

Review of Studies on Service Quality in Public Utilities: A Construct Operationalization Approach

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Abstract

Service quality dimensions differ substantially across public-sector and private-sector enterprises. The quality of water provision takes a hard hit as quality monitoring is easy in competitive setups yet challenging in monopolistic arrangements. The construct of service quality has been extensively explored in organizations across competitive markets, yet an Indian perspective; often entails a focus on monopolistic market structures and mechanisms. The World Bank report on infrastructure for development enlists the significant challenges in the water sector as involving the gross lack of competitors, lack of incentives for individuals and organizations responsible for managing the provision of services, and respective lack of involvement of customers (citizens) in the processes of planning, delivery, and regulation of the water provision in a qualitative manner. The uni-dimensional models insist on one or two aspects, whereas the hierarchal models emphasize the multidimensional nature of the contextual phenomenon. The scale instrument development perspective in service quality in public utility often marks the dimension of either the customer perceptions or the service provider's dimensions. The perceived gaps in expected and realized service parameters in infrastructure service quality and respective construct operationalization have suffered from a perception formation and consideration bias. The paper-bound application of the dimensional approach suggests that wider differences prevail with regard to constructing conceptualization. The SERVAQUAL and its modifications for service quality assessment in infrastructure and public utility services perspective envision more comprehensive loopholes vis a vis the context, the ground realities, and the broader ecosystem perspective. The study explored the various relationships between quality assessment approaches and respective conceptualization hassles in water as a public utility in the NCR region. The study is unique because it prepares an empirical ground for exploring service quality dimensions concerning the provision of water supplies to millions in the national capital region.

Keywords: Public Utility; Service Quality; SERVQUAL; Service Quality Model

Introduction

The 'service quality' and its 'measurement' have been reviewed primarily across private sector units and operations. Service quality assessment across the public sector utility sector has been reviewed primarily with private-public sector partnerships. The need for more consensus regarding a standard perception-driven scaling instrument or measurement methodology, or dimensional aggregation; further mars the generalized approach. Service quality dimensions differ substantially across public-sector and private-sector enterprises. Across the culture, economy types, and the extent of globalization of the economy, the perceptions and determinants of service quality (Romano, Masserini, 2020) differ substantially. The public utility services (a sector that is receiving investment focus from World Bank and IFC in developing countries) constitute the capital-intensive and infrastructure provision across areas of electricity, water supply, drinking water provision, sewage disposal, garbage management, as well as other publicly desired services under a common platform. The services made available across such public utility channels or networks often cater to public goods, and the government has been intent in regulating the pricing levels to ascertain social and economic justice and reach and accessibility of the service and product as such. The common denominator in providing such public utility services in developing countries is the public interest. The attempts to privatize and public-private partnerships have often been experimented with in the provision of public utilities, yet the natural monopoly prevails. From an Indian perspective, as the debate on infrastructure development, infrastructure financing, and infrastructure privatization is ripe, service quality seems to matter. Public utilities (Kessides, Miniaci, 2009) are regarded as critical to the public and for the effective functioning of the economy. A public utility, especially regarding electricity, water, and garbage management, often involves economies of scale, inhibits the competitive spirit, and organizes itself as either oligopoly or monopoly within the economic framework. The public often distinguishes themselves as involving a higher proportion of sunk costs vis a vis the fixed costs and often involve higher industry-specific barriers to entry and a multi-player economy. The public utility also

characterizes as involving the service quotient to a more extensive range of users like the economically included as well as economically excluded sections of society. The pressures on maintaining (Tangaja, Centino, 2021), improving and revitalizing basic and essential service quality benchmarks in service delivery have remained problematic and challenging worldwide.

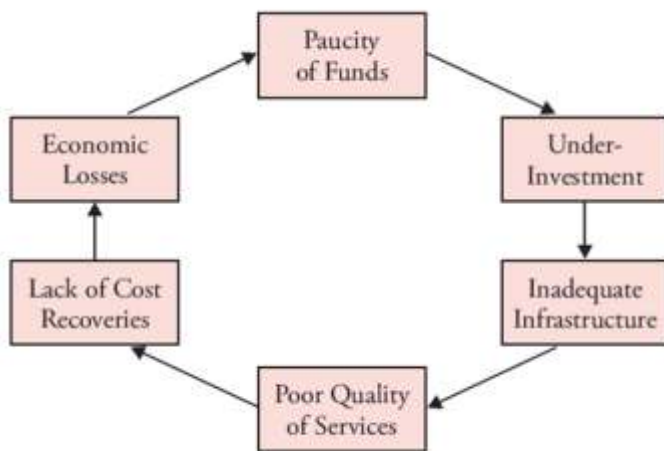
The global research (Djain, Sangkala, 2020) on cross-country service quality development and retention from a public utility perspective often reflects on the individual citizen's perceptions as integral to quality evaluation exercise. The academic discourses (Romano, Masserini, 2020) on 'service quality' in the 'public utility' perspective regard the public sector monopolies as an inefficient provider of utility services in the middle to low developing economies. The economics of water service delivery favor the large-scale monopoly and provision by the public or private monopolistic holdings. The quality of water provision takes a hard hit as quality monitoring is easy in competitive setups yet challenging in monopolistic configurations. The construct of service quality has been extensively explored in organizations across competitive markets, yet from an Indian perspective, this often entails a focus on monopolistic market structures and mechanisms. The literature reflects tremendously on the blind following of standards adopted across developed countries as being adopted across developing countries. The paper explores the construct operationalization perspective across water-based public utilities from the NCR perspective, focusing on service quality conceptualization from customer paradigms. The article first explores the water sector-based challenges and the structuring of industry in India, then examines the theoretical framework and reviews the existing attempts to construct operationalization in the water-based public utility field. The last section reviews the respective service and quality models.

Water Sector Challenges

The World Bank report on infrastructure (WDR, 2004) for development enlists the significant challenges in the water sector as involving the gross lack of competitors, lack of incentives for individuals and organizations responsible for managing the provision of services (Garcia, 2007), and

respective lack of involvement of customers (citizens) in the processes of planning, delivery and regulation of the water provision in a qualitative manner. The sustainable water supply provision (Jiang, Zheng, 2010) has always been a matter of policy agenda, yet the nature and scope of reforms involving the policy maker, operator, and regulator in water-based public good provision. The water sector witnesses immense challenges regarding supply consistency, preserving and retaining water quality daily and hourly, and ensuring compliance with health standards. Infrastructure management (Wagle, Deekshit, 2011), especially water management, suffers from the vicious cycle of losses, lack of funds across the operational process, undercapitalization and underinvestments in gross assets, the inadequacy of infrastructure management practices, poor quality of services, lack of cost recoveries from the beneficiaries, economic losses and mounting financial inadequacies.

Figure 1: The bottlenecks in infrastructure quality provision



Source: (Wagle, Deekshit, 2011)

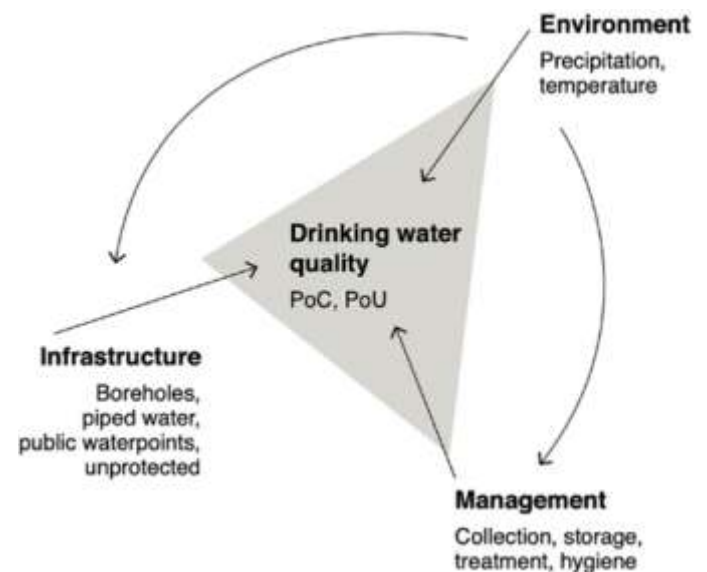
Especially concerning the Indian scenario, the water distribution and supply of water across urban areas have been marked with monopolistic origins and lesser private sector participation in the Indian context. The respective lack of monitoring (Kumar, Post, 2022) of in-depth quality and lack of incorporation of independent water quality monitoring agencies further complicate the situation. The recent attempts at mapping quality by Niti Ayog under the

data monitoring and quality assessment on a pan-nation basis is the first worthwhile step towards the meaningful evaluation of service quality in the Indian public utility quality management sector.

Theoretical Framework

Infrastructure management (Wallbaum, Ebrahimi, 2021) in utility sectors has remained problematic. The existing water infrastructure planning frameworks (Furlong, Considine, 2016) constitute the focus on a tripod across infrastructure, environment, and the management of affairs (Charles, Howard, 2022) collectively. Infrastructure management in the water sector encompasses the aspects of coordinated and collective action on the part of multiple stakeholders across the ecosystem, as mentioned herein.

Figure 2: The stakeholders in quality debate in public utility perspective



Source: (Charles, Howard, 2022)

Thematic Preview of Determinants

In literal terms, the proximal determinants often involve the individual as an agency himself and the environment in which service delivery (Kansara, 2019) is undertaken. The distal correlates identify the particular uncertainties that shape the opinion-making and perception development concerning the service being delivered (Dewi, 2019) and

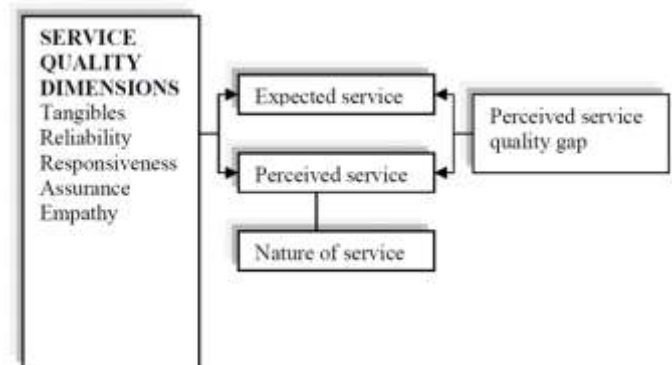
the quality offered. The proximal correlates of service delivery in the water utility (Saini, Satpal, 2018) sector, in turn, represent the neighboring and the core agentic (individual-driven) influences. In contrast, the distal effects on quality development categorize as the distant and contextual influences (Chachar, Ali, 2021) that collectively impact the prospects for shaping the probability of quality service delivery (Munhurrun, Naidoo, 2010) in water. The construct operationalization concerning service quality in public utility (Satapathy, 2014) foresees a long history of being operationalized as a multidimensional perspective and may involve the aspects of individual decision-making (D'Inverno, Romano, 2021) concerning water usage practices, awareness about the changing water patterns, pressures on individual cognitions to adhere by new verbology, service provider generated influences; industry derived results on the mindsets concerning fashion and easy life living, government policies and attitude towards life, contingent requirements and human talent based sensitivity; count as some of the prominent aspects. The classical ecological model of perception development (Gonzalez, Inesta, 2016) concentrates on the processes between an individual and diverse levels of the environment as defining the interactions across subsystems and resultant outcomes in the form of individual embedment and prospective transformation (Stephan, Gruhn, Jaconelli, 2013) in outlook. The classical Bronfenbrenner's five subsystems model (Gonzalez, Inesta, 2016) helps explain the microsystem, mesosystem, ecosystem, macro-system, and chrono-system derived influences (Kansara, 2019) on possible service quality quantification. The bio-ecological approach underlines the plethora of influences that impact the overall shaping of the service quality from an Indian perspective. The illustration (table 1) below captures the various effects involving individual, vocational practices driven, health-related, stress-derived, contingent, and malpractices, to name a few.

Review of Scale Instruments from a Public Utility Perspective

The scale instruments are devised to map the contextual phenomenon in practical terms quantitatively. The service

quality as an aspect of service delivery eschews a longer theoretical history and foresees the construct as driven by either the regulator's perceptions (Rieper, Mayne, 1988) or the customer's perceptions. The studies (Romano, Masserini, 2020) consistently incorporate two core scales, SERVPERF and SERVQUAL. The service quality (Gronroos, 1984) in itself is hard to decipher as the service vis a vis the product involves the intangible, inseparable, and heterogeneous offering that is elusive (Purcarea, Gheorghe, 2013), unresolved, and seems to be far from conclusive (Parasuraman, Zeithaml, 1988). Significantly concerning quality assessment in a preview of public utilities, the scale instruments vary from uni-dimensional to multidimensional to lived customer experiences.

Figure 3: The service quality gaps



Source: (Parasuraman, Zeithaml, 1988)

The uni-dimensional models (Roy, Lassar, 2016) insist on one or two aspects. In contrast, the hierarchal models emphasize the multidimensional nature of the contextual phenomenon (Tadeo, Gomez, 2008). The scale instrument development perspective (Babakus, 2008) in service quality in public utility often marks the dimension of either the customer perceptions or the service provider's dimensions. The perceived gaps (Sigala, 2015) are expected, and realized service parameters in infrastructure service quality and respective construct operationalization have suffered from a bias of perception formation and consideration. The SERVPERF dimensions emphasize the service quality and performance linkages, whereas the SERVQUAL reflects solely on the service quality dimensions. The service quality dimensions comprise the conceptualized focus on differences between expected and

realized derived propositions and advocate quantitative measurement impetus. The attribute Service Quality approach (Farmer, 1988) reflects that the services of an organization that consistently fulfills customer expectations are ranked higher from a quality point of view. This model identifies three fundamental attributes of service quality which are (i) installed infrastructural facilities & processes, (ii) operating employee behavior, and (iii) employee's sense of judgment. Each set of attributes depends on various factors and an apex of a triangle. To maintain a higher level of service quality, an organization must have a balance among the features. PCP Attribute (Philip, Hazlett, 1997) comprises three main attributes, i.e., pivotal aspects, core aspects, and peripheral aspects, which constitute service quality. The pivotal attributes are basically an outcome from the service confronts, i.e., what the service user expects and receives. The core attributes center around the key attributes and are essential in ensuring quality service delivery to the user. These attributes are a unification of all the employees and organizational processes through which the user receives service. The respective peripheral characteristics cover service organizations' contingent and flashy arrangements. The approach points to a hierarchical structure of the three attributes, which possess overlapping areas that shape a pyramid where the pivotal attribute is at the apex, being at the top priority, while the peripheral is at the base at the lowest priority. The service Quality and Customer Satisfaction Model (Oh, 1999) is an integrated quality vitalization model that incorporates an organization's perceived performance and customer satisfaction and their relationship with value incorporation in service delivery. This model focuses mainly on the post-purchase decision process. Yet the respective word-of-mouth communication intention is conceptualized as a mixture of customer-derived perceptions, satisfaction intent, and customer re-purchase intentions. GAP Model (SERVQUAL) (Parasuraman, Zeithaml, 1988) explored that the quality of a service is a function of the differences between expectation about the service and cognition about the service. Thus, they developed a model to measure service quality based on an analysis of gaps observed between expectations about service and the actual realization of the

service by a customer/user. Hence, the model is known as GAP Model. Presumed gaps, as highlighted in the approach, are summarized herein:

Gap No. 1 = (Expectation of Customer – Perception of Management about Customer's expectation)

Thus, Gap no.1 shows management's failure to assess customers' desires for the service.

Gap No. 2 = (Perception of Management about Expectation of Customers in respect of a service – Quality specifications framed to deliver the service)

Thus, Gap no.2 exhibits considerable lapses in framing service quality standards of service.

Gap No. 3 = (Quality Specifications in respect of a service – Service quality delivered actually)

Thus, Gap no.3 shows failure in the performance of a service.

Gap No. 4 = (Announcement about quality of service delivery - Service quality delivered actually)

Thus, Gap no.4 shows failure in keeping promises about a service.

Gap No. 5 = (Expectation of Customer about a service - Service quality delivered actually)

The Gap Model (Parasuraman, Zeithaml, 1988) was initially introduced with ten service quality dimensions. Still, this model was re-named as SERVQUAL Model with five dimensions: reliability, responsiveness, tangibles, assurance, and empathy. Performance Only Model (SERVPREF)(Cronin & Taylor, 1992) concluded that data analysis of performance/perceptions is a better predictor of service quality than data analysis of the gap between expectations and perceptions, i.e., SERVQUAL tool. According to them, service quality may be treated as an attitude and can be understood through the adequacy-importance model. However, the traditional IT-Based Model (Zhu, Wayner, 2002) reflects more on the utilization of information technology (IT) to improve service quality. The systemic incorporation of Information technology impetus reduces service costs and provides customers with value-added service options. The model analyses the correlation between IT-based services and customer

perceptions regarding service quality. In this model, service quality dimensions are measured by linking IT-based service construct with the service quality measured in the SERVQUAL model. The multidimensional nature of 'service quality' as a research construct needs extensive exploration, especially regarding the quality management framework and stakeholder and accountability

perspective. The construct has a marked history of being worked out with individual, contextual, and contingency-related aspects and perceptions. The construct has been reviewed as uni-dimensional and multidimensional across the current literature on the subject matter.

Table 1: Summary of various approaches in service quality conceptualization

Model	Key Features	Limitations	Data Collection	Analysis Method	Service Quality Measurement
Attribute Service Quality Model	Emphasizes balancing three dimensions of service quality for consistently delivering high-rank quality. Shows potential to target the right customer segment. Helpful in knowing periodic changes in customer taste.	Unable to measure service quality. No suggestions / practical ways to identify/resolve service quality issues or to improve service quality.	Organizational Record/Data	Not mentioned in the model	Three dimensions: Physical facilities & processes, People's behavior & conviviality, Professional judgment
PCP Attribute model	Simple and general but effective framework to evaluate service quality. Areas of improvement in service quality may be assessed on the bases of frequency of service confronts. Three levels of attributes are sector-dependent with reference to customers.	Unable to measure service quality. Unable to provide general dimensions to three levels of attributes. Empirical validation is not feasible.	Organizational Record/Data	Not mentioned in the model	Three dimensions: Pivotal attributes, Core attributes, and Peripheral attributes
Service quality, customer value, and customer satisfaction model	Focuses on customer satisfaction. Provide a framework to acknowledge the consumer decision process and evaluate the organizational performance. Provides ideas for pro-customer approaches.	It needs to be generalized for different types of service settings. Its variables are measured through relatively fewer items.	Through Questionnaire	Path analysis using LISRELVIII	Through single item for the perceived price and eight items for perceptions of hotel settings.
Gap Model / SERVQUAL	Focused and Analytical tool. Useful for management to recognize gaps in service quality. Service quality factors are judged from a customer's point of view.	Exploratory study. Unable to explain clearly the quality measurement system in respect of the measurement of gaps at different levels.	Through Questionnaire	Principal-axis Factor followed by oblique rotation	Five dimensions explored: Tangibility, Reliability, Responsiveness, Assurance & Empathy
Performance Only Model / SERVPREF	Service quality is treated and measured as an attitude. Service quality factors are judged by the service purchase intention of the customer.	Exploratory study. Customization is needed as per the type of services.	Questionnaire	Principal-axis factor, oblique rotation, and LISREL confirmatory	Five dimensions: Tangibility, Reliability, Responsiveness, Assurance & Empathy
IT-based model	Shows that information technology-driven services significantly impact the reliability, responsiveness, and assurance dimensions and indirectly impact customer satisfaction and perceived service quality.	The approach comprises a far lesser number of representing dimensions. The approach fails to yield a measurement of the service quality of IT-based transactions.	Questionnaire	Factor analysis and structured equation modeling using LISREL VII	Five dimensions: Tangibility, Reliability, Responsiveness, Assurance & Empathy (with perceptions only Statements)

Conclusions

The dimensional approach suggests that wider differences prevail with regard to constructing conceptualization. The SERVAQUAL and its modifications for service quality assessment in infrastructure and public utility services perspective envision more comprehensive loopholes vis a vis the context, the ground realities, and the broader ecosystem perspective. The study explores the various relationships between quality assessment approaches and respective conceptualization of hassles in water as a public utility in the NCR region. The study is unique because it prepares an empirical ground for exploring service quality dimensions concerning the provision of water supplies to millions in the national capital region. A crucial gap exists concerning how contingent and contextual influences have been mapped and considered in prior research. The environmental impacts, presence or absence of technology transfer mechanisms and learning and innovation ecosystems shape innovation and creativity abilities. Yet, their incidence in federal setup and across clusters is totally different. Social norms and cultural practices need to be considered from an Indian perspective as the Indian religious and political mix presents a further case study from liberal economic setups worldwide. There is quantifiable evidence of culture, contextual elements, and contextual supports shaping individual capability to innovate, contain deviations from quality benchmarks, and create a quality water supply experience. The studies (Furlong, Considine, 2016) on dimensions of 'service quality behavior' of Indian infrastructure bodies seem scattered and are concentrated more on developed economies, whereas India is an emerging economy. The conceptualization of the construct needs to consider studies (Jiang, Zheng, 2010) and experiences from across the world. The construct (service quality in public utilities, especially water service) is multidimensional, yet the choice of factors needs to reflect Indian realities and contextual conditions. No single measurement instrument could capture consumers' perceptions of all these aspects in one go. The regulator's behavior and inherent managerial mindsets often emerge as a natural area of research. Yet, lesser research focuses on the factors that influence

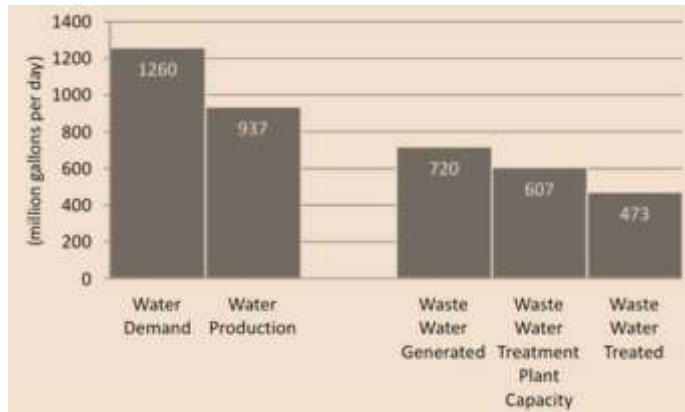
individual and organizational behavior and career outcomes in post-Covid uncertain business times. The infrastructure management and respective quality aspirations take a lot of work to quantify in view of evolving monopolistic provision of water in the NCR context.

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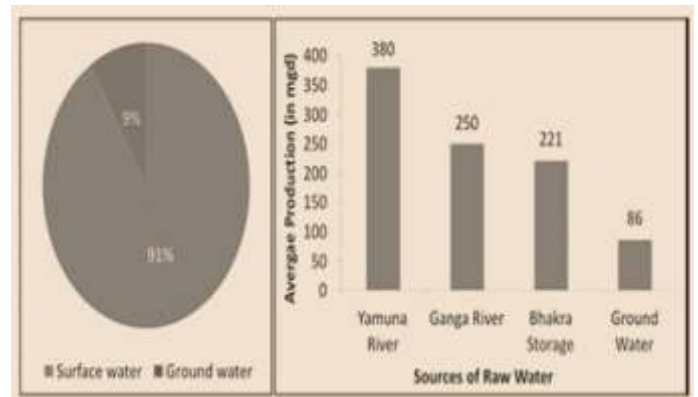
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Delhi based statistics Gaps in Water Production



Sources of Raw Water

Sources of Raw Water



Source: Planning Department, Economic Survey of Delhi, 2019-2020