CBEL Journal of Multidisciplinary Research
Vol. 1 No. 2 (2026): ISSN (Online): 3108-8848
DOI: https://doi.org/10.66313/knrcrk26
Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania



Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania

Hussein Kipanga Mbega[1*], Kassim Rashid Kiliza[1] & Lucas Antony Kisasa[1]
[1]*Kampala International University in Tanzania, Dar es Salaam, Tanzania*

*Corresponding author: Hussein Kipanga Mbega, Kampala International University in Tanzania. Email: hkmbega@gmail.com

ORCID

Hussein Kipanga Mbega https://orcid.org/0009-0006-5514-5962
Kassim Rashid Kiliza https://orcid.org/0009-0006-4763-0597

Article History
Received: 2026-09-20
Revised: 2026-10-30
Accepted: 2026-11-08
Published: 2026-11-11

Keywords
Billing transparency
Payment compliance
Water service delivery
Agency theory
Tanzania

How to cite:
Mbega, H. K., Kiliza, K. R., & Kisasa, L. A. (2026). Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania. *CBEL Journal of Multidisciplinary Research, 1*(2), 114–125. https://doi.org/10.66313/knrcrk26

Abstract

Purpose: This paper examines the relationship between transparency in the water billing system and water service delivery in Kigamboni Municipality, Dar es Salaam, and tests whether household payment compliance is an intervening pathway in that relationship.

Design/methodology/approach: A convergent parallel mixed-methods case study was conducted in Kigamboni and Tungi Wards. A questionnaire was completed by 397 randomly selected household heads (response rate 94.5%), semi-structured interviews were held with 20 purposively selected participants, and billing records were reviewed. Quantitative data were analysed using correlation, regression-based mediation analysis with bootstrap confidence intervals and independent-samples t-tests; qualitative data were analysed using reflexive thematic analysis.

Findings: Billing transparency was rated only marginally above the scale midpoint (M = 3.05). Transparency was positively associated with payment compliance (r = .463) and with service delivery (r = .272). Payment compliance partially mediated the relationship (indirect effect = 0.154, 95% CI [0.104, 0.215]), accounting for about 58% of the total effect, while a smaller direct association remained (0.112, p = .028). Interviews and billing records showed that disclosure occurs at the level of tariff policy but not at the level of the individual bill.

Research limitations/implications: The cross-sectional, perception-based design does not permit causal inference, and the findings relate to two wards of one municipality.

Practical implications: Plain-language bills that show the previous reading, the current reading and the rate applied, together with visible reporting of how revenue is used for maintenance, are low-cost reforms consistent with the results.

CBEL Journal of Multidisciplinary Research
Vol. 1 No. 2 (2026): ISSN (Online): 3108-8848
DOI: https://doi.org/10.66313/knrcrk26
Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania



INTRODUCTION

Access to safe and reliable water depends as much on how water services are governed as on the pipes, pumps and reservoirs that carry them. Globally, 2.1 billion people still lacked safely managed drinking water in 2024 (World Health Organization [WHO] & United Nations Children's Fund [UNICEF], 2025). In Dar es Salaam, Tanzania's largest city, shortages have long been attributed less to the physical scarcity of water than to governance failure, including deteriorating infrastructure, weak institutional coordination and limited responsiveness to residents (Rugemalila & Gibbs, 2015). Where the utility network does not reach or does not deliver reliably, households turn to private networks, self-supply and mobile vendors, producing hybrid arrangements that extend access but also generate uneven service across neighbourhoods (Dakyaga et al., 2023). The cost of this unevenness falls on households: in 2024 the regulated tariff of the Dar es Salaam Water and Sewerage Authority (DAWASA) was reported at TZS 1,663 per cubic metre, about TZS 33 per 20-litre bucket, whereas residents in rationed areas reported paying vendors between TZS 200 and TZS 1,000 per bucket ("Struggling With Scarce, Costly Clean Water," 2024).

Tanzania's legal and policy framework recognises that these problems are institutional. The Water Supply and Sanitation Act, 2019 sets out the duties of water supply and sanitation authorities and the regulatory role of the Energy and Water Utilities Regulatory Authority (EWURA) (United Republic of Tanzania [URT], 2019), and the National Water Policy was revised in 2025 (URT, 2025). Regulatory reviews nevertheless continue to report weak performance. EWURA's review of the 2023/24 financial year found that some utilities recorded non-revenue water above 30 per cent against a 20 per cent benchmark, and that collection efficiency in some utilities was below 70 per cent (Domasa, 2025). Non-revenue water and low collection efficiency are partly billing problems: they reflect what is measured, what is charged, and whether customers accept and pay the charge.

Kigamboni Municipality, on the southern side of Dar es Salaam, offers a revealing setting for examining this billing relationship. It combines an urbanising core served by the piped network (Kigamboni Ward) with a peri-urban frontier where decentralised and non-network sources remain important (Tungi Ward). For most households the water bill is the main, and often the only, document through which the utility communicates with them. If the bill cannot be understood or verified, the household has little basis for judging whether the utility is acting in its interest. This paper therefore focuses on the first objective of a wider study of governance and water service delivery in Kigamboni: to measure the relationship between transparency in the billing system and water service delivery, and to test whether payment compliance links the two.

Theoretical Framing

The paper draws principally on Agency Theory. Jensen and Meckling (1976) define an agency relationship as one in which a principal engages an agent to act on the principal's behalf; because the agent's interests may diverge from those of the principal and because the agent holds information that the principal cannot easily verify, the principal incurs costs in monitoring and bonding the agent. Eisenhardt (1989) emphasises that information systems which make agent behaviour observable are a central means of curbing such divergence. In public water supply, residents can be treated as principals and the utility as the agent: the utility knows how meters are read, how tariffs are applied and how revenue is spent, while residents see only the bill. Billing transparency is therefore the mechanism through which information asymmetry at the point of charge is reduced. Agency Theory suggests two consequences. Better information should support cooperation, in this

case the willingness to pay, and it should also strengthen the principal's capacity to monitor the agent, which may bear directly on performance.

Institutional Theory provides a complementary lens. Organisations may adopt formal structures to secure legitimacy in their institutional environment rather than to improve efficiency, and these structures can become decoupled from day-to-day practice (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). Transparency may thus exist ceremonially, for example in published tariff schedules and public announcements, without reaching the individual transaction. Bovens (2010) similarly distinguishes accountability as a public virtue from accountability as a concrete mechanism in which an actor is obliged to explain and justify conduct to a forum. Taken together, the two theories suggest that what matters for service delivery is not whether disclosure exists in principle but whether residents can use it to verify what they are charged.

Billing Transparency, Payment Compliance and Service Delivery

Research on government transparency shows that disclosure can strengthen trust and cooperation, but that its effects are modest and depend on context and on the form information takes (Grimmelikhuijsen et al., 2013; Cucciniello et al., 2017; Porumbescu et al., 2022). Experimental evidence indicates that access to underlying data and a clearly identified source raise citizens' trust in performance information (Schmidthuber et al., 2023). The OECD Principles on Water Governance likewise treat integrity and transparency as conditions for effective water services, alongside clear roles and stakeholder engagement (OECD, 2015). Fox (2015) cautions, however, that information alone rarely improves services unless citizens can act on it and institutions are able to respond.

Evidence from African utilities links billing and payment to trust in the provider. In South Africa, non-payment of municipal service charges was associated with distrust in how local authorities would use revenue and in the fairness of procedures (Fjeldstad, 2004). In Dar es Salaam, Krolikowski (2014), drawing on a survey of 1,097 utility customers and 42 interviews, found that mobile-enabled payment made billing and payment data more transparent and reduced the discretion available for petty corruption. Munro and Kweka (2021) showed that trust in the city's public utility rested mainly on familiarity with the service and on perceptions of government performance, and concluded that trust is an outcome of social accountability at the micro level. In Ekiti State, Nigeria, weak tariff collection methods and poor utility responses to complaints were among the main constraints on households' willingness to pay piped water bills (Adeoti & Fati, 2022). In Nairobi, giving households information about the infrastructure behind their water raised the bill they regarded as fair by 15 to 24 per cent, although 43 per cent reported difficulty paying their bills (Fuente et al., 2023). The evidence is not uniform: in the Greater Accra Region of Ghana, monitoring, service quality, perceived value and corporate image reduced the likelihood of default, whereas billing issues showed no clear effect (Sualihu & Rahman, 2014). More recently, a study of the Njombe utility in Tanzania found that billing reliability was rated relatively favourably while complaint resolution was rated poorly, and that overall reliability was strongly correlated with customer satisfaction (Frank, 2025).

Three gaps follow from this literature. First, most studies examine either the link between information and payment or the link between governance and service outcomes, but rarely test whether payment behaviour connects billing transparency to service delivery. Second, Tanzanian evidence has concentrated on established parts of the utility network or on rural, community-managed schemes, leaving rapidly urbanising peri-urban municipalities such as Kigamboni under-examined. Third, few studies distinguish disclosure at the level of utility policy from the clarity of the individual bill. Guided by Agency Theory, the study tested three hypotheses:

H1: Billing transparency is positively associated with water service delivery.



H2: Billing transparency is positively associated with household payment compliance.

H3: Payment compliance mediates the association between billing transparency and water service delivery.

The aim of the paper is to estimate these associations for households in Kigamboni and Tungi Wards and to use interview and documentary evidence to explain them.

METHOD

Research Design

The study used a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018) within a single-municipality case study. Quantitative and qualitative data were collected during the same fieldwork period, analysed separately, and then integrated at the interpretation stage by comparing results and presenting them together, following established integration practice (Fetters et al., 2013; Creswell & Creswell, 2023). The quantitative strand estimated the associations specified in the hypotheses, and the qualitative and documentary strands explained the mechanisms behind them.

Study Area and Population

The study was conducted in two purposively selected wards of Kigamboni Municipality. Kigamboni Ward represents the urbanising core with established piped infrastructure, while Tungi Ward represents the peri-urban frontier with a greater reliance on decentralised sources. Both wards are served by DAWASA. Based on 2022 census figures (National Bureau of Statistics, 2022), the two wards contained 55,595 households: 24,810 in Kigamboni Ward and 30,785 in Tungi Ward. The qualitative population comprised DAWASA technical, customer-service and management staff, Ward Executive Officers, and community and committee leaders.

Sample Size and Sampling

The household sample was determined using Yamane's (1967) formula, $n = N / [1 + N(e^2)]$, with N = 55,595 and e = 0.05, giving n = 397. The sample was allocated proportionately to the two wards, yielding 177 households in Kigamboni Ward and 220 in Tungi Ward. Household heads were selected by simple random sampling from household lists obtained from sub-ward (mtaa) offices, using a random number generator. To allow for non-response, 420 questionnaires were administered. Twenty participants were selected purposively for interviews: eight household heads, two Ward Executive Officers, three community and committee leaders, four DAWASA technical and customer-service staff, and three participants in DAWASA management, regulatory or related roles.

Instruments and Measures

A structured questionnaire, translated into Kiswahili and administered by trained research assistants, measured each construct with five-point Likert items (1 = strongly disagree, 5 = strongly agree). Billing transparency was measured with five items covering the clarity of bills, open communication of tariffs and billing procedures, accessibility of fee and payment information, sharing of financial information with the community, and the contribution of billing transparency to trust. Payment compliance, the intervening variable, was measured with five items on timely payment, continued payment despite service problems, perceived bill accuracy, willingness to pay a higher tariff for reliable supply, and awareness of others who had stopped paying because of poor service. Water service delivery, the dependent variable, was measured with seven items on daily availability, predictability of supply, frequency of shortages, safety, absence of unpleasant smell, colour or taste, maintenance of infrastructure, and promptness of repairs. Composite scores were computed as item means. The questionnaire also recorded how often households received a bill. Semi-structured interview guides explored



how residents understood and verified their bills and how the utility communicated tariffs. Water billing records were reviewed to check whether bills showed the information needed to verify a charge.

Data Analysis

Quantitative data were analysed in SPSS Version 29.0. Returned questionnaires were screened for completeness, outliers and straight-lining; questionnaires with less than 80 per cent completion were excluded. Descriptive statistics summarised items and composites. Pearson correlations tested H1 and H2. H3 was tested with a regression-based simple mediation model using the PROCESS procedure, in which the indirect effect was judged significant when its bootstrap confidence interval excluded zero (Hayes, 2022). Independent-samples t-tests compared the two wards. Assumptions of normality, linearity, homoscedasticity and multicollinearity were checked before inferential interpretation. Qualitative data were transcribed and analysed using Braun and Clarke's (2022) six-phase reflexive thematic analysis, with NVivo 14 used to organise coding rather than to generate themes. The documentary review was used to cross-check claims made in interviews.

Validity, Reliability and Ethics

Content validity was established through expert review of the instrument and a pilot with 30 respondents, after which ambiguous items were revised. Internal consistency was assessed with Cronbach's alpha against the conventional 0.70 benchmark (Nunnally & Bernstein, 1994). Credibility of the qualitative strand was supported by reflexive memoing, a documented codebook and triangulation with documentary evidence. Ethical approval was obtained from the Institutional Review Board of Kampala International University in Tanzania, and research permission was obtained from Kigamboni Municipal Council. Participants gave informed consent in English or Kiswahili, questionnaires carried no direct identifiers, and interviewees were assigned anonymised codes.

RESULTS

Respondent Profile and Data Quality

Of the 420 questionnaires administered, 397 were usable, a response rate of 94.5 per cent; the remaining 23 were blank or less than 80 per cent complete. Usable responses matched the planned allocation of 177 in Kigamboni Ward and 220 in Tungi Ward. Of the retained cases, 378 were complete and 19 had fewer than 20 per cent of items missing, which were replaced with item means; two cases flagged for possible straight-lining were retained after inspection showed genuine variation elsewhere. Women made up 54.4 per cent of respondents. Most respondents were aged 31 to 45 years (39.0%), three-quarters (76.6%) had at least secondary education, 79.6 per cent reported a monthly household income below TZS 700,000, and 75.3 per cent had lived in the area for five years or more. Water service delivery scores did not differ significantly by education level ($F = 1.50$, $p = .224$), and length of residence was unrelated to perceived transparency ($r = .006$, $p = .908$), suggesting that these characteristics are unlikely to account for the associations reported below.

Perceptions of Billing Transparency

Table 1 reports the transparency items. The composite score was 3.05 (SD = 0.72), only marginally above the scale midpoint. Item means were tightly grouped between 3.03 and 3.09. Agreement was highest for bill clarity (42.3 per cent agreed or strongly agreed) and lowest for the sharing of financial information with the community (38.6 per cent) and for the contribution of transparency to trust (38.1 per cent). No item was endorsed by a majority, strong agreement ranged only from 8.8 to 12.8 per cent, and roughly a quarter of respondents (25.2 to 26.4 per cent) chose the neutral category on every item. The trust item was the most polarised, with the largest shares at both extremes.

CBEL Journal of Multidisciplinary Research
Vol. 1 No. 2 (2026): ISSN (Online): 3108-8848
DOI: https://doi.org/10.66313/knrcrk26
Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania



Table 1. *Descriptive statistics and response distribution for billing transparency items (n = 397)*

Item	Mean	SD	Disagree (%)	Neutral (%)	Agree (%)
Bills are clear and show consumption and charges	3.09	0.96	32.5	25.2	42.3
Tariff and billing procedures are openly communicated	3.05	0.93	34.0	25.4	40.6
Fee and payment information is easily accessible	3.04	0.92	34.5	25.7	39.8
Financial information is shared with the community	3.03	0.94	35.2	26.2	38.6
Transparency in billing improves trust	3.03	0.88	35.5	26.4	38.1
Composite billing transparency	3.05	0.72			

Note. Disagree combines strongly disagree and disagree; Agree combines agree and strongly agree. Source: Field data (2026).

Most households (72.3 per cent) received a bill monthly, but 16.1 per cent received it every two months, 7.8 per cent quarterly and 3.8 per cent irregularly or not at all. More than one household in four (27.7 per cent) therefore received bills less often than monthly, which lengthens the interval between readings and reduces opportunities to check consumption against the charge.

Payment Compliance, Service Delivery and Their Associations

Table 2 presents the composite scores, reliability coefficients and correlations for the three constructs. All three scales exceeded the 0.70 reliability benchmark. Payment compliance (M = 3.03) and service delivery (M = 3.00) were, like transparency, close to the midpoint. Among the service delivery items, daily availability (M = 3.04) and rare shortages (M = 3.03) were rated slightly above infrastructure maintenance (M = 2.97) and prompt repairs (M = 2.99), indicating that residents rate the supply of water slightly above the upkeep that sustains it.

Table 2. *Composite scores, reliability and correlations for the Objective One constructs (n = 397)*

Construct	Items	α	Mean	SD	1	2	3
1. Billing transparency	5	0.839	3.05	0.72	1		
2. Payment compliance	5	0.839	3.03	0.73	.463	1	
3. Water service delivery	7	0.877	3.00	0.71	.272	.382	1

Note. α = Cronbach's alpha. All correlations are significant at $p < .001$. Source: Field data (2026).

Billing transparency was positively and significantly correlated with water service delivery ($r = .272$, $p < .001$), supporting H1, and more strongly with payment compliance ($r = .463$, $p < .001$), supporting H2. Payment compliance had the strongest association with service delivery ($r = .382$, $p < .001$). All correlations were below .50, indicating that the constructs are related but distinct.

Mediation Analysis

Table 3 and Figure 1 report the mediation model. Transparency was positively associated with payment compliance ($a = 0.468$, $p < .001$), and payment compliance was positively associated with service delivery when transparency was held constant ($b = 0.330$, $p < .001$). The indirect effect of transparency on service delivery through payment compliance was 0.154, and its 95 per cent bootstrap confidence interval [0.104, 0.215] excluded zero. The direct association remained significant ($c' = 0.112$, $p = .028$). The indirect effect therefore accounted for about 58 per cent of the total effect (0.266), and the direct association for the remaining 42 per

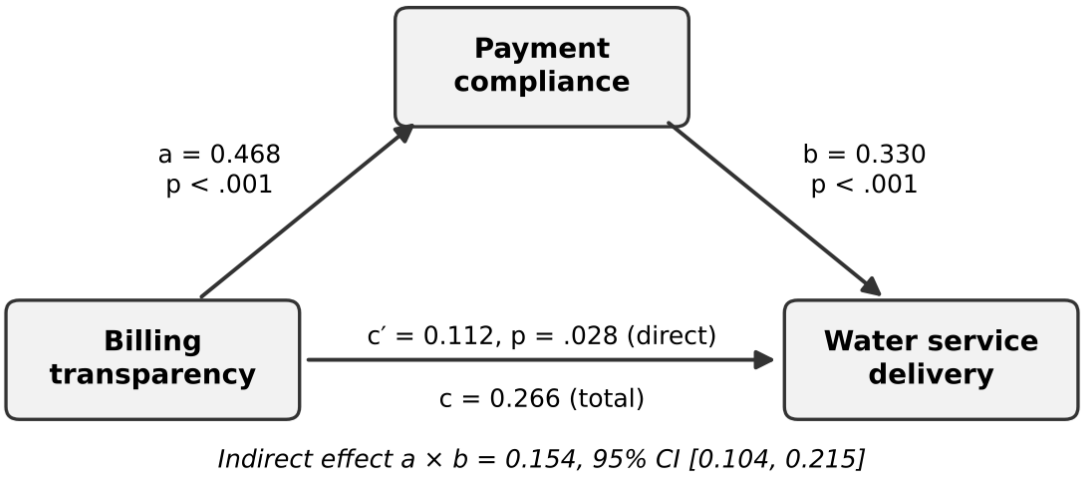
cent. H3 was supported in the form of partial mediation. The first path was stronger than the second, meaning that transparency is more closely related to payment behaviour than payment behaviour is to service delivery.

Table 3. *Mediation of the association between billing transparency and water service delivery by payment compliance*

Path	Coefficient	p-value / 95% CI
a: Transparency → Payment compliance	0.468	< .001
b: Payment compliance → Service delivery	0.330	< .001
c′: Transparency → Service delivery (direct effect)	0.112	.028
a × b: Indirect effect	0.154	[0.104, 0.215]
c: Total effect (c′ + a × b)	0.266	–

Note. Unstandardised coefficients. The confidence interval for the indirect effect is a bootstrap interval. Source: Field data (2026).

Figure 1. *Mediation model of billing transparency, payment compliance and water service delivery*



Source: Field data (2026).

Ward Comparison

As Table 4 shows, transparency (3.05 in both wards) and payment compliance (3.00 in Kigamboni and 3.06 in Tungi) did not differ significantly between the wards. Service delivery, however, was rated significantly higher in Kigamboni Ward (M = 3.06) than in Tungi Ward (M = 2.91; t = 2.10, p = .036). The difference is modest, about 0.2 standard deviations. Because transparency is identical in the two wards while service delivery differs, the service gap cannot be attributed to billing transparency, and the equal transparency scores are consistent with both wards being billed by the same utility.

CBEL Journal of Multidisciplinary Research
Vol. 1 No. 2 (2026): ISSN (Online): 3108-8848
DOI: https://doi.org/10.66313/knrcrk26
Billing Transparency, Payment Compliance and Water Service Delivery: Evidence from Kigamboni Municipality, Dar es Salaam, Tanzania



Table 4. *Comparison of Objective One construct means between Kigamboni and Tungi Wards*

Construct	Kigamboni M (SD)	Tungi M (SD)	t	p
Billing transparency	3.05 (0.72)	3.05 (0.73)	0.02	.984
Payment compliance	3.00 (0.72)	3.06 (0.74)	–0.79	.429
Water service delivery	3.06 (0.72)	2.91 (0.67)	2.10	.036

Note. Kigamboni Ward n = 177; Tungi Ward n = 220. Source: Field data (2026).

Qualitative and Documentary Evidence

Two themes emerged from the interviews. The first, *billing opacity*, gathered codes on hidden tariffs, estimated bills, missing receipts and unclear calculation. Household heads described bills they could not reconcile with their consumption and an office unable or unwilling to explain them:

> "On the bill, I don't really understand the amount how was calculated. At times, it's even greater than the previous month, despite the fact that we didn't consume any more water and when we ask the figures properly no one at office is able to explain. We are simply informed to pay and in days or weeks, without our payment, the water will be turned off." (Household Head K1)

The second theme, *selective disclosure*, captured the contrast between public announcements of tariff policy and the opacity of the individual charge, including uncertainty about how meter readings were recorded:

> "In some cases, they have been broadcasting it on the radio that there will be a tariff change, and I'm grateful for that. However, when I get to my own bill, I don't find this at all transparent … I have inquired directly from the meter reader, regarding the reading on my property, and he's just been told that it's done centrally, but he can't break it down any further. There's transparency in having a policy, but very little transparency in having an individual charge." (Household Head T1)

Where formal explanation was missing, residents turned to trusted local figures. A ward committee member reported that residents regularly asked him to explain their bills because they trusted him more than the utility office, and that his proposal for bills to show the previous reading, the current reading and the rate applied had received no response (Community Leader 1). The review of billing records confirmed this account: bills did not consistently show the previous reading, the current reading and the rate applied together in a single plain-language statement. The qualitative and documentary strands therefore converge with the survey: residents can inspect the bill in their hand, which is why bill clarity receives the most agreement, but they cannot verify how the charge was produced or how revenue is used, which is where agreement is lowest.

DISCUSSION

Transparency, Payment and Service Delivery

All three hypotheses were supported. Billing transparency was positively associated with water service delivery (H1) and with payment compliance (H2), and payment compliance partially mediated the association between transparency and service delivery (H3). The pattern is consistent with the two consequences that Agency Theory attributes to reduced information asymmetry (Jensen & Meckling, 1976; Eisenhardt, 1989). The strong first path suggests that residents who can understand their charges are more willing to pay them, which is the cooperative consequence. The smaller but significant direct path is consistent with the monitoring consequence, in which clearer information allows residents to observe and question the agent independently of payment.



The relative size of the pathways is informative. The direct association is modest, and the interviews help explain why: residents who cannot establish how a bill was calculated, and whose meter reader cannot break the charge down, have little capacity to check and challenge the utility. Transparency in its present form therefore performs its monitoring function only weakly. The second path, from payment to service delivery, is weaker than the first, which suggests that revenue does not convert automatically into better service. Between payment and delivery lie maintenance and repair processes, and these were the lowest-rated aspects of service delivery. Fox (2015) argues that information improves services only when it is joined to voice and institutional responsiveness, and the present results are consistent with that view: transparency moves payment behaviour more than it moves the service itself.

The findings agree with earlier work linking information and payment. Like Krolikowski (2014), who found that more transparent payment data reduced rent-seeking in Dar es Salaam, this study finds that information asymmetry persists in a billing system where residents cannot verify readings, and that it is closely tied to payment. Consistent with Fjeldstad (2004) and Munro and Kweka (2021), payment and trust appear to depend on what residents believe about the utility's conduct as much as on the charge itself; the trust item was the most polarised in the transparency scale, and residents relied on committee members whom they trusted more than the utility office. The results also qualify Sualihu and Rahman's (2014) finding that billing issues did not predict default in Accra. In Kigamboni, transparency was the construct most strongly associated with payment compliance, which suggests that the importance of billing information may vary with how verifiable bills are in a given system. The equal payment compliance in the two wards despite unequal service ratings, together with interview accounts of payment demanded under threat of disconnection, suggests that some payment reflects obligation rather than satisfaction, echoing the collection and complaint-handling constraints identified by Adeoti and Fati (2022).

Theoretical Implications

The study extends Agency Theory by showing that information asymmetry in public utilities is experienced at the level of the individual transaction. Disclosure that exists at the policy level, such as radio announcements of tariff changes, does little to reduce the asymmetry that matters to a household, which concerns its own reading and its own charge. The contrast between policy-level disclosure and opaque individual bills also illustrates the decoupling described by Institutional Theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983): transparency is present in ceremonial form but is loosely connected to the documents residents actually receive. A further implication concerns trust. Where the institution does not provide verifiable information, trust is produced informally through intermediaries, which is consistent with Munro and Kweka's (2021) view of trust as an outcome of micro-level social accountability, but which also creates inequity between residents who have access to such intermediaries and those who do not.

Practical Implications

Three practical implications follow. First, DAWASA could adopt a standard plain-language bill that shows the previous reading, the current reading, the rate applied and the breakdown of fixed and consumption charges. This responds directly to the gap found in the billing records and is low in cost. Second, regular monthly billing for all households would reduce the reliance on long intervals and estimated charges reported by more than a quarter of respondents. Third, because the path from payment to service delivery is weaker than the path from transparency to payment, the utility should make visible how collected revenue is used for maintenance and repairs, for example through ward-level summaries of revenue and maintenance spending. Without this link, gains in payment compliance may not translate into better service. Because transparency did not differ between



wards, billing reform should be designed for the whole municipality, whereas narrowing the service gap in Tungi Ward is likely to require attention to infrastructure and participation as well as billing.

Limitations

The findings should be read in light of several limitations. The design is cross-sectional, so the mediation reported is statistical rather than causal, and the direction of the associations cannot be established; residents who receive better service may, for example, rate their bills more favourably. All three constructs were measured through residents' perceptions in a single questionnaire, which raises the possibility of common-method variance, and the measures were not compared with audited indicators such as metered consumption or collection records. Self-reported payment compliance may be affected by social desirability. The study covered two wards of one municipality, which limits transferability. Finally, the documentary review relied on the billing records that were made available to the researcher.

CONCLUSION

This paper set out to measure the relationship between transparency in the billing system and water service delivery in Kigamboni Municipality. The evidence shows that billing transparency is positively associated with service delivery and that much of this association runs through payment compliance, while a smaller direct association remains. Residents rate transparency only marginally above the midpoint, and the interviews and billing records locate the weakness precisely: disclosure exists at the level of tariff policy but not at the level of the individual bill. The conclusion is bounded by the design. The associations are statistical, and they describe two wards rather than Tanzania as a whole. Within those limits, the study suggests that billing transparency should be assessed by whether residents can verify their own charges, not by whether tariff information has been published, and that bill reform is most likely to improve service when it is accompanied by visible reinvestment of revenue in maintenance.

Future research could use longitudinal or quasi-experimental designs, for example comparing households before and after the introduction of itemised bills, to establish the direction of the relationships reported here. It could also combine household perceptions with administrative data on metered consumption, collection efficiency and non-revenue water, and test whether the payment-compliance pathway recurs in other rapidly urbanising municipalities.

Acknowledgements: The authors thank the residents of Kigamboni and Tungi Wards, the ward officials and the staff of the Dar es Salaam Water and Sewerage Authority who took part in this study, and Kigamboni Municipal Council for granting research permission.

Declaration of interest: The authors report no conflict of interest.

REFERENCES

Adeoti, O., & Fati, B. O. (2022). Factors constraining household willingness to pay for piped water tariffs: The case of Ekiti State, Nigeria. *H2Open Journal, 5*(1), 115–133. https://doi.org/10.2166/h2oj.2022.135

Bovens, M. (2010). Two concepts of accountability: Accountability as a virtue and as a mechanism. *West European Politics, 33*(5), 946–967. https://doi.org/10.1080/01402382.2010.486119

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE.

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE.



Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.

Cucciniello, M., Porumbescu, G. A., & Grimmelikhuijsen, S. (2017). 25 years of transparency research: Evidence and future directions. *Public Administration Review, 77*(1), 32–44. https://doi.org/10.1111/puar.12685

Dakyaga, F., Schramm, S., Lupala, J. M., & Magembe-Mushi, D. L. (2023). Geographies of infrastructure: Everyday governance of urban water supply beyond the utility network in Dar es Salaam. *Water Alternatives, 16*(3), 769–792.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147–160. https://doi.org/10.2307/2095101

Domasa, S. (2025, April 3). Water utilities struggle to meet performance benchmarks. *Daily News*. https://dailynews.co.tz/water-utilities-struggle-to-meet-performance-benchmarks/

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review, 14*(1), 57–74. https://doi.org/10.5465/amr.1989.4279003

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs: Principles and practices. *Health Services Research, 48*(6pt2), 2134–2156. https://doi.org/10.1111/1475-6773.12117

Fjeldstad, O.-H. (2004). What's trust got to do with it? Non-payment of service charges in local authorities in South Africa. *Journal of Modern African Studies, 42*(4), 539–562.

Fox, J. A. (2015). Social accountability: What does the evidence really say? *World Development, 72*, 346–361. https://doi.org/10.1016/j.worlddev.2015.03.011

Frank, I. (2025). Service reliability and customer satisfaction in semi-rural public utilities: Evidence from NJUWASA, Tanzania. *EPRA International Journal of Economics, Business and Management Studies, 12*(6). https://eprajournals.com/IJHS/article/16535

Fuente, D., Mulwa, R., & Cook, J. (2023). *Out of sight out of mind: Household perceptions of "fair" water prices in Nairobi, Kenya* (EfD Discussion Paper 23-02). Environment for Development Initiative. https://www.efdinitiative.org/sites/default/files/publications/EfD_DP-23-02.pdf

Grimmelikhuijsen, S., Porumbescu, G., Hong, B., & Im, T. (2013). The effect of transparency on trust in government: A cross-national comparative experiment. *Public Administration Review, 73*(4), 575–586. https://doi.org/10.1111/puar.12047

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). The Guilford Press.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Krolikowski, A. (2014). Can mobile-enabled payment methods reduce petty corruption in urban water provision? *Water Alternatives, 7*(1), 235–255.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology, 83*(2), 340–363. https://doi.org/10.1086/226550



Munro, N., & Kweka, O. (2021). Trust in providers of domestic water: A comparison of the public utility and informal vendors in Dar es Salaam. *Journal of Development Studies, 57*(10), 1710–1722. https://doi.org/10.1080/00220388.2021.1887479

National Bureau of Statistics. (2022). *The 2022 population and housing census: Administrative units population distribution report, Tanzania*. Ministry of Finance and Planning.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.

OECD. (2015). *OECD principles on water governance*. OECD Publishing.

Porumbescu, G., Meijer, A., & Grimmelikhuijsen, S. (2022). *Government transparency: State of the art and new perspectives*. Cambridge University Press.

Rugemalila, R., & Gibbs, L. (2015). Urban water governance failure and local strategies for overcoming water shortages in Dar es Salaam, Tanzania. *Environment and Planning C: Government and Policy, 33*(2), 412–427. https://doi.org/10.1068/c1324

Schmidthuber, L., Willems, J., & Krabina, B. (2023). Trust in public performance information: The effect of data accessibility and data source. *Public Administration Review, 83*(2), 279–295. https://doi.org/10.1111/puar.13603

Struggling with scarce, costly clean water in Dar city. (2024, April 10). *The Guardian*. https://ippmedia.com/the-guardian/business/read/struggling-with-scarce-costly-clean-water-in-dar-city-2024-04-10-154249

Sualihu, M. A., & Rahman, M. A. (2014). Defaulting on water utility bills: Evidence from the Greater Accra Region of Ghana. *Indian Journal of Finance, 8*(3), 22–34. https://doi.org/10.17010/ijf/2014/v8i3/71960

United Republic of Tanzania. (2019). *The Water Supply and Sanitation Act, No. 5 of 2019*. Government Printer.

United Republic of Tanzania. (2025). *National water policy 2002 (version 2025)*. Ministry of Water.

World Health Organization & United Nations Children's Fund. (2025). *Progress on household drinking water, sanitation and hygiene 2000–2024: Special focus on inequalities*. World Health Organization. https://data.unicef.org/resources/jmp-report-2025/

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.