing public scrutiny toward government performance further reinforces the need for professional, responsive, and citizen-oriented services (Muliono, 2022; Setyawan, 2023). The concept of service quality is fundamentally linked to the comparison between expected and perceived service outcomes, where discrepancies between the two may indicate deficiencies in service delivery (Febriana, 2016). Consequently, governments are required to continuously enhance their service systems to achieve optimal public satisfaction and to support sustainable national development agendas (Karisma et al., 2023). Within this broader framework, the provision of clean water services represents a highly

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strategic domain, as it directly influences public health, environmental sustainability, and overall quality of life. Water utilities, particularly those managed by regional government-owned enterprises, play a pivotal role in ensuring equitable access to safe and reliable water resources. Therefore, examining service quality in this sector becomes essential, especially in regions with complex geographical and infrastructural challenges.

Natuna Regency, as an archipelagic region in Indonesia, presents a unique context for public service delivery due to its dispersed geography and infrastructural limitations. PDAM Tirta Nusa, as a regional public water utility, is responsible for providing clean water services that meet the standards of quantity, quality, and continuity. The organization has articulated its commitment through a vision to become a leading regional water utility in the Riau Islands Province, supported by missions that emphasize service excellence, customer satisfaction, and the implementation of sound corporate governance principles. Despite these commitments, preliminary observations indicate that service delivery has not yet fully met optimal standards. Issues such as disruptions in water distribution, delayed responses to customer complaints, and limitations in service facilities continue to affect service performance and customer satisfaction. To systematically analyze service quality, this study adopts the SERVQUAL framework developed by Parasuraman, Zeithaml, and Berry, which conceptualizes service quality across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. These dimensions provide a comprehensive analytical lens to evaluate both the technical and functional aspects of service delivery. In the context of PDAM Tirta Nusa, while certain aspects, such as assurance and empathy, appear to be relatively well implemented, significant challenges persist in reliability and responsiveness. For instance, inconsistencies in water distribution and prolonged service processing times reflect gaps between expected and actual service performance, thereby highlighting critical areas requiring improvement.

In addition to service performance issues, regulatory compliance constitutes another important dimension in assessing public service quality. The implementation of clean water services in Indonesia is governed by the Regulation of the Minister of Public Works and Public Housing Number 4 of 2020 concerning Standard Operating Procedures for Drinking Water Supply Systems. This regulation mandates the development and application of standardized operational procedures covering both system development and management aspects. Compliance with these procedures is essential to ensure service quality, operational efficiency, and accountability. However, the extent to which such regulatory frameworks are effectively implemented at the local level remains an empirical question, particularly in regions facing structural and geographical constraints. Further empirical evidence underscores the urgency of this issue. An audit conducted by the Financial and Development Supervisory Agency (BPKP) identified significant risks within the drinking water supply system in Natuna Regency, with a potential impact level reaching 70%, indicating limited access to clean water for a substantial portion of the population (Evan, 2025). The identified challenges include high leakage rates in distribution networks, limited availability of raw water sources, and suboptimal distribution systems that fail to serve remote areas adequately. Additionally, concerns regarding water quality standards in specific distribution points further exacerbate public dissatisfaction and undermine trust in service providers. These findings reveal that the challenges faced by PDAM Tirta Nusa are not solely operational but also structural, requiring comprehensive and integrated solutions.

Despite the growing importance of public service quality in the water sector, existing studies often emphasize overall service performance without adequately addressing the interplay among service quality dimensions, regulatory compliance, and geographical constraints in archipelagic contexts. This indicates a research gap in understanding how multidimensional service quality frameworks, such as SERVQUAL, can be applied to evaluate and improve public water services in geographically complex regions. Furthermore, limited empirical studies focus specifically on regional water utilities in remote areas, underscoring the need for context-sensitive research that integrates theoretical and practical perspectives. Addressing this gap, the present study aims to analyze the quality of public service delivery at PDAM Tirta Nusa, Natuna Regency, and identify the key factors hindering optimal service delivery. By employing a qualitative descriptive approach, this study seeks to provide an in-depth understanding of service dynamics from both institutional and user perspectives. The findings are expected to contribute to the development of the public service quality

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literature, particularly in the context of regional water utilities, and to offer practical recommendations for improving service delivery systems. Ultimately, this study aspires to support the realization of more responsive, efficient, and equitable clean water services, thereby enhancing community welfare and strengthening local governance.

II. Literature Review and Hypothesis Development

This study adopts Service Quality (SERVQUAL) as the grand theory to examine the quality of clean water services as a user-experienced phenomenon rather than merely an organization's technical performance. The framework proposed by Parasuraman (1990) conceptualizes service quality as a multidimensional construct comprising tangibles, reliability, responsiveness, assurance, and empathy, thereby enabling a more comprehensive assessment of service processes, staff conduct, and an organization's capacity to meet public expectations. The relevance of SERVQUAL in public service settings lies in its ability to bridge the "service promise" and "customer perceptions," enabling mismatches across specific dimensions to be traced to systemic issues, governance arrangements, or implementer capabilities. In the context of a water utility, these five dimensions can be interpreted as an integrated service ecosystem: tangibles represent the readiness of facilities and infrastructure; reliability reflects consistency in service fulfillment; responsiveness captures the speed and willingness to respond to needs; assurance concerns perceived safety and credibility; and empathy indicates the extent of human-centered service orientation. Accordingly, SERVQUAL functions not merely as a typology but also as a diagnostic logic for identifying strengths, weaknesses, and constraints affecting clean water service delivery in a structured manner (Parasuraman, 1990).

2.1. Definition of Service Quality

The literature on service quality generally emphasizes that quality is not synonymous with expensive services; instead, it is reflected in adequacy, accessibility, efficiency, effectiveness, and safety, all of which require continuous evaluation and improvement (Herlambang, 2016). This view aligns with the notion of service as an effort to meet customer expectations and shape satisfaction through organizational attitudes and actions, including the intangible and non-ownership nature of services (Rangkuti, 2013; M. Nur Rianto Al Arif, 2010; Siagian, 2005). Hence, service quality can be understood as the degree of excellence assessed through attributes that influence a service's capacity to fulfill explicit and implicit needs (Siahaan, 2022). From a service management perspective, service quality constitutes an expected standard of excellence that must be managed to satisfy user needs (Harsono, 2019), while the level of perfection in fulfilling customer expectations serves as a direct indicator of service quality (Bahar et al., 2020). In public administration, service quality carries broader institutional consequences because it shapes citizens' perceptions of organizational performance and the legitimacy of service providers. When service quality falls below expectations, complaints, criticism, and negative organizational images tend to follow, making public satisfaction both an experiential outcome and an evaluative instrument of administrative effectiveness. Theoretically, satisfaction is closely linked to trust; negative public assessments of government institutions commonly stem from dissatisfaction with service processes and outcomes (Dwiyanto, 2002). This relationship indicates that service quality is intertwined with staff performance, organizational capacity, and commitment to task execution. Performance is understood as work outcomes influenced by individuals' abilities, skills, experience, and commitment within an organization (Hasibuan, 2001), implying that professional public servants are a prerequisite for service delivery that is fast, accurate, responsive, and accountable. This synthesis strengthens the argument that interventions to improve PDAM services should not be limited to technical upgrades but must also address staff performance and service governance.

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2.2. Definition of Public Service

Public service is commonly defined as a series of regular, continuous actions aimed at fulfilling user needs, with satisfaction arising from the relationship between service providers and recipients (Siahaan, 2022). The term "public" underscores the orientation of services toward the broader community and positions government officials as strategic actors who interact directly with citizens (Muliono, 2022). Accordingly, public service is also associated with the legal obligation of service providers to meet users' needs in accordance with established procedures and regulations (Harsono, 2019; Erlianti, 2019). This normative framework is reinforced by regulations that define public service as the actions undertaken by public service providers to fulfill legal duties and meet service users' needs (Decree of the Minister for Administrative Reform Number 25 of 2009), including services delivered to communities, organizations, government institutions, and individuals (Karisma et al., 2023). However, the literature also highlights that delivering high-quality public services is not straightforward; many countries struggle to provide adequate-quality services to their citizens (Rohman in Sari, 2023). This challenge explains why procedural compliance alone is insufficient: public services must be managed as strategic instruments of development and as arenas for demonstrating state capacity. Moenir (1995) argues that public service entails actions performed by bureaucracies or authorized entities to help communities achieve collectively determined outcomes, while Sinambela et al. (2011) emphasize public service as government efforts to respond to citizens' needs and expectations as rights-bearing service recipients. Within this framework, the professionalism of public servants and the government's success in serving citizens become key determinants of state legitimacy (Tanjung, 2018). Thus, investigating service quality at a water utility requires a dual lens: as the fulfillment of fundamental rights and as a governance achievement evaluated through lived service experiences.

2.3. Principles of Public Service

Principles of public service function as operational guidelines to ensure that services are clear, understandable, timely, accurate, safe, and supported by adequate facilities and accessibility. These principles include clarity of procedures, clarity of technical-administrative requirements, certainty of time, accuracy of service outputs, safety, and service orderliness and comfort (MENPAN Decree No. 63/KEP/M.PAN/7/2003 in Roza, 2021). This framework positions public service as a process that must be transparent, straightforward, and accountable, indicating that outcome orientation and user satisfaction are inseparable from procedural compliance. At the same time, these principles require organizational capacity and service leadership, as their effectiveness depends heavily on staffing adequacy, supporting infrastructure, and grievance-handling mechanisms. From a more contemporary standpoint, ideal public service should not be assessed solely by procedural adherence but also by its ability to reduce information asymmetry, ensure affordability, and sustain quality over time. Amin Ibrahim (2008) emphasizes clarity of rights and obligations, alignment of services with citizens' needs and capacity, assurance of service quality, and community involvement in service delivery. This perspective enriches the understanding of public service as a governance arena, where collaboration across stakeholders may be necessary to expand coverage and improve effectiveness. In the context of a water utility, such principles are crucial because clean water services involve risk, infrastructural dependence, and the need for rapid responses to distribution disruptions that directly affect citizens' welfare.

2.4. Public Service Standards

Public service standards operate as a "service promise" that binds providers and simultaneously serves as a reference for users to evaluate service quality. Standards provide resources for decision-makers, help define which services should be sought and delivered, and enable benchmarking for continuous quality assessment and review (Siahaan, 2022). In public administration, standards are not merely documents but mechanisms for standardizing processes, enabling citizens to understand procedures, monitor performance,

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and evaluate service consistency. Thus, service standards reinforce the notion that quality is the product of system design, not solely individual competence. In practice, standards also function as control instruments to prevent service providers from lowering quality merely to save costs (Siahaan, 2022). This is particularly relevant for clean water services, where cost-efficiency pressures often conflict with the need for infrastructure investment and system maintenance. Strong standardization should promote a balance between effectiveness, efficiency, and service equity, while offering a basis for identifying service weaknesses when complaints or dissatisfaction arise.

2.5. Indicators of Public Service Quality

Service quality in the service sector is commonly evaluated using the five SERVQUAL indicators introduced by Parasuraman (1990): tangibles, reliability, responsiveness, assurance, and empathy. The tangible dimension emphasizes observable physical evidence and facilities that shape users' perceptions of service quality and reflect the provider's readiness (Bahar et al., 2020). Reliability focuses on the ability to deliver services as promised, requiring timeliness, consistency, and minimal errors, making it especially critical for clean water services that depend on distribution continuity. Responsiveness assesses the willingness to help and to provide prompt service; failure to respond or leaving customers waiting without clear reasons may reduce perceived quality, whereas rapid service recovery can improve public perceptions. Assurance relates to the provider's ability to build confidence and trust through knowledge, politeness, and service credibility (Muliono, 2022). Empathy emphasizes personalized attention, understanding customer needs, and creating positive service experiences (Prihatin et al., 2021). At the same time, public service literature underscores that service quality is also intertwined with principles of transparency, accountability, conditionality, participation, equality of rights, and the balance of rights and obligations (Setyawan, 2023). Synthesizing these two perspectives strengthens the argument that SERVQUAL can be used not only as a customer perception measure but also as a gateway to assess whether service delivery aligns with public service principles. However, an important tension should be noted: public service studies often emphasize normative-procedural dimensions, whereas SERVQUAL is grounded in user experience; thus, conflicts between "procedural compliance" and "user satisfaction" may arise, especially in essential services like clean water that face capacity constraints.

Empirically, the literature presented in this chapter suggests that public service quality depends on the integration of user-perception dimensions (SERVQUAL), staff capacity (performance), and service governance (principles and standards). Nonetheless, a relevant gap remains for the present study. First, theoretically, although SERVQUAL is often presented as a grand theory, the review does not yet explicitly explain how interactions among dimensions (e.g., reliability and responsiveness) account for complaint patterns or dissatisfaction in clean water services. Second, empirically, existing references emphasize public satisfaction and staff professionalism (Dwiyanto, 2002; Hasibuan, 2001) but do not map specific mechanisms of service constraints within clean water utilities, particularly in archipelagic contexts characterized by access and infrastructure challenges. Third, methodologically, the dominant normative focus is on principles and standards (MENPAN Decree No. 63/KEP/M).PAN/7/2003 in (Roza, 2021; Amin Ibrahim, 2008; Siahaan, 2022) may need to be complemented by an experiential lens to ensure that evaluation moves beyond "the presence of procedures" toward "the functioning of procedures" in real service settings.

III. Research Method

3.1. Research Design and Approach

This study employed a descriptive qualitative research design grounded in a post-positivist paradigm, in which the researcher served as the primary instrument, data collection relied on triangulation, analysis was conducted inductively, and the emphasis was placed on meaning rather than statistical

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generalization (Hasan et al., 2022). A qualitative approach was selected because it enables a holistic understanding of phenomena experienced by research subjects—such as perceptions, motivations, actions, and service experiences—through rich descriptions in natural settings (Nasution, 2023). The descriptive qualitative design was considered appropriate for producing a systematic and factual portrayal of the characteristics and relationships among phenomena related to public service quality at PDAM Tirta Nusa, Natuna Regency, particularly from the viewpoints of both service providers and service users (Siahaan, 2022). Conceptually, the inquiry was anchored in the SERVQUAL service quality framework, which examines five dimensions—tangible, reliability, responsiveness, assurance, and empathy—as an analytical lens for exploring service delivery performance and constraints in the context of clean water services (Sinollah, 2019).

3.2. Population and Participants

The study's information sources comprised individuals and organizational records relevant to the service quality phenomenon. Primary data were obtained directly from key informants representing managerial, operational, and user perspectives, including the Director of PDAM Tirta Nusa Natuna Regency, the Head of Customer Service Division, front office/customer service officers, field technicians, complaint-handling officers, and members of the public as customers of PDAM Tirta Nusa Natuna Regency (Supriyono, 2018). To enrich contextual understanding and to support data verification, the study also incorporated perspectives from local government actors responsible for supervising PDAM operations within the service governance structure, consistent with the triangulation strategy described below. Secondary data were sourced indirectly through intermediary media and organizational documentation, including records on employee numbers, facilities, tariff structures, and other institutional documents relevant to assessing service quality (Supriyono, 2018).

3.3. Data Collection Procedures

Data collection was conducted using multiple complementary techniques to capture the phenomenon comprehensively (Siahaan, 2022). First, the researcher conducted participatory observation through direct engagement in the research setting, enabling a first-hand examination of routine service activities performed by PDAM employees in their interactions with customers. This approach positioned the researcher as a participant-observer who gained experiential insights into service processes and organizational practices, while also allowing integration with interviews and document review where needed (Nasution, 2023). Second, in-depth interviews were used to obtain detailed information on beliefs, experiences, and service behaviors, with the flexibility to develop probing questions in response to informants' answers to refine the emerging understanding (Ahyar et al., 2020). Interviews were conducted with key organizational actors, including the Director of PDAM Tirta Nusa Natuna Regency, to explore the implementation of service quality and the constraints. Third, a documentation study was employed to collect written, visual, and archival materials that could support and contextualize field findings, including organizational rules, procedures, and other records relevant to public service delivery at PDAM Tirta Nusa Natuna Regency (Ratnaningtyas et al., 2022).

3.4. Instruments and Measures

In line with qualitative inquiry principles, the researcher functioned as the primary instrument, supported by interview guides, observation notes, and documentation review protocols. The SERVQUAL framework guided the development of data collection focus and analytic sensitizing concepts across five dimensions: tangible aspects of facilities and staff appearance, reliability of consistent and accurate service, responsiveness to customer needs and complaints, assurance reflected in staff competence and attitudes that build trust, and empathy expressed through attention to individual customer needs (Sinollah, 2019). These

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dimensions served as organizing categories for exploring how service quality was enacted in practice and how customers and staff experienced or interpreted service performance.

3.5. Data Analysis Techniques

Data analysis followed an interactive qualitative analysis model, involving systematic processing of field notes, interview transcripts, and documents through iterative cycles of data reduction, data display, and conclusion drawing and verification (Siahaan, 2022). Data reduction involved selecting, focusing, and simplifying information by distinguishing essential from less relevant data to align evidence with the study's research questions (Ratnaningtyas et al., 2022). Data display then organized the reduced data into coherent narrative forms and, where appropriate, structured representations to facilitate interpretation and pattern recognition (Ratnaningtyas et al., 2022). Finally, conclusions were drawn and verified through continuous reflection and re-checking across data sources and earlier analytic steps to ensure that findings were grounded in the accumulated evidence (Ratnaningtyas et al., 2022). Throughout these stages, the SERVQUAL dimensions provided a conceptual scaffold for identifying service quality patterns and constraints within PDAM Tirta Nusa's service delivery.

3.6. Trustworthiness

To ensure data credibility and rigor, the study applied triangulation as a qualitative validity strategy. Triangulation was treated as qualitative cross-validation by assessing the sufficiency of evidence through convergence across multiple data collection procedures (Sugiyono, 2017). Following this approach, the study employed source, technique, and time triangulation (Haryoko, 2020). Source triangulation was achieved by comparing information from leadership, service, and technical staff; customers across different service areas; and relevant local government actors to examine consistency and enrich interpretive depth. Triangulation was conducted by cross-checking interview accounts against direct observations and documentary evidence, such as standard operating procedures, performance reports, complaint records, and water distribution data, thereby strengthening inferential confidence. Time triangulation was applied by conducting observations at different service hours (e.g., morning and midday) and interviewing customers on different days to reduce situational bias and improve the stability of interpretations across time.

3.7. Ethical Considerations

The methodological description in the original thesis did not explicitly specify formal ethical procedures; therefore, this article reports only the methodological safeguards stated in the source text. Nonetheless, given the use of in-depth interviews and participatory observation, the study's triangulation-based rigor and multi-source verification were intended to support responsible handling of information and to ensure that interpretations accurately represented the service context and stakeholder perspectives (Sugiyono, 2017; Sapto Haryoko, 2020).

IV. Results and Discussion

4.1. Results

The findings indicate that the implementation of public service quality at PDAM Tirta Nusa Natuna reflects varying performance across the five SERVQUAL dimensions, with some aspects relatively adequate while others remain substantially constrained. In the tangible dimension, the customer service facilities, such as complaint counters and waiting rooms, were generally perceived as adequate and accessible. Observational evidence confirmed the availability of complaint service desks and a reasonably comfortable waiting area, both of which support fundamental service interactions. However, core infrastructure related to

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water production and distribution was found to be inadequate. The absence of proper water treatment installations (IPA) in several service areas results in water being distributed directly from intake to reservoir without filtration, while aging pipeline systems frequently experience leaks, breaks, and operational disruptions. In the reliability dimension, the results demonstrate that PDAM Tirta Nusa faces significant challenges in maintaining service consistency. The system's installed capacity reaches approximately 110 liters/second, yet only about 68 liters/second can be effectively utilized under normal conditions, with further reductions during the dry season. The reliance on outdated pipeline infrastructure and reactive maintenance practices contributes to frequent service interruptions. Distribution is often affected by seasonal variability, leading to uneven water supply across regions. Customers reported dissatisfaction due to inconsistent flow, particularly during dry seasons when some areas receive little or no water.

Regarding responsiveness, PDAM Tirta Nusa shows a relatively strong institutional commitment to promptly handling complaints. Management emphasized that responses to reports are delivered immediately. However, in practice, responsiveness is inconsistent due to variations in case complexity, geographical constraints, and human resource performance. While some complaints are resolved quickly, others experience delays, particularly when technical coordination is required. Customer feedback reveals inconsistent staff responsiveness, particularly via phone and messaging apps, with some reports not being promptly addressed. In the assurance dimension, findings reveal notable deficiencies in guaranteeing service quality and safety. The lack of standardized water treatment processes and the absence of formal cooperation with health authorities for routine water quality testing weaken institutional credibility. Although periodic checks are conducted by external agencies such as the Health Office and River Basin Agency, these processes are not fully institutionalized. Furthermore, tariff issues present additional challenges, as water prices are relatively low compared to operational costs, limiting the organization's capacity to improve infrastructure. Conversely, customers in remote areas perceive tariffs as relatively high compared to the quality and continuity of service received.

In terms of empathy, PDAM Tirta Nusa demonstrates a relatively strong social orientation. The institution provides flexible services such as complimentary water tank delivery for bereavement events. It facilitates payments through partnerships with post offices and banks, accommodating elderly and non-digital users. These practices indicate an awareness of community needs and social inclusivity. However, empathy remains mainly informal and reactive, as the institution lacks systematic mechanisms, such as customer satisfaction surveys or structured feedback systems, to comprehensively capture public perceptions. In addition to service quality dimensions, the study identified three main inhibiting factors affecting public service delivery. First, human resource limitations were evident in the lack of systematic training, inconsistent staff performance, and weak internal supervision. Second, geographical conditions significantly constrain service distribution due to Natuna's archipelagic nature, uneven topography, and dispersed settlements, resulting in high operational costs and unequal service access. Third, inadequate infrastructure, particularly aging pipelines and limited water treatment facilities, remains a critical barrier to achieving reliable and high-quality service delivery.

4.2. Discussion

The findings highlight that public service quality at PDAM Tirta Nusa Natuna is structurally constrained by the interaction between infrastructure limitations, human resource capacity, and environmental factors, which collectively shape the performance of each SERVQUAL dimension. From a theoretical perspective, the imbalance across dimensions indicates that frontline service interactions do not merely determine service quality but are deeply rooted in organizational capacity and system readiness, as emphasized in the SERVQUAL framework (Parasuraman et al., 1990). In the tangible dimension, the disparity between customer service facilities and core technical infrastructure suggests partial compliance with public service standards. While administrative service facilities align with accessibility principles under Law No. 25 of 2009, the absence of adequate water treatment systems contradicts the requirements of Government Regulation No. 122 of 2015 on Drinking Water Supply Systems (SPAM), which mandates quality, quantity, and continuity of water services. This finding supports Dwiyanto's (2006) argument that service quality should be evaluated not only from procedural completeness but also from user satisfaction and outcome effectiveness.

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The lack of digital innovation, such as customer satisfaction surveys and online complaint systems, further indicates limited institutional adaptation to contemporary public service trends.

The low reliability of service delivery reflects fundamental weaknesses in asset management and operational planning. The reliance on reactive maintenance rather than preventive strategies demonstrates a lack of sustainable infrastructure management, a critical feature of public service organizations (Osborne & Gaebler, 1992). This condition aligns with Moenir's (2014) assertion that infrastructure limitations and inefficient systems are primary barriers to effective service delivery. Furthermore, environmental dependency, particularly seasonal fluctuations, reinforces the argument by Dwiyanto (2006) that external factors must be integrated into service planning to ensure consistency and equity. The responsiveness findings reveal a dual pattern between institutional commitment and operational inconsistency. Although management demonstrates a strong commitment to rapid response, the absence of standardized service-level agreements (SLAs) and inconsistent staff performance undermine service reliability. This supports Rahmadana et al. (2020), who identify low responsiveness and weak coordination as key barriers in public service delivery. The inconsistency in staff communication also indicates the absence of a customer-oriented service culture, which is essential in modern public administration.

In the assurance dimension, the absence of formalized quality control systems and standardized water treatment processes directly affects public trust. According to Parasuraman et al. (1990), assurance is critical in building customer confidence through competence and credibility. The findings suggest that PDAM Tirta Nusa has not yet fully institutionalized quality assurance mechanisms, particularly in compliance with health regulations such as Permenkes No. 2 of 2023. Additionally, the tariff dilemma reflects a classic tension between affordability and sustainability in public service provision. This condition illustrates the challenge of balancing social responsibility with financial viability, which is commonly observed in public sector organizations. The empathy dimension indicates that PDAM Tirta Nusa has developed a socially responsive approach, particularly in accommodating the needs of vulnerable groups and the community. This aligns with the concept of citizen-centered service, where public institutions are expected to prioritize inclusivity and social sensitivity. However, the absence of structured feedback mechanisms indicates that empathy is not yet institutionalized as a measurable performance indicator. In line with sound governance principles, empathy should be operationalized through systematic engagement tools such as customer surveys and participatory forums.

The identified inhibiting factors further reinforce the multidimensional nature of service quality challenges. Human resource limitations confirm Dwiyanto's (2006) argument that bureaucratic capacity is a critical determinant of service performance. The lack of continuous training and performance evaluation systems weakens both reliability and responsiveness. Geographical constraints highlight the importance of spatial equity in public service delivery, as access disparities arise from environmental conditions (Elvie Dyah Fitriana et al., 2014). Meanwhile, infrastructure deficiencies underscore the central role of physical resources in determining service effectiveness, as Moenir (2014) emphasizes. Overall, this study contributes to the public service literature by demonstrating that improving service quality in the water sector requires an integrated approach that combines infrastructure modernization, human resource development, and adaptive service systems. The findings extend the SERVQUAL framework by contextualizing it within the challenges of regional public utilities in archipelagic areas, where environmental and structural constraints significantly influence service outcomes.

V. Conclusion

This study concludes that the quality of public service delivery at PDAM Tirta Nusa Natuna Regency is categorized as moderately good but not yet optimal in meeting community expectations. Based on the analysis of the five SERVQUAL dimensions, the tangible aspect indicates limitations in facilities and infrastructure that have not met ideal clean water service standards; the reliability dimension remains weak due to inconsistent water distribution caused by environmental factors and aging infrastructure; the responsiveness dimension is relatively adequate in terms of commitment to handling complaints but is not yet supported by efficient and standardized service systems; the assurance dimension is insufficient due to weak quality guarantees and the absence of formal collaboration with relevant supervisory institutions; while

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the empathy dimension is reflected through social concern and specific service initiatives, it remains incidental and not yet institutionalized within a systematic service policy. These findings suggest that improving service quality requires not only operational adjustments but also comprehensive strengthening of technical and managerial capacities.

From a theoretical perspective, this study reinforces the applicability of the SERVQUAL model as a framework for evaluating public service quality based on user perceptions and experiences, while also highlighting the imbalance among dimensions when institutional capacity, infrastructure, and governance are inadequate. The main contribution lies in demonstrating that clean water service quality in archipelagic regions is shaped by the complex interaction between internal factors (human resource competence, service management systems, and infrastructure availability) and external factors (geographical constraints and budget limitations), which collectively influence service stability and public perception. Managerially, the findings imply the need for institutional strengthening through personnel capacity building, the development of a customer-oriented work culture, infrastructure modernization, and the implementation of digital-based complaint and monitoring systems. At the policy level, more substantial support from local governments is required through regulatory reinforcement, increased budget allocation for infrastructure development, and inter-agency collaboration to ensure service quality and accountability, alongside encouraging community participation in feedback and monitoring mechanisms.

This study is limited by its qualitative descriptive approach, which emphasizes contextual depth rather than statistical generalization, and does not provide standardized quantitative measures of customer satisfaction or service gaps. Furthermore, the specific context of PDAM Tirta Nusa in an archipelagic region makes the findings highly dependent on local geographical and institutional characteristics. Future research is recommended to employ quantitative or mixed-method approaches to obtain more comprehensive empirical measurements of service performance and customer satisfaction. Additionally, further studies should explore water governance, the effectiveness of public policies and subsidies, and the impact of geographical conditions on service equity in border and archipelagic regions to produce more precise, evidence-based policy recommendations.

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