International Journal of Building Pathology and Adaptation

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Private sector participation in water infrastructure provision: investigating users' preference in Lagos, Nigeria

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Received 2 July 2025
Revised 8 December 2025
3 March 2026
Accepted 11 April 2026

Abstract

Purpose – There is a growing need for private sector participation (PSP) in the provision of water infrastructure to boost availability and efficiency, especially in developing economies. This study investigates users' preference for PSP in water infrastructure provision in Lagos, Nigeria.

Design/methodology/approach – Using a multistage sampling, the study selected 57, 172 and 296 buildings in Shomolu, Surulere and Ikeja local government areas, respectively, in Lagos. Closed-ended questionnaires were administered to one adult resident in each building. From a total of 525 questionnaires, only 450 (85.71%) were returned and analyzed using descriptive and inferential statistical techniques.

Findings – The analysis revealed that users had a higher level of awareness of PSP in water infrastructure provision, though preference for PSP was slightly lower. Three key determinants of PSP acceptance were identified: effective management/policy framework, service competitiveness/effectiveness and price increase. While users recognize the advantages of improved service delivery, the positive attitudes are offset by concerns of increased costs. Anticipated price increases and reduced affordability diminish perceived behavioural control and present compatibility challenges. Regression analysis confirms that while governance and efficiency drive acceptance, affordability is a factor limiting support. Thus, users' preferences rely not solely on efficiency, but on equitable pricing, regulatory transparency and socioeconomic factors.

Practical implications – Evaluating end-users' perspectives could encourage PSP in water infrastructure provision, thereby limiting environmental hazards, guaranteeing quality control and reducing individual expenses through economies of scale.

Originality/value – Quality water supply infrastructure significantly influences housing quality and property values. However, empirical research on the determinants of user preferences for PSP in developing countries remains scarce.

Keywords Investment, Efficiency, Awareness, Developing countries, TPB-DOI, Infrastructure financing

Paper type Research article

1. Introduction

Infrastructure development strongly correlates with economic growth (Xu and Luo, 2018). However, infrastructure provision is capital intensive, and extant studies (Xu and Luo, 2018; Mofokeng *et al.*, 2024) have noted that strained public resources and high budget deficits have

International Journal of Building Pathology and Adaptation
Vol. 44 No. 9, 2026
pp. 35-51
Emerald Publishing Limited
e-ISSN: 2398-4716
p-ISSN: 2398-4708
DOI 10.1108/IJBPA-07-2025-0164

widened the gap between the demand for infrastructure and the availability of funds across most developing countries.

Across developing nations, there is an increasing neglect of water supply infrastructure. Highlighting the severe challenge, data from UNICEF reports that, as of 2022, 36% of the sub-Saharan Africa population has access to potable water. Access to potable water supply across most developing countries is becoming a major challenge, as expounded by SDG GOAL 6, "clean water and sanitation for all". Investment in water supply infrastructure, that is, what is built to pump, divert, transport, store, treat and deliver to end users, is central to economic development and significantly enhances housing quality and property values (Hsu and Shr, 2023).

There appears to be an imbalance in the water supply infrastructure in Nigeria, especially in fast-growing states like Lagos. Public water supply is constrained by financial limitations and inefficiencies (Benitez *et al.*, 2012). Hence, users seek alternative water sources which are costly and could pose environmental danger and could be unfit for human consumption. Water infrastructure, when provided disjointedly or individually, loses the efficiency and value of its provision. Hence, there is a need for organized private sector participation (PSP) to boost availability and efficiency.

Extant studies (Ameyaw *et al.*, 2017; Simões, 2017) have advocated for PSP in water infrastructure. PSP in water infrastructure is an investment; the expectation of investors is the ability of the investment to give suitable returns, while minimizing unforeseen risks. Therefore, investors seek to identify the inherent investment potential, especially from the perspective of the end-users. However, scarcity and demand are not adequate to evaluate value creation and sustainability, but users' desire and effective purchasing power. Thus, value is driven by acceptability and affordability. Therefore, the investment potential in private provision of water infrastructure is beyond the supply and demand imbalance, but also in the assessment of end-users' preferences and acceptability.

While extant studies have investigated the benefits of private infrastructure provision (Mawejje, 2024), and constraints to direct investment (Clark *et al.*, 2012), there is a dearth of studies assessing users' preference for PSP in water infrastructure in the global south. Thus, this study investigates users' preferences for PSP in water infrastructure provision in Lagos, Nigeria. Evaluating end-users' preferences, from the demand perspective, could encourage water infrastructure financing through PSP, enhance the achievement of the SDGs and limit individual expenses through economies of scale.

Towards this end, the research questions set for the study include:

RQ 1. What is the level of users' awareness of PSP in water infrastructure provision?

RQ 2. What is the level preference for PSP in water infrastructure provision?

RQ 3. What factors influence users' preference for PSP in the provision of water infrastructure?

RQ 4. How do the emergent underlying dimensions of PSP in water infrastructure predict users' overall preference?

2. Literature review

2.1 Infrastructure financing

Traditional infrastructure funding through taxes, the municipal bond market and loans are increasingly inadequate. Given the increasing pressure on public funds, widening infrastructural gap and paucity of finance, governments are beginning to adopt more innovative financing options. Innovative finance includes a range of non-traditional mechanisms such as public-private partnerships (PPP), bonds green finance and market-based financial transactions. Consequently, extant studies (Zakeri *et al.*, 2025; Li *et al.*, 2021;

Tshehla and Mukudu, 2020) acknowledge the significant role of private finance, via PPPs and Private Participation in Infrastructure (PPIs), in supplementing public funds.

2.2 Infrastructure financing in emerging markets

Despite its application across emerging markets, private infrastructure financing in Sub-Saharan Africa remains critically low, facing an estimated USD 130 billion gap between 1990 and 2013 (World Bank PPI database, 2015). Existing literature attributes infrastructure financing in these markets to four interrelated factors. These include institutional and regulatory frameworks, economic/market conditions, financing instruments and risk management approaches.

Institutional and regulatory frameworks are a major determinant for attracting PSP in infrastructure. Investors require a stable investment climate characterized by the rule of law, transparency, institutional quality and enforceable legal frameworks (Tshehla and Mukudu, 2020). Conversely, Tayeng *et al.* (2024) highlighted the data irregularity and political volatility are major drawbacks to investors. Regarding economic fundamentals, macroeconomic stability, market size and purchasing power have a significant influence on the availability and cost of project finance (Tshehla and Mukudu, 2020). While public funds are essential for initiating large-scale projects, private sector finance is naturally drawn to favourable economic environments, subsequently providing efficiency, expertise and innovation.

Finally, mitigating perceived risks, such as regulatory disputes and political or financial volatility, are important to securing private investment (Tayeng *et al.*, 2024). Infrastructure, particularly in the water sector, faces distinct challenges including high capital intensity, extended payback periods, low returns and varying levels of public acceptance. This study posits that public acceptance is inextricably linked to user awareness and preference. Therefore, understanding the determinants of user preference for PSP is a crucial step in mitigating investment risk and successfully leveraging private sector efficiency.

2.3 Factors influencing users' preference for PSP in water infrastructure

As the shift towards PSP in water infrastructure increases, understanding the demand-side perspective, specifically user preference based on findings from extant studies, is important.

Public perception significantly influences users' preference for PSP in water infrastructure provision. Several factors contribute to shaping this preference, which also impact the level of acceptance and success. PSP is often expected to increase efficiency and reduce costs, empirical evidence suggests that PSP does not necessarily result in efficiency gains or cost reductions for users (Dehner, 2011). The discrepancy between expectations and reality negatively impacts public opinion. Public perception of PSP is more favourable where there are well-designed PPP contracts that ensure regulatory compliance and transparency (Dehner, 2011; Ameyaw *et al.*, 2017). Conversely, users in low- and middle-income urban areas are wary of PSP due to profit-driven motives, reduced accountability and negative experiences in other sectors (Rakodi, 2000). Public utilities are often preferred to private utilities where previous privatization has led to price hikes or controversial outcomes (Kallis *et al.*, 2010).

Also, equity and accessibility concerns shape user preferences. In developing countries, users fear that privatization may restrict access to affordable water in marginalized communities exacerbating inequalities (Dehner, 2011; Twum and Abubakari, 2020). Extant studies such as Rakodi (2000) noted that while users recognize the need to pay for water services, their willingness is contingent on service quality. Users also express concern about the impact of cost recovery and fear of excluding the poor. Increasing disparity adversely influences users' perceptions of PSP, especially in regions where equitable access to water is a critical issue. Chernavsky (2021) noted that users' scepticism is fuelled by perceptions of excessive profits, monopolistic tendencies and ineffective government regulation.

Public acceptance is a critical success factor for PSP. Without public acceptance, investors become hesitant due to a lack of community cooperation (Ameyaw *et al.*, 2017; Dithebe *et al.*,

2019). Thus, participatory decision-making and stakeholder consent are essential in fostering successful PSP in water provision (Ameyaw *et al.*, 2017; Swamy *et al.*, 2018). While reasonable pricing is considered, social acceptability is a more important factor (Swamy *et al.*, 2018) and unwelcome privatization could lead to tariff resistance (Galaa and Bukari, 2014). Thus, public transparency, effective communication and engagement are necessary to foster a positive perception and cooperation (Dithebe *et al.*, 2019).

However, users' conceptual knowledge or education is insufficient to ensure positive perception and attitudes. Wang *et al.* (2021), using a Taiwanese case study, noted that despite high awareness of the environmental impact of water infrastructure, users did not support additional fees for maintenance. Resistance often stems from deeply rooted socio-economic traditions where water is viewed as a basic right and a core state responsibility to ensure equitable access (Rakodi, 2000; Simões, 2017). This perception makes users sceptical of PSP. Thus, socio-economic context plays a crucial role in shaping perceptions, as private involvement is viewed with suspicion in regions with strong public sector traditions. Thus, users' preference is not driven solely by expected efficiency but by nuanced evaluation of equity, ownership, legal frameworks, political stability, equity/transparency, social context and level of community participation. Analyzing these factors will provide information for investors navigating emerging economies.

2.4 Theoretical and conceptual underpinning

The study adopts a dual theoretical lens, combining the Theory of Planned Behaviour (TPB) and Diffusion of Innovation (DOI) to address issues of awareness and the individual-level factors that influence users' preference for PSP.

The TPB (Ajzen, 1991) posits that individuals' behavioural intention, such as preference for PSP, is determined by three core constructs, including attitude, subjective norm and perceived behavioural control (PBC). In this instance, attitude refers to a favourable or unfavourable evaluation of PSP in water provision, and subjective norm evaluates the perceived social pressure from community leaders, family, or peers. PBC evaluates the perceived ease or difficulty, reflecting users' experience and anticipated obstacles.

Complementarily, DOI Theory (Rogers, 2003) explains the spread of new ideas. PSP in the water sector is a social innovation, and the DOI provides an understanding of how awareness-knowledge and perceived attributes influence the adoption rate. While the awareness-knowledge addresses users' exposure and understanding. The perceived attributes refer to relative advantage, compatibility and complexity, which influence adoption rates. While TPB has been applied to understand public acceptance of water-related policies (Mahdavi, 2021), DOI assesses the temporal and social dynamics of how initial awareness translates into preferences.

Thus, this study conceptualizes awareness as the main precursor to preference (see Figure 1). The study posits that the preference for PSP begins with the knowledge stage, which directly corresponds to users' level of awareness. Awareness is defined as the users' exposure to and understanding of the PSP model, including its existence, the nature of the private entity's role, and the general implications for service delivery. Without a foundational awareness, a meaningful preference cannot be evaluated. Assessing users' level of awareness of PSP helps in evaluating their preferences and factors influencing the preference. The conceptual framework posits that users' preference for PSP is a cumulative function of initial awareness, the evaluation of perceived attributes, subjective norms and PBC. Ultimately, a positive evaluation of these combined factors will enable a favourable attitude and high preference for PSP.

This study contributes to existing literature on PSP in water infrastructure and the application of behavioural theories. The study advances theoretical understanding by integrating the TPB and DOI theories. While both theories have been individually applied to various adoption contexts, their combined application to explain user preference for PSP in

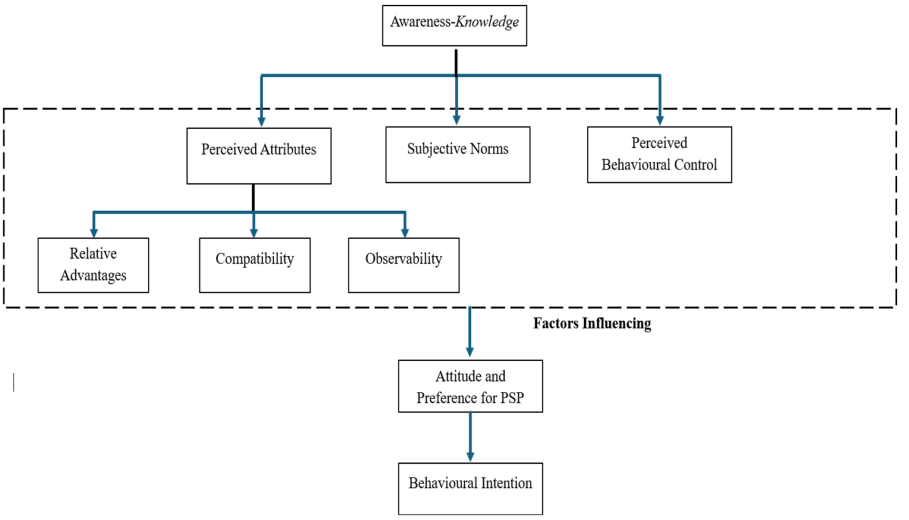

Figure 1. Conceptual framework. Source: Authors' own work

water infrastructure, particularly in a developing economy, is limited. Also, the study contributes empirically by providing evidence from Lagos, Nigeria, a rapidly urbanizing developing region facing critical water infrastructure challenges. While this context is often underrepresented in global literature, our findings fill a significant geographical and sectoral gap. The findings from the study are invaluable for policymakers, urban planners and private sector entities engaged in sustainable water provision strategies in similar developing contexts.

3. The study setting: Lagos, Nigeria

Lagos is characterized by high population density. Lagos is a major centre for commercial, industrial and political activities and a major port of entry and exit for Nigeria (Healy *et al.*, 2020). However, as one of the world's fastest-growing cities (Faisal *et al.*, 2021), the rapid pace of urbanization has led to housing problems, overcrowded slums and strain on public facilities and infrastructure.

A manifestation of this pressure is the widening water infrastructure gap. In 2018, the daily water demand of 540 million gallons exceeded the Lagos Water Corporation production capacity, creating a 320 million gallon deficit (Akinbode, 2018). Current estimates suggest that the daily demand exceeds 700 million gallons (Abiodun, 2025), while the LWC's total installed production capacity remains at 210 million gallons per day. This disparity results in a deficit of nearly 490 million gallons per day. Exacerbated by rapid urbanization, increasing demographics (Olabode and Comte, 2024), dilapidated infrastructure and low budgetary provisions (Iniobong, 2024), the scarcity in water supply highlights the state's inability to meet public needs. Thus, the infrastructural gap presents potential value for prospective institutional and private investors.

4. Research method

The study utilized primary data collected from users of water supply infrastructure in residential buildings in Lagos, Nigeria. Using the latest house numbering project by Lagos State Signage and Advertisement Agency (LASAA) done in 2012, the number of residential houses in Lagos State is put at 1,194,525. Based on the Independent National Electoral

Commission, Lagos state is divided into three senatorial districts: Lagos East and Lagos Central, each comprising five (5) Local Government Areas (LGAs) and Lagos West, comprising ten (10) LGAs.

The study adopted a multi-stage sampling technique. The first stage entails purposively selecting one LGA in each of the senatorial districts. From a pilot survey, the selection was based on the LGA having the highest level of perceived water infrastructure gap and service complaints. The purposively selected LGAs include Shomolu (Lagos-East), Surulere (Lagos-Central) and Ikeja (Lagos-West).

In stage two, the study used the LASAA 2012 records to obtain the number of streets in each of the selected LGAs. The number of streets in Shomolu, Surulere and Ikeja are 55, 167 and 286, respectively, making a total of 508 streets. For data manageability, systematic sampling was used for the on-field selection of every 5th street (i.e. 20%) from the list of streets in each selected LGA. During the selection, consideration was given to the next street if the fifth street selected had no residential properties. A total of 101 representing 11, 33 and 57 streets in Shomolu, Surulere and Ikeja were selected, respectively.

The third stage entailed the selection of buildings from the selected streets in each LGA. Based on the LASAA records, there are 572, 1,716 and 2,964 buildings in the selected streets of Shomolu, Surulere and Ikeja, respectively. A systematic sampling of every 10th building (10%) was adopted to select the buildings from the selected streets in each LGA. Consideration was given to the next building if the tenth building selected is not a residential building. The study selected 57, 172 and 296 buildings in the Shomolu, Surulere and Ikeja LGAs, respectively. Consequently, 525 residential users were sampled for the study. One adult resident per selected building was surveyed. The survey instrument underwent content validation by three senior academics prior to administration to ensure clarity and internal consistency. The feedback was incorporated to refine and finalize the instrument. The survey achieved a response rate of 85.71% (450 out of 525 questionnaires). Evidence from studies such as Groves (2006) suggests that a response rate above 80% is considered excellent and significantly reduces non-response bias.

The study collected data about users' socio-economic characteristics using categorical data. The users' level of awareness, preference for PSP, and factors influencing users' preference were measured using 5-point Likert scales. While the users' socio-economic characteristics were analyzed using frequency and percentages, users' level of awareness and preference were analyzed using mean and standard deviation and a one-sample *t*-test. Regarding the factors influencing users' preference, this was analyzed using mean and standard deviation, one-sample *t*-test (statistical significance set at $p < 0.05$), and factor analysis. For the purpose of inferential analysis, the Likert-type items were treated as interval data. The items for each component, as extracted from the PCA, were aggregated to form composite scores used in the regression analysis. This approach is supported by the literature (Norman, 2010; Sullivan and Artino, 2013), which suggests that parametric tests such as the *t*-test and linear regression are robust to the ordinal nature of Likert scales, particularly when using large sample sizes. The use of parametric techniques in this study allows for a more nuanced interpretation of the mean differences and the predictive power of the identified components. This is also consistent with practices in other infrastructure research, such as (Dithebe et al. (2019) and Li *et al*. (2021). The reliability of the components was analyzed using Cronbach's alpha. The Cronbach alpha values obtained were above 0.900, and this was considered adequate (DeVellis and Thorpe, 2021). The extent to which the latent dimensions (independent variables) identified through factor analysis influence users' preference (dependent variable) for PSP were further tested using multiple regression analysis.

In interpreting the mean results, a benchmark mean value of 3.0 (mean value of 5-point) was adopted. Consequently, the mean score range becomes

$x > 4.50$ – Very-High-Importance (VH-I)

$4.49 < x > 3.50$ – Medium-High-Importance (MH-I)

$3.49 < x > 3.00$ – High–Importance (H-I)

$x < 3.00$ – Low–Importance (L-I)

5. Results and discussion of findings

5.1 Users' socio-economic characteristics

The socio-economic characteristics of the respondents (Table 1) show that most respondents (45.1%) were between the ages of 41 and 50 years, suggesting that most respondents were within the highly active age bracket and would readily expect the convenience of efficient water supply systems. Regarding users' educational status, 87.6% were educated up to the tertiary level. Thus, the users are expected to have knowledge about the role of PSP in water provision. The household size shows that the majority (50.2%) were 4–6 in sizes. The users' response to the type of accommodation shows that 95.6% occupied one to three-bedroom apartments. The property ownership status indicated that 80.7% were tenants. It is expected that tenants' satisfaction could significantly hinge on access to the water supply. Also, 444

Table 1. Respondents socio-economic characteristics

Demographic variable		Local government areas				
		Shomolu	Surulere	Ikeja	Total	Percentage
Age	30 years and below	4	1	27	32	7.1
	31–40	26	14	92	132	29.3
	41–50	14	84	105	203	45.1
	51–60	9	48	18	75	6.7
	Above 60	2	1	5	8	1.8
	Total	*55*	*148*	*247*	*450*	*100.0*
Educational Status	Secondary Education	7	49	0	56	12.4
	Tertiary Education	48	99	247	394	87.6
	Total	*55*	*148*	*247*	*450*	*100.0*
Household Size	1 to 3	4	84	36	124	27.6
	4 to 6	48	59	119	226	50.2
	7 to 9	3	5	44	52	11.6
	No response	0	0	48	48	10.6
	Total	*55*	*148*	*247*	*450*	*100.0*
Type of Accommodation	1 Bedroom	1	124	31	156	34.7
	2 Bedrooms	14	14	85	113	25.1
	3 Bedrooms	35	7	119	161	35.8
	4 Bedrooms	1	3	12	16	3.5
	5 Bedrooms and Above	4	0	0	4	0.9
	Total	*55*	*148*	*247*	*450*	*100.0*
Property ownership status	Owner	11	42	34	87	19.3
	Tenant	44	106	213	363	80.7
	Total	*55*	*148*	*247*	*450*	*100.0*
Employment Status	Employed	55	147	242	444	98.7
	Retired	0	1	5	6	1.3
	Total	*55*	*148*	*247*	*450*	*100.0*
Monthly Income (in NGN)*	Below 50,000	1	45	6	52	11.6
	₦50,000 – below ₦150,000	9	56	170	235	52.2
	₦150,000 – below ₦500,000	32	47	71	150	33.3
	₦500,000 – below ₦2,000,000	11	0	0	11	2.5
	₦2,000,000 and above	2	0	0	2	0.4
	Total	*55*	*148*	*247*	*450*	*100.0*

Note(s): * 1 USD = NGN 1,650 as at November 2024

Source(s): Authors' own work

(98.7%) users were employed, while 6 (1.3%) users were retired. The monthly income shows that 52.2% earn in the range of ₦50,000 to ₦150,000.

5.2 Users' awareness and preference for PSP in water infrastructure provision

The analysis indicates a medium-high (M-H) level of users' awareness and preference for PSP across the three locations. Awareness is highest in Shomolu (*mean* = 4.25), Ikeja (*mean* = 3.82) and lowest in Surulere (*mean* = 3.67), with an overall average of 3.82. Similarly, preference scores show an overall mean of 3.65, with Ikeja (*mean* = 4.01) demonstrating the highest preference, Shomolu (*mean* = 3.78) and the least preference in Surulere (*mean* = 3.01). The overall mean values exceed the 3.0 benchmark, suggesting a generally favourable disposition toward PSP in water infrastructure provision within the locations. This outcome is, however, expected, because the TPB and DOI, as described in the conceptual framework suggests that users' preference for PSP is a cumulative function of initial awareness. The lower rating of the preference for PSP could be informed by users' reluctance to pay for water, because of its perception as a "social good".

5.3 Factors influencing preference for PSP in water infrastructure provision

(1) Descriptive Analysis

The factors influencing users' preference for PSP in water infrastructure provision were examined (Table 2). The results of the mean rating showed that attitude towards PSP was largely positive, driven by behavioural beliefs regarding the benefits. Findings reveal that factors such as "Transparency in charges" (*mean* = 4.22), "Better quality of service to consumers" (*mean* = 4.19) and "Improved quality of product supply" (*mean* = 4.16), "Technical/Operational competence" (*mean* = 4.13) and "Improved service reliability and continuity" (*mean* = 4.13) had high mean scores. This underscores users' belief that PSP could offer tangible improvements over existing public water provision. However, in terms of compatibility of PSP with existing values and needs, the results present a nuanced picture. While the desire for improved water services aligns well with user needs, the potential for increased prices poses a challenge to compatibility. Factors such as "increase in prices of services", "services may be less accessible to the poor" and "services may be less affordable to low-income earners", had lower mean scores of 3.51, 3.26 and 3.23, respectively. This indicates a conflict between the perceived benefits of PSP and users' economic realities, suggesting that while the innovation is compatible with the need for better service, it may be incompatible with their financial capacity. This also impacts users' PBC, as users' perceived ability to manage the financial implications of PSP directly influences their overall preference.

The higher mean scores of factors such as "Reduction of leakages and wastages" (*mean* = 3.95) and "Improvement in the financial performance of the infrastructure" (*mean* = 3.90) are highly observable outcomes that could significantly accelerate the diffusion of PSP. Observed improvements in service delivery would serve as motivators, encouraging broader acceptance and adoption by users. Regarding subjective norms**,** mean rating shows that "Availability of standard regulatory framework" (*mean* = 4.00) suggests that users' preferences are shaped by the expectation of institutional oversight and normative rules of engagement. Furthermore, "Inclusion of environmental norms in private participation arrangement" (*mean* = 3.62) and "Improvement in the enforcement of environmental protection laws" (*mean* = 3.80) suggests a social and institutional pressure to align water provision with broader societal standards of environmental responsibility. All the variables were statistically significant and had positive mean differences (*mean values > 3.00 benchmark*).

(2) Principal Component Analysis

To identify the principal components within the larger variables, the study employed the factor analysis. To ascertain the suitability of the data, the Kaiser-Meyer-Olkin (KMO) and Bartlett's

Table 2. Factors influencing users' preference for PSP in water infrastructure provision

Factors	Mean	Std. Deviation	Interpretation	Test value = 3.0 t	df	*p*-value	Mean difference
Transparency in charges	4.22	0.982	M-H	26.075	436	0.000	1.22
Better quality of service to consumers	4.19	1.072	M-H	23.580	449	0.000	1.19
Improved quality of product supply	4.16	1.095	M-H	22.470	449	0.000	1.16
Safety and security of service supply	4.13	1.053	M-H	22.828	449	0.000	1.13
Technical/Operational competence	4.13	1.080	M-H	22.255	449	0.000	1.13
Improved service reliability and continuity	4.13	1.080	M-H	22.227	449	0.000	1.13
Productivity and efficiency in service delivery	4.07	1.075	M-H	20.755	433	0.000	1.07
Increased accessibility to infrastructure services	4.07	1.059	M-H	21.452	449	0.000	1.07
Increased investment in infrastructure services	4.06	1.053	M-H	21.390	449	0.000	1.06
Managerial expertise	4.03	1.139	M-H	19.245	449	0.000	1.03
Availability of a standard regulatory framework	4.00	1.029	M-H	20.670	449	0.000	1.00
Reduced the need for resources on backup facilities	4.00	1.127	M-H	18.827	449	0.000	1.00
Sustainable pricing policies	4.00	1.071	M-H	19.521	436	0.000	1.00
Reduction in wasteful cost	4.00	1.048	M-H	19.919	435	0.000	1.00
Increased availability of resources for investing in expansion	4.00	1.057	M-H	19.973	449	0.000	1.00
Improved financial discipline	3.99	1.050	M-H	19.980	449	0.000	0.99
Expansion of service delivery	3.96	1.028	M-H	19.522	433	0.000	0.96
Reduction of leakages and wastages	3.95	1.152	M-H	17.164	433	0.000	0.95
Improvement in the financial performance of the infrastructure	3.90	1.105	M-H	17.274	449	0.000	0.90
Attempt by PSP to cut expenditure on safety and security of supply for an increased profit margin	3.89	1.071	M-H	17.103	420	0.000	0.89
Reduction in prices of infrastructure services	3.86	1.009	M-H	18.182	449	0.000	0.86
Efficient personnel management	3.86	1.114	M-H	16.339	449	0.000	0.86
Improved self-sustainability of infrastructure services	3.83	1.029	M-H	17.138	449	0.000	0.83
Increase in employment	3.82	1.061	M-H	16.489	449	0.000	0.82
Adequate allocation and management of associated risk in the investment	3.81	1.103	M-H	15.515	449	0.000	0.81
Improvement in the enforcement of environmental protection laws	3.80	1.075	M-H	15.876	449	0.000	0.80
Availability of resources for investing in expansion	3.78	1.053	M-H	15.509	435	0.000	0.78

(*continued*)

Table 2. Continued

Factors	Mean	Std. Deviation	Interpretation	Test value = 3.0 t	df	*p*-value	Mean difference
Reduced financial losses	3.78	1.072	M-H	14.915	420	0.000	0.78
Opportunity to improve the Nation's fiscal policy	3.72	1.283	M-H	11.784	436	0.000	0.72
Effective revenue collection of user fees	3.70	1.029	M-H	14.518	449	0.000	0.70
Opportunity for government to raise revenue for much-needed social programs	3.67	1.128	M-H	12.575	449	0.000	0.67
Inclusion of environmental norms in private participation arrangement	3.62	1.085	M-H	11.956	435	0.000	0.62
Increase in wages and salaries	3.62	1.127	M-H	11.454	433	0.000	0.62
Private participation may warrant laying off staff	3.59	1.046	M-H	11.947	449	0.000	0.59
Increase in prices of services	3.51	1.375	M-H	7.751	433	0.000	0.51
Possibilities of private participation leading to corruption	3.47	1.064	H	9.115	433	0.000	0.47
Reduced financial constraints on the government	3.37	1.101	H	7.104	449	0.000	0.37
Service may be less accessible to the poor	3.26	1.108	H	4.937	433	0.000	0.26
Service may be less affordable to low-income earners	3.23	0.962	H	4.988	433	0.000	0.23
Reduction in revenue to the government	3.15	1.202	H	2.631	435	0.009	0.15
Reduction in employment	3.14	1.158	H	2.529	433	0.012	0.14
Private participation may allow for competition	3.08	1.237	H	1.317	435	0.189	0.08
Overall	3.81	0.9155	M-H	18.733	449	0.000	0.81

Source(s): Authors' own work

test of sphericity were conducted. The results revealed a KMO value of 0.564. While this value is below 0.70, it exceeds the minimum threshold of 0.50 required to proceed with factor analysis (Field, 2005). Furthermore, the Bartlett's test was highly significant ($\chi^2 = 16{,}781.075$, $p < 0.001$), indicating that the variables are sufficiently correlated to provide a stable factor structure. Also, given the large sample size ($N = 450$) and the exploratory nature of the study, these parameters confirm that the dataset is appropriate for factor extraction.

From the PCA output (Table 3), the first three components have eigenvalues greater than one and these components constitute a total of 91.635% of the cumulative variance. The result of the rotated loadings showed that component one captured the bulk of the variation, having 57.939% variance, component two has 27.994% variance and component three captures 5.703% variance. Although the third component, named "Price Increase," emerged as a single-item factor, it was retained. Statistically, the factor met the Kaiser Criterion with an eigenvalue of 1.622, and the item exhibited a high factor loading of 0.735, confirming a strong relationship with the latent construct. The 0.735 factor loading aligns with the submission of Wanous and Hudy (2001) on the decision criteria for single factor loading. Also, the item was retained as it measures a distinct, unidimensional concept that is not strongly correlated with the other variables in the analysis. Furthermore, the retention of this factor aligns with extant literature,

Table 3. Rotated component matrix

Variables	Components 1	2	3
1. Effective Management/Policy Framework (Cronbach Alpha = 0.994)			
Availability of standard regulatory framework	0.934		
Expansion of service delivery	0.930		
Productivity and efficiency in service delivery	0.903		
Improved financial discipline	0.902		
Improved self-sustainability of infrastructure services	0.899		
Increased investment in infrastructure services	0.895		
Increased accessibility to infrastructure Services	0.892		
Technical/operational competence	0.889		
Efficient personnel management	0.889		
Managerial expertise	0.885		
Inclusion of environmental norms in private participation arrangements	0.884		
Improvement in the enforcement of environmental protection laws	0.882		
Opportunity to improve the Nation's fiscal policy	0.881		
Reduction of leakages and wastages	0.879		
Improved service reliability and continuity	0.876		
Sustainable pricing policies	0.876		
Attempt by PSP to cut expenditure on safety and security of supply for increased profit margin	0.874		
Safety and security of service supply	0.870		
Increased availability of resources for investing in expansion	0.867		
Opportunity for government to raise revenue for much-needed social programs	0.863		
Availability of Resources for Investing in Expansion	0.862		
Better quality of service to consumers	0.858		
Improvement in the financial performance of the infrastructure	0.854		
Reduced need for resources on back up Facilities	0.844		
Adequate allocation and management of associated risk in the investment	0.843		
Reduction in wasteful cost	0.831		
Improved quality of product supply	0.825		
Transparency in charges	0.720		
Reduced financial losses	0.700		
Increase in employment	0.680		
Reduction in prices of infrastructure Services	0.651		
Reduced financial constraints on the government	0.630		
2. Service Competitiveness and Effectiveness (Cronbach Alpha = 0.968)			
Reduction in revenue to the government		0.964	
Private participation may warrant laying off staff		0.948	
Increase in wages and salaries		0.889	
Private participation may allow for competition		0.874	
Services may be less accessible to the poor		0.845	
Services may be less affordable to low-income earners		0.841	
Possibilities of private participation leading to corruption		0.817	
Effective revenue collection of user fees		0.758	
Reduction in employment		0.732	
3. Price Increase			
Increase in prices of services			0.735
Rotation Sum of Squared Loadings			
Total	24.334	11.758	2.395
% of Variance	57.939	27.994	5.703
Cumulative %	57.939	85.933	91.635
Initial Eigen Value			
Total	32.759	4.106	1.622
% of Variance	77.998	9.777	3.861
Cumulative %	77.998	87.774	91.635

Note(s): Extraction Method: Principal Component Analysis

Source(s): Authors' own work

which emphasizes that factors related to the prices of services are critical considerations for users when evaluating PSP in service delivery.

Component One (Effective Management/Policy Framework): Users' positive attitude, as highlighted in the mean score, is further reinforced by the factor analysis, where "Effective Management/Policy Framework" (Component 1) emerged as the most significant factor. This component encapsulates several positive attributes associated with private sector efficiency, collectively influencing users' favourable disposition towards PSP.

Water infrastructure projects inherently lack trialability; users cannot experiment with PSP before full adoption. This absence of a trial phase influences the importance of effective management and regulatory frameworks. These reflect users' need for assurances and guarantees in the absence of direct trialability. Thus, the items loaded onto Component 1 indicate that the preference for PSP is not merely a personal choice but is embedded in a normative framework of effective policy and legal compliance. Effective management and policy frameworks are crucial in influencing public perception of PSP in water infrastructure provision (Aigbavboa *et al.*, 2023). This finding corroborates the submissions of Mause (2019), which underscored the importance of policy/governance issues on private infrastructure provision. This often significantly affects public perception, especially if the project fails to meet expectations. Effective management and policy frameworks that ensure transparency, accountability and performance can positively influence public perception of private infrastructure provision (Sutherland *et al.*, 2011; Mause, 2019). Policy/regulatory independence can reduce inefficiencies and improve users' perception of private investments. However, policy/regulatory bottlenecks can lead to inefficient pricing and negatively impact users' perception (Schram and Ule, 2024). Across most emerging economies, issues relating to governance and effective management remain critical areas to address to ensure PSP acceptance.

Component Two (Service Competitiveness and Effectiveness): The second component, "Service Competitiveness and Effectiveness" primarily influences users' attitude. Items such as "Private participation may allow for competition" (0.874) and "Effective revenue collection of user fees" (0.758) contribute to a positive attitude. Users may perceive that competition fosters innovation and efficiency, leading to better service quality, thereby forming favourable behavioural beliefs about PSP. Efficient revenue collection might also be viewed positively as a sign of improved financial management and sustainability, further enhancing a positive attitude. Conversely, items within this component significantly challenge a positive attitude and directly impact PBC. Concerns like "Services may be less accessible to the poor" (0.845) and "Services may be less affordable to low-income earners" (0.841) represent significant control beliefs. If users perceive that PSP will erect barriers to access or affordability, it negatively impacts their intention to support PSP.

From a DOI perspective, the component directly relates to the attributes of relative advantage and compatibility. Users might see the positive aspects as superior ways of organizing water services, promising greater efficiency and responsiveness. This perceived advantage is crucial for the initial adoption and continued diffusion of the innovation. However, the negative aspects of this component highlight challenges to compatibility. The concerns about services becoming less accessible or affordable to vulnerable populations directly conflict with existing social values and expectations regarding equitable access to essential services. For PSP to diffuse widely, it must be perceived as consistent with the values, past experiences and needs of potential adopters. When an innovation is seen as incompatible with these elements, its rate of adoption is significantly hindered.

Thus, while PSP can enhance service competitiveness and effectiveness, this is, however, dependent on effective government regulations to mitigate agency problems and opportunistic behaviours of private investors (Koo *et al.*, 2013). In addition, prioritizing financial gains over quality can lead to a lack of effectiveness and compromise of quality (Reynaers, 2019). Competition generally leads to efficiency. Users may perceive PSP more favourably in competitive markets due to the potential for improved services and efficiency. However, the

complexity of PSP arrangements could erode the benefits of competitive market pressures (Cruz and Sarmento, 2022).

Component Three (Price Increase): The only variable loaded under this component is the increased prices of services. Price increase impacts PBC and influences users' attitude towards PSP. An increase in water price implies a reduced ability to afford the service. For households with limited disposable income, a price hike translates into a lack of resources to comply with the PSP model. When users perceive that they lack the necessary financial resources, their preference for PSP significantly diminishes. Furthermore, price increases form a negative behavioural belief, contributing to an unfavourable attitude towards PSP. While users may justify price increases if they lead to service improvements (Matas *et al.*, 2018), the negative utility of higher costs can outweigh the benefits, leading to a net negative evaluation of PSP, thereby reducing the intention to support PSP.

Also, a price increase directly impacts the compatibility and relative advantage of PSP. For an economically constrained population, price increases make PSP incompatible with their financial realities and expectations. This incompatibility will deter adoption, as PSP is seen as misaligned with their needs and resources. If the financial burden outweighs the service improvements, the net relative advantage becomes negative, making PSP adoption less attractive. However, if regulatory and policy frameworks can ensure that fair pricing remains aligned with users' interest, users are more likely to view PSP favourably (Schram and Ule, 2024).

(3) Linear Regression Analysis

The results of the multiple regression (Table 4) show that the multiple correlation coefficient, R value, has a value of 0.809. This indicates a very strong positive correlation, suggesting that the three factors, effective management/policy framework, service competitiveness/effectiveness and price increase, are highly effective in predicting the observed variation in

Table 4. Regression analysis outputs

Model summary

Model	R	R^2	Adjusted R^2	Std. Error of the estimate
1	0.809	0.654	0.651	0.596

ANOVA of preference for PSP in water infrastructure provision

Model		Sum of squares	Df	Mean square	F	Sig
1	Regression	268.978	3	89.659	251.996	0.000
	Residual	142.319	400	0.356		
	Total	411.297	403			

Coefficients of the equation predicting users' preference for PSP

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. Error	Beta	t	Sig
1	(Constant)	0.656	0.124		5.296	0.000
	Effective Management/Policy Framework (C1)	0.651	0.032	0.660	20.411	0.000
	Service Competitiveness/Effectiveness (C2)	0.322	0.029	0.399	11.044	0.000
	Price Increase (C3)	−0.160	0.026	−0.221	−6.252	0.000

Source(s): Authors' own work

users' preference for PSP. The coefficient of determination, R^2 value, is 0.654. This shows that 65.4% of the total variance in the dependent variable, i.e. Users' Preference for PSP, is accounted for by the three independent variables included in the regression model. The R^2 value is considered substantial, confirming that the conceptual framework adequately captures a significant portion of the determinants of user preference for PSP in water infrastructure provision. The minimal difference between the R^2 (0.654) and the Adjusted R^2 (0.651) suggests that the three components contribute meaningfully to the prediction of the dependent variable without overfitting the data.

The ANOVA section (Table 4) shows that the independent variables statistically significantly predicted the dependent variable, where the $p < 0.005$; in other words, the regression model is a good fit of the data.

The general form of the equation to predict preference for PSP in water infrastructure provision from any one variable in component one (C1) – "effective management/policy framework"; component two (C2) – 'service competitiveness/effectiveness and component three (C3) – "price increase", is obtained from the coefficients table. The un-standardized coefficients show how much the dependent variable varies with an independent variable, given that other independent variables are held constant. Table 4 also shows the statistical significance of the independent variables. The *p*-value indicates that all the independent variable coefficients are statistically significant.

Thus, the general form of the equation to predict preference for PSP in water infrastructure provision from the coefficient Table 4 is:

$$\text{Preference for PSP} = (0.651)\text{C1} + (0.322)\text{C2} - (0.160)\text{C3} - 0.656$$

The unstandardized coefficient B for C1 is 0.651, for C2 it is 0.322 and for C3 it is −0.160. This implies that for every one increase in component C1, preference will increase by 0.651; for every one increase in C2, preference will increase by 0.322; and for every one increase in C3, preference will decrease by 0.160.

The results reveal that Component One, an effective management/policy framework, is a positive predictor of users' preference (beta = 0.651). This component directly links to the TPB construct of PBC. This suggests that users' preference for PSP is not solely driven by the mere promise of better service, but by assurance of accountability and effective governance (Dehner, 2011; Ameyaw *et al.*, 2017). High PBC, based on a belief in a robust and transparent management and policy structure, is an important factor in fostering a positive attitude (preference) among users. The other two components represent the user's cost-benefit analysis, aligning with the TPB's behavioural beliefs and the DOI's relative advantage attribute. Component Two, service competitiveness and effectiveness (beta = 0.322) capture the perceived positive outcomes of PSP, such as better quality of service and efficiency. This positive coefficient confirms that the anticipated benefits of service improvement are an important driver of preference. Conversely, Component Three, price increase (beta = −0.160) with a negative coefficient, highlights the critical trade-off users make. While users value the improvements in service, the associated cost increase acts as a detractor, reducing the level of preference (Swamy *et al.*, 2018). This finding underscores that the perceived relative advantage of PSP is based on the benefits outweighing the financial cost. Summarily, while effective management/policy framework had a greater positive influence on users' preferences than service competitiveness/effectiveness, an increase in prices decreases users' preferences.

6. Conclusion

The study investigated the users' preference for PSP in water infrastructure provision. The analysis revealed a high level of users' awareness of PSP in water infrastructure provision. However, users' preference for PSP in water infrastructure is a complex interplay of perceived benefits, social influences and economic considerations. The application of the TPB reveals

that a predominantly positive attitude towards PSP, driven by expectations of enhanced service quality and efficient management, is an important determinant. Also, subjective norms, manifested as the expectation for standard regulatory frameworks and environmental compliance, play a significant role in legitimizing PSP within the social system. However, this positive disposition is influenced by concerns related to PBC, particularly the affordability of services in the face of potential price increases. From a DOI perspective, PSP is viewed as an innovation with considerable relative advantage, though its compatibility is challenged by socio-economic constraints. The inherent lack of trialability necessitates robust regulatory frameworks and transparent practices to foster trust and facilitate the diffusion process. Thus, there is a need to strengthen the regulatory body and governance mechanisms. This involves ensuring the regulatory framework is transparent, independent and capable of enforcing performance standards, protecting consumer interests and holding the private investors accountable. Policy efforts should concentrate on establishing clear performance metrics, accessible complaint mechanisms and public reporting on compliance, thereby increasing the user's PBC and building the necessary trust for a positive preference toward PSP.

6.1 Limitations

The study focused on users' perception of PSP. Further studies could triangulate responses from service providers, using objective water quality assessments to provide more nuanced information. Also, further research could operationalize the core constructs of the TPB and DOI and assess the direct influence of these constructs on users' preference for PSP in water infrastructure. Research could further explore providing qualitative insights, such as interviews, to understand the underlying reasons behind users' support or scepticism for PSP. Further studies could also extend to peri-urban and rural LGAs to capture the full spectrum of water supply challenges across the urban-rural continuum.

References

Abiodun, Y. (2025), "LWC: lagosians rightly deserve uninterrupted potable water supply", August 25, 2025. available at: https://www.environewsnigeria.com/lwc-lagosians-rightly-deserve-uninterrupted-potable-water-supply/ (accessed 05 December 2025).

Aigbavboa, C., Addo, L.Y., Ebekozien, A., Thwala, W.D. and Arthur-Aidoo, B.M. (2023), "Developing a framework for effective institutional management of Ghana's urban water supply", *International Journal of Building Pathology and Adaptation*, Vol. 41 No. 6, pp. 290-302, doi: 10.1108/ijbpa-05-2023-0058.

Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211, doi: 10.1016/0749-5978(91)90020-t.

Akinbode, M.O. (2018), "The Lagos water crisis: any role for the private sector?", Urbanet, available at: https://www.urbanet.info/nigeria-lagos-water-crisis/ (accessed 12 May 2025).

Ameyaw, E.E., Chan, A.P.C. and Owusu-Manu, D.-G. (2017), "A survey of critical success factors for attracting private sector participation in water supply projects in developing countries", *Journal of Facilities Management*, Vol. 15 No. 1, pp. 35-61, doi: 10.1108/jfm-06-2016-0027.

Benitez, D., Estache, A. and Søreide, T. (2012), "Infrastructure policy and governance failures", *CMI Working Paper*, Vol. 5, pp. 1-27, available at: https://www.cmi.no/publications/file/4535-infrastructure-policy-and-governance-failures.pdf (accessed 05 December 2025).

Chernavsky, E. (2021), "The unfounded enthusiasm towards private participation in infrastructure", *Brazilian Journal of Political Economy*, Vol. 41 No. 3, pp. 563-587, doi: 10.1590/0101-31572021-3208.

Clark, G.L., Monk, A.H.B., Orr, R. and Scott, W. (2012), "The new era of infrastructure investing", *Pensions: An International Journal*, Vol. 17(2) No. 17, pp. 103-111, doi: 10.1057/pm.2012.10.

Cruz, C.O. and Sarmento, J.M. (2022), "Public private partnerships renegotiations in transportation: case studies from Portugal. Springer nature".

Dehner, C.D. (2011), "Private sector involvement in public water distribution assessing local water systems in Massachusetts", *Journal of New England Water Works Association*, Vol. 125 No. 1, pp. 25-67.

DeVellis, R.F. and Thorpe, C.T. (2021), *Scale Development: Theory and Applications*, SAGE Publications, London.

Dithebe, K., Aigbavboa, C.O., Thwala, W.D. and Oke, A.E. (2019), "Factor analysis of critical success factors for water infrastructure projects delivered under public–private partnerships", *Journal of Financial Management of Property and Construction*, Vol. 24 No. 3, pp. 338-357, doi: 10.1108/jfmpc-06-2019-0049.

Faisal, K.A., Yue, W., Abdullahi, A.G., Hamed, R. and Noman, A.A. (2021), "Analyzing urban growth and land cover change scenario in Lagos, Nigeria using multi-temporal remote sensing data and GIS to mitigate flooding", *Geomatics, Natural Hazards and Risk*, Vol. 12 No. 1, pp. 631-652, doi: 10.1080/19475705.2021.1887940.

Field, A. (2005), *Discovering Statistics Using SPSS*, 2nd ed., SAGE Publications, London.

Galaa, S.Z. and Bukari, F.I.M. (2014), "Water tariff conflict resolution through indigenous participation in tri-water sector partnerships: dalun cluster communities in northern Ghana", *Development in Practice*, Vol. 24 Nos 5-6, pp. 722-734, doi: 10.1080/09614524.2014.940852.

Groves, R.M. (2006), "Nonresponse rates and nonresponse bias in household surveys", *International Journal of Public Opinion Quarterly*, Vol. 70 No. 5, pp. 646-675, doi: 10.1093/poq/nfl033.

Healy, A., Upton, K., Capstick, S., Bristow, G., Tijani, M., Macdonald, A., Goni, I., Bukar, Y., Whitmarsh, L., Theis, S., Danert, K. and Allan, S. (2020), "Domestic groundwater abstraction in Lagos, Nigeria: a disjuncture in the science-policy-practice interface?", *Environmental Research Letters*, Vol. 154, p. 045006, doi: 10.1088/1748-9326/ab7463.

Hsu, C.-C. and Shr, Y.-H.J. (2023), "The impacts of water storage infrastructure on real property values and crop production", *Water Research*, *247*, Vol. 120786.

Iniobong, I. (2024), "2025 budget: Lagosians demand improved security, portable water", *Businessday NG*, 24 July, available at: https://businessday.ng/news/article/2025-budget-lagosians-demand-improved-security-portable-water/ (accessed 6 September 2025).

Kallis, G., Ray, I., Fulton, J. and McMahon, J.E. (2010), "Public versus private: does it matter for water conservation? Insights from California", *Environmental Management*, Vol. 45 No. 1, pp. 177-191, doi: 10.1007/s00267-009-9403-8.

Koo, J., Yoon, G.S., Hwang, I. and Banerjee, S.G. (2013), "A pitfall of private participation in infrastructure: a case of power service in developing countries", *The American Review of Public Administration*, Vol. 43 No. 6, pp. 674-689.

Li, H., Li, W., Wang, L. and Lv, L. (2021), "Public satisfaction evaluation of urban water environment treatment public-private partnership project: a case study from China", *International Journal of Building Pathology and Adaptation*, Vol. 39 No. 2, pp. 407-432, doi: 10.1108/ijbpa-10-2019-0089.

Mahdavi, T. (2021), "Application of the 'theory of planned behavior' to understand farmers' intentions to accept water policy options using structural equation modeling", *Water Supply*, Vol. 21 No. 6, pp. 2720-2731, doi: 10.2166/ws.2021.138.

Matas, A., Raymond, J.-L. and Ruiz, A. (2018), "Regional infrastructure investment and efficiency", *Regional Studies*, Vol. 52 No. 12, pp. 1684-1694, doi: 10.1080/00343404.2018.1445845.

Mause, K. (2019), "Governing public-private partnerships: the problem of low-cost decisions", *Journal of Infrastructure, Policy and Development*, Vol. 3 No. 2, pp. 261-270, doi: 10.24294/jipd.v3i2.1154.

Mawejje, J. (2024), "Private sector participation in infrastructure in emerging market and developing economies: evolution, constraints, and policies", *Global Policy*, Vol. 15 No. 2, pp. 465-474, doi: 10.1111/1758-5899.13375.

Mofokeng, M., Alhassan, A.L. and Zeka, B. (2024), "Public–private partnerships and economic growth: a sectoral analysis from developing countries", *International Journal of Construction Management*, Vol. 24 No. 10, pp. 1029-1037, doi: 10.1080/15623599.2023.2217374.

Norman, G. (2010), "Likert scales, levels of measurement and the 'laws' of statistics", *Advances in Health Sciences Education*, Vol. 15 No. 5, pp. 625-632, doi: 10.1007/s10459-010-9222-y.

Olabode, O.F. and Comte, J.C. (2024), "Water scarcity in the fast-growing megacity of Lagos, Nigeria and opportunities for managed aquifer recharge", *Wiley Interdisciplinary Reviews: Water*, Vol. 11 No. 5, e1733.

Rakodi, C. (2000), "Getting the pipe laid is one matter and getting the water flowing through the pipe is another: user views on public-sector urban water provision in Zimbabwe, Sri Lanka, Ghana and India", *International Planning Studies*, Vol. 5 No. 3, pp. 365-391, doi: 10.1080/713672857.

Reynaers, A.M. (2019), "Mission impossible for effectiveness? Service quality in public–private partnerships", in Quality of Governance: Values and Violations, Springer International Publishing, Cham, pp. 159–180.

Rogers, E.M. (2003), *Diffusion of Innovations*, 5th ed., Free Press.

Schram, A. and Ule, A. (2024), "Regulatory independence may limit electoral holdup but entrench capture", *Public Choice*, Vol. 198 No. 3, pp. 403-425, doi: 10.1007/s11127-023-01136-y.

Simões, F.D. (2017), "The erosion of the concept of public service in water concessions: evidence from investor-state arbitration", *The Regulation of the Global Water Services Market*, Vol. 2017, pp. 70-90, available at SSRN: https://ssrn.com/abstract=2912636.

Sullivan, G.M. and Artino, A.R., Jr (2013), "Analyzing and interpreting data from Likert-type scales", *Journal of graduate medical education*, Vol. 5 No. 4, pp. 541-542, doi: 10.4300/jgme-5-4-18.

Sutherland, D., Araujó, S., Egert, B. and Kozluk, T. (2011), "Public policies and investment in network infrastructure", *OECD Journal: Economic Studies*, Vol. 2011 No. 1, pp. 1-23.

Swamy, R.R.D., Tiwari, P. and Sawhney, A. (2018), "Assessing determinants of PPP project performance: applying AHP to urban drinking water sector in India", *Property Management*, Vol. 36 No. 1, pp. 67-85, doi: 10.1108/pm-08-2016-0046.

Tayeng, T., Assumi, K.H., Khaiyum, S., Amin, R., Shah, P., Chandratreya, A. and Dhote, S. (2024), "Assessing the impact of infrastructure financing on economic growth in emerging markets", *Journal of Infrastructure, Policy and Development*, Vol. 8 No. 15, 9560, doi: 10.24294/jipd9560.

Tshehla, M.F. and Mukudu, E. (2020), "Addressing constraints for effective project finance for infrastructure projects in emerging economies–the case of Zimbabwe", *Journal of Construction Business and Management*, Vol. 4 No. 1, pp. 48-59, doi: 10.15641/jcbm.4.1.806.

Twum, K.O. and Abubakari, M. (2020), "Drops in the city: the puzzle of water privatization and consumption deficiencies in urban Ghana", *Water Policy*, Vol. 22 No. 3, pp. 417-434, doi: 10.2166/wp.2020.175.

Wang, Y.H., Fan, C.W., Lou, J.R. and Chang Chien, C.T. (2021), "Analyzing public cognition and attitudes toward water infrastructure in taiwan", *IOP Conference Series: Earth and Environmental Science, 2021*.

Wanous, J.P. and Hudy, M.J. (2001), "Single-item reliability: a replication and extension", *Organizational Research Methods*, Vol. 4 No. 4, pp. 361-375, doi: 10.1177/109442810144003.

Xu, X. and Luo, X. (2018), "Infrastructure, value chains, and economic upgrades", *Journal of Infrastructure, Policy and Development*, Vol. 2 No. 2, pp. 258-271, doi: 10.24294/jipd.v2i2.691.

Zakeri, A.A., Abbasianjahromi, H., Mirhosseini, S.M. and Ehsanifar, M. (2025), "Determining the range of negotiable prices for public–private partnership infrastructure projects: a simulation approach", *International Journal of Building Pathology and Adaptation*, Vol. 43 No. 1, pp. 50-74, doi: 10.1108/ijbpa-05-2022-0075.

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