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# Examining the Determinants of User's Satisfaction in Drinking Water Services: A Dual-Theoretical Perspective of Expectancy-Value and Service Quality Theory

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## Abstract

This study investigates the determinants of customers' satisfaction with drinking water management services, namely user expectations, perceived value, service quality, gap analysis, and user awareness. Guided by Expectancy-Value Theory (EVT) and Service Quality Theory (SERVQUAL), the study employed a cross-sectional survey design using 399 users as respondents selected through stratified cluster sampling and data was gathered through Computer-Assisted Interviewing (CAI) with a structured interview schedule. The total sample and two categories of service providers, Consumer Committee and Drinking Water Board, were compared using regression analysis through structural equation modeling to determine the relationships among variables. The results showed that service quality had the largest and largest-scale positive effect on customer satisfaction in all groups, with standardized regression coefficients of 0.320 ($p < 0.001$) in total, 0.264 ($p = 0.001$) for the Consumer Committee, and 0.306 ($p < 0.001$) for the Drinking Water Board. Gap analysis found that only Drinking Water Board users showed a strong positive relationship between them (standardized $\beta = 0.248$, $p = 0.002$), indicating the precedence of expectation–performance congruence in larger institutions. User's expectations and perceived value had a weak or insignificant impact on overall satisfaction, whereas user awareness had a moderate and significant positive impact among Drinking Water Board users (standardized $\beta = 0.135$, $p = 0.027$). The results indicate that while improving service quality remains the most effective way to enhance user satisfaction, addressing expectation gaps and enhancing user awareness become especially important in more complex service delivery systems. This study adds value to both academic theory and practical strategies aimed at improving user satisfaction within public water supply services.

***Keywords:*** drinking water service, user's satisfaction, service quality, management board and user committees.

## 1. Introduction

Access to safe and reliable drinking water is a fundamental human right (Oliveira, 2017; Eman & Meško, 2020) and a critical determinant of public health and socio-economic development (Adil, 2021; WHO & UNICEF, 2021). Despite global advancements in water supply infrastructure, many communities still face challenges related to water quality (Cosgrove & Loucks, 2015; Elimelech, 2006) accessibility (Dos Santos et al., 2017; Carpenter, 2022; Chmielewski et al., 2025), affordability (McDonald, 2011, (Meehan et al., 2020) and service reliability (Evaristo et al., 2023; Mishra, 2021). User satisfaction with drinking water services is a key indicator of service performance (Ogata et al., 2022), reflecting the extent to which water providers meet user expectations (Haque et al., 2020; Wagner et al., 2025).

Several factors influence user satisfaction, comprising water quality (Denantes & Donoso, 2021; Romano & Masserini, 2020) (taste, odor, and clarity), continuity of supply, pressure adequacy, billing transparency, and responsiveness to complaints (Abu-Bakar et al., 2021). Dissatisfaction with these aspects can lead to reduced trust in water utilities, increased reliance on alternative (and often unsafe) water sources, and lower willingness to pay for services (Nauges & Whittington, 2019).

In both developed and developing countries, disparities exist in water service satisfaction. Urban areas typically have better infrastructure, whereas rural and peri-urban regions often experience intermittent supply and poor water quality (Majeed et al., 2022). Furthermore, climate change, population growth, and aging infrastructure exacerbate service delivery challenges, necessitating a deeper understanding of consumer perceptions to guide policy and investment decisions (OECD, 2020).

Nepal, a landlocked country nestled in the Himalayas (Shrestha, 2023), has long grappled with the challenge of ensuring adequate access to clean water and proper sanitation facilities for its diverse population (Gyawali, 2001). In recent years, the Nepalese government, alongside various non-governmental and developmental organizations, has undertaken significant efforts to address these pressing issues (Bhattarai et al., 2023; & Ojha et al., 2020).

The provision of clean and reliable drinking water is a fundamental necessity for human well-being and societal development (Pokhrel et al., 2020; & Elimelech, 2006)). However, ensuring consistent access to high-quality drinking water remains a significant challenge, particularly in developing regions. This research paper aims to investigate the issue of drinking water user satisfaction, with a focus on understanding the factors that influence user perceptions and experiences.

Existing literature highlights the critical linkage between water quality, sanitation, and public health outcomes. Water contamination can arise from various sources, including geological, agricultural, and industrial activities, which can compromise the safety and palatability of the water supply. (Madilonga et al., 2021) (Bazaanah & Mothapo, 2023). Additionally, the reliability and accessibility of water services are key determinants of user satisfaction (Denantes, 2021; & Raut, 2023), as intermittent supply or long distances to water sources can negatively impact user experiences (Majuru et al., 2012).

One of the key initiatives has been the implementation of large-scale, centralized water supply systems to serve the rapidly growing urban centers in the country (Ojha et al., 2020; & Kalbar, 2023). However, these systems have not been without their challenges, as they often fail to reach marginalized communities in rural and peri-urban areas. As a result, there has been a growing recognition of the importance of decentralized, community-based water management strategies as a more resilient and inclusive approach to water security (Ojha et al., 2020; & Adams, 2020).

The country has made substantial progress in providing access to improved water sources, with 92% of its citizens now having access to such sources. However, this statistic alone does not reflect the safety or quality of the water being supplied, nor does it necessarily

translate to improved health and nutrition outcomes due to other factors, such as poor sanitation and hygiene practices (Cronin et al., 2016).

This study examines user satisfaction with drinking water services, identifying key determinants that influence user perceptions. By analyzing satisfaction levels across different demographic and geographic contexts, the research aims to provide actionable insights for water service providers, policymakers, and regulators to enhance service delivery and ensure sustainable water management.

This research uses a combined theoretical framework of expectancy-value theory (EVT) and service quality Theory (SERVQUAL) to examine user satisfaction in water management systems. EVT suggests that satisfaction is influenced by users' expectations and perceived value of services (Chen et al., 2022; & Ali et al.), whereas SERVQUAL measures the gap between expectations and actual performance of services on five dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Murrar et al., 2024; Murrar et al., 2021; & Muthwa, 2022). Together, the theories present a two-dimensional perspective; cognitive (value and expectation) and evaluative (service quality gaps) for breaking down determinants of satisfaction. The model posits that with service delivery exceeding or equaling expectation, perceived value rises, enhancing satisfaction and triggering positive behavioral intentions like payment compliance and loyalty. The combined framework offers a good foundation for describing and enhancing water service delivery.

Despite growing interest in service quality and user satisfaction, there is a noticeable gap in literature specifically focused on the water management sector. While prior studies (Hu et al., 2009; Kayaga, 2009) have examined these constructs in general service contexts such as hospitality or public utilities, the unique operational and user service challenges faced by water utilities, particularly in low-income or urban developing regions remain underexplored. Moreover, the investigation into how users's expectations, service quality, perceived value, gap analysis and user's awareness influence user satisfaction has received limited attention in this context (Wafa et al., 2023; Chen et al., 2024). Additionally, existing models often neglect gap analysis and user's awareness level as a key driver of satisfaction, highlighting the need for a more integrated approach (Hu et al., 2009; Tambunan & Widyadhari, 2024). Therefore, this study aims to address these gaps by developing a comprehensive framework that captures the interplay of these variables within water service delivery.

### 1.1 Purpose of the study

The purpose of this research is to evaluate how users' expectations, perceived value, service quality, gap analysis, and user awareness influence user satisfaction in water management services. It aims to identify the key factors that shape user satisfaction by analyzing both psychological and service performance variables within this essential public service sector.

### 1.2 Hypotheses of the study

Hypotheses formulated for the study are presented below:

a. **H1:** Greater user awareness about water management services leads to higher levels of user satisfaction.
b. **H2:** Users' expectations have a significant positive effect on user satisfaction in water management services.
c. **H3:** Perceived value significantly influences user satisfaction in water management services.
d. **H4:** Higher perceived service quality is positively associated with user satisfaction in water management services.

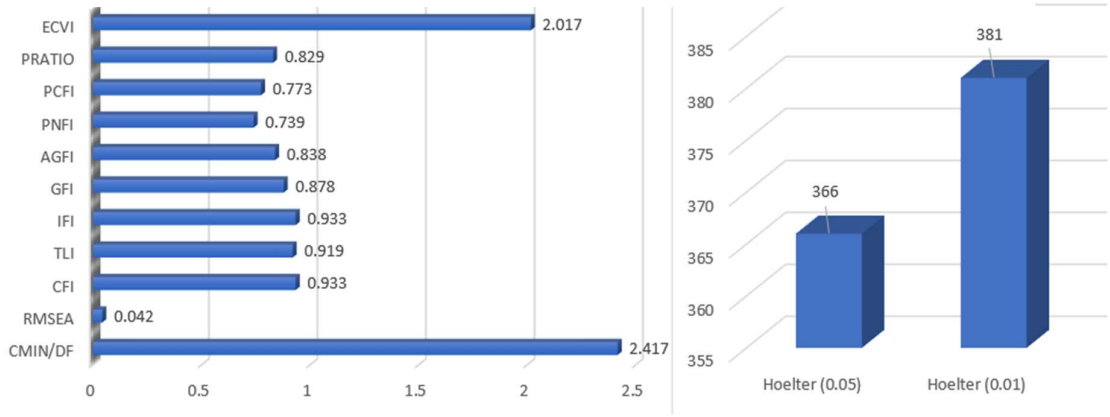
e. **H5:** A smaller gap between expected and perceived service performance (gap analysis) is positively associated with higher user satisfaction.

## 2. Methods and Materials

This study employed a quantitative cross-sectional survey design to investigate the determinants of user satisfaction in water management services in Hetauda, Nepal. The research focused on two key stakeholder groups: The Water user committees and the Management Board. Survey was carried out among Hetauda Sub-metropolitan City drinking water consumers aiming at 408 households (384 estimated + 24 for non-response) through stratified-cluster sampling in which 19 wards stratified according to water supply management: 8 wards being supplied by Hetauda Water Supply Management Board (HWSMB) alone and 9 jointly managed by HWSMB and Water User Committee (WUC). Implicit stratification with proportional allocation was applied using multistage sampling design based on administrative units. In the first stage, all 19 wards were included; 4 out of 9 jointly managed wards were randomly chosen. A household list in each chosen cluster formed the second-stage sampling frame. Twenty-eight clusters were formed 19 for HWSMB (one per HWSMB-only ward) and 9 for WUC (one per jointly managed ward). From each of the 4 jointly managed wards selected, 51 HWSMB and 51 WUC households were systematically sampled, with the desired 204 respondents from each provider (408 total). The final data that had successfully collected in the study was 196 from HWSMB and 203 from WUC respondents. Interviewers instructed only to pre-sampled households; no substitutions were permitted and one response was provided by all eligible households (one registered with HWSMB or WUC and with drinking water availability). Data were collected using computer-assisted personal interviews (CAPI), which allowed for efficient and accurate recording of responses. A structured questionnaire was used, incorporating five-point Likert scale items to measure key constructs such as service quality, user satisfaction, perceived value, user's expectations, user's awareness and the gap between expectations and perceived performance (based on the SERVQUAL + EVT model). Data collection for field survey was carried out by individual enumerator in designated field. The fieldwork began on March 25, 2024, in 3 different cluster area under close supervision. On completion of the fieldwork in these first 3 cluster locations, a review session was held on March 29, 2024, and the teams departed to their respective assigned clusters on April 2, 2024, to continue with data collection for the survey. Data collection activities were completed on April 20, 2024. All measurement items were adapted from validated instruments in previous studies and contextualized to the water service environment. Path analysis from AMOS was employed to analyze the data, as it allows for simultaneous testing of multiple relationships among latent variables. This methodological approach enabled a comprehensive evaluation of the proposed theoretical framework within the context of water service delivery in a developing urban area.

## 3. Analysis and Results

**Figure 1:** *Model fit summary*

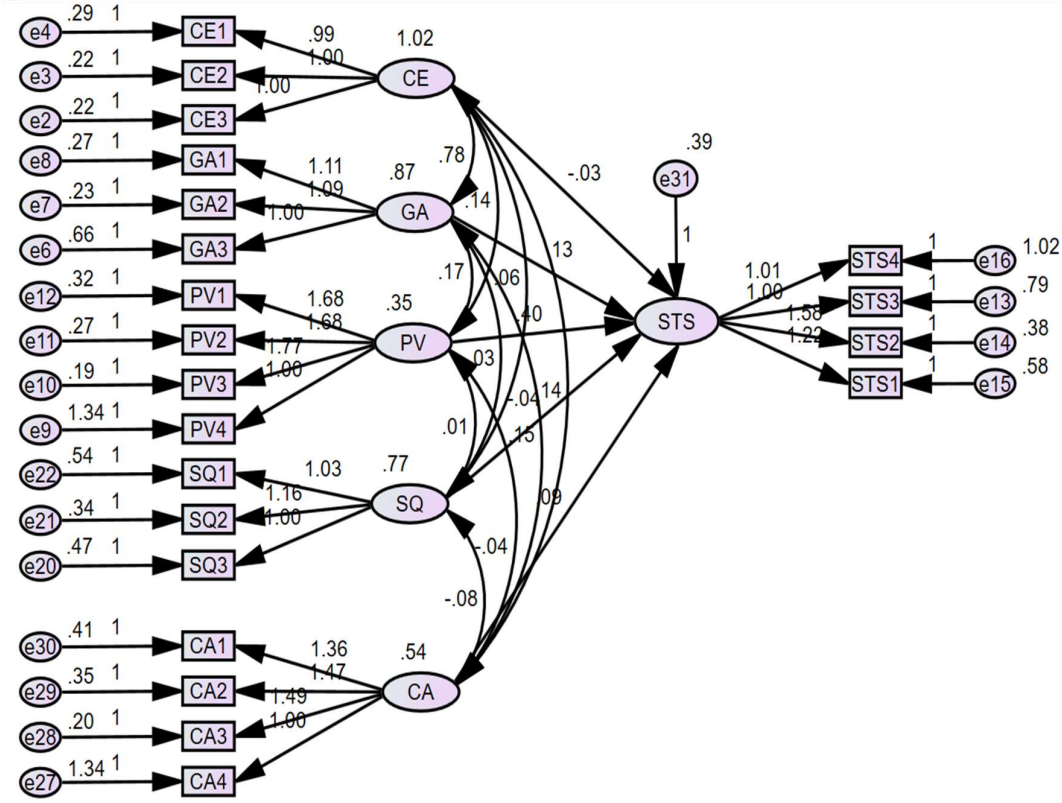



**a.** Analysis of Structural Equation Modeling Output

The structural equation model (SEM) analysis of the Consumer Committee - Default model depicts a well-fitting and sound measurement model statistically. The statistical significance at the level of $p < .001$ of all the unstandardized regression weights guarantees that all the observed variables were good indicators of their corresponding latent constructs. The standardized factor loadings range from .557 to .957, and this indicates acceptable to strong convergent validity. Precisely, constructs like user expectation (CE), gap analysis (GA), perceived value (PV), service quality (SQ), and user awareness (CA) had high standardized loadings of over .80 for all indicators, suggesting strong correspondence between the latent variables and their observed measures. User's satisfaction (STS) was also doing well, though one indicator (STS4) had somewhat lower loading of .557, indicating possible scope for improvement.

Its fit statistics also reinforce its sufficiency. The ratio of chi-square to degrees of freedom (CMIN/DF) is 2.417, within the acceptable range of less than 3.0 and thus an appropriate model-data fit. The Root Mean Square Error of Approximation (RMSEA) was 042 with a 90% confidence interval of .039 to .045 and a PCLOSE statistic of 1.000. This reflects a close fit with minimal approximation error in the population. Second, Comparative Fit Index (CFI = .933), Tucker-Lewis Index (TLI = .919), and Incremental Fit Index (IFI = .933) all exceed the .90 cutoff point, reflecting strong comparative and incremental model fit. While the Goodness-of-Fit Index (GFI = .878) and Adjusted GFI (AGFI = .838) were slightly below the conventionally used .90 cutoff, they are within acceptable limits, especially when other indices are strong.

**Figure 2:** *Structural Equation Model of the Effects of CE, GA, PV, SQ, and CA on STS*



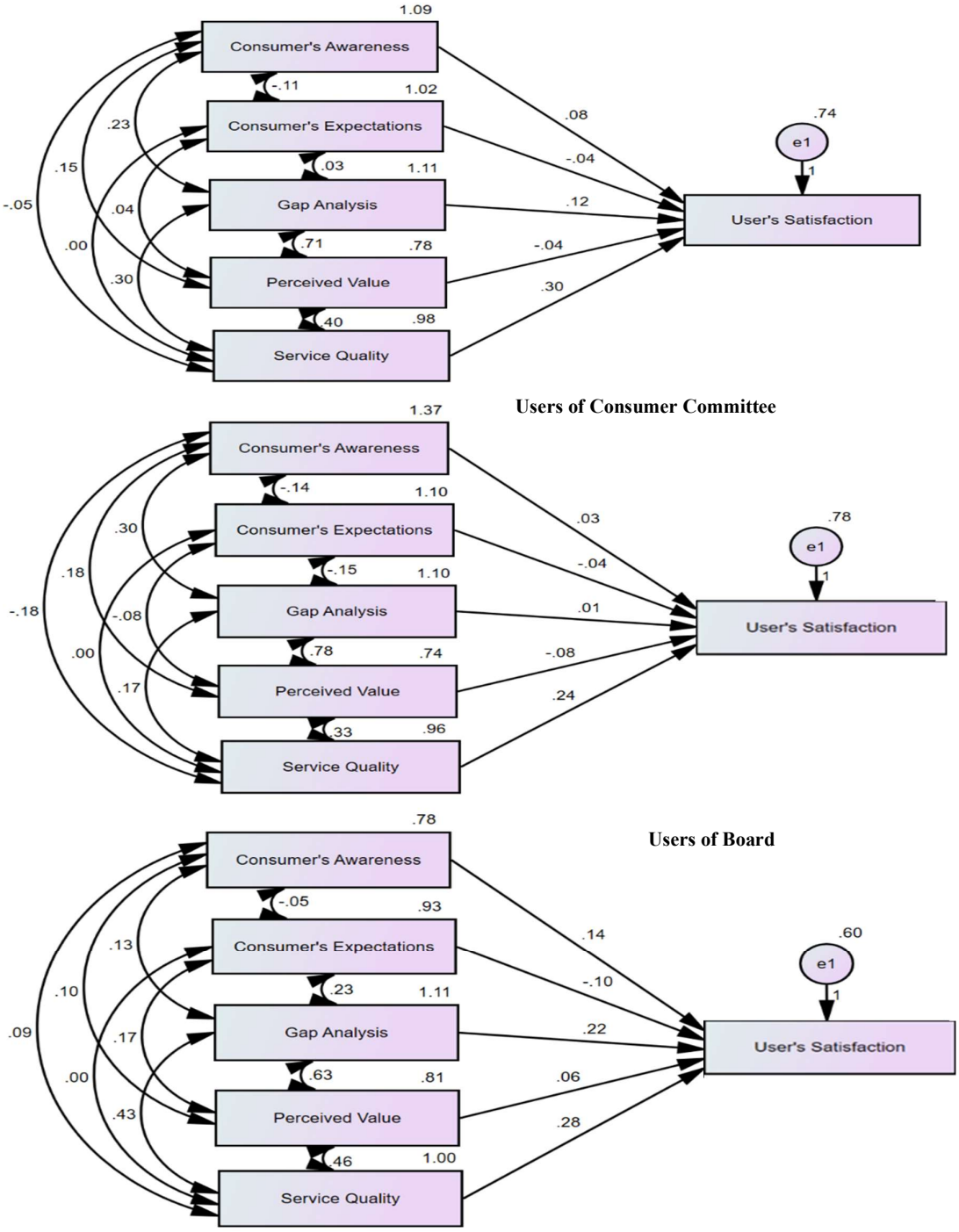

The parsimony-adjusted indices also concur with the model strength, with PNFI (.739) and PCFI (.773) well in excess of the .50 cutoff, indicating perfect model complexity-fit balance. The Expected Cross-Validation Index (ECVI = 2.017) was quite close to that of the saturated model (1.743), which indicates good replication capability in future samples. The Hoelter's critical N values (366 at p = .05 and 381 at p = .01) are significantly greater than the benchmark of 200, assuring that the sample size was sufficient enough to maintain the model structure statistically.

In conclusion, the SEM findings confirm that Consumer Committee's measurement model is statistically sound and theoretically justifiable. The substantial factor loadings, significant regression weights, and strong model fit indices overall indicate that the latent constructs are well operationalized and the general model is suitable for further structural or causal analysis.

**b. Analysis of Factors Explaining User's Satisfaction by Drinking Water Service Providers**

The data provided here is a report of results from the regression analysis to examine the effects of various variables; user expectations (CE), gap analysis (GA), perceived value (PV), service quality (SQ), and user awareness (CA) on user's satisfaction (STS) towards drinking water services. The analysis has been carried out in three groups: general users, users under Consumer Committee, and users under Drinking Water Board. These relationships are explained by prisms of expectancy-value theory (EVT) and service quality Theory (SERVQUAL) that emphasize the expectations, perceived value, service quality, and awareness in the construction of user satisfaction.

**Figure: 3 Path analysis**




In the total model, service quality (SQ_ALL) had the highest positive impact on Satisfaction (STS_ALL) with a standardized coefficient of 0.320 and a very high significance level (.000) that shows that when the service was perceived to be of high quality, satisfaction levels rose significantly. This conforms with both EVT and SERVQUAL, which emphasize the significance of actual performance compared to expectations. user awareness (CA_ALL) also shows a moderate positive relationship with satisfaction (standardized estimate = 0.091), such that more aware users are very slightly more satisfied, perhaps because they had clearer expectations or had more insight into the service they were being provided with. This effect is

however marginally significant (p = 0.059). Gap Analysis (GA_ALL) has a weak positive correlation (standardized = 0.133) but was not significant at the conventional 0.05 level (p = 0.070), indicating that, while critical, the alignment of expectation and perception was perhaps not as influential a driver for all users as a group. User expectations (CE_ALL) and perceived value (PV_ALL) both show negative and insignificant correlations with satisfaction, that is, higher expectations do not always lead to higher satisfaction unless they are met, and perceived value does not significantly affect satisfaction in the overall sample.

**Table 1:** *Effects of all predictors on user's satisfaction among drinking water users*

| Indicator | Estimate | S.E. | C.R. | P | Estimate |
|---|---|---|---|---|---|
| | | | **Overall** | | |
| CE_ALL | -.044 | .043 | -1.018 | .308 | -.048 |
| GA_ALL | .117 | .065 | 1.814 | .070 | .133 |
| PV_ALL | -.042 | .083 | -.508 | .611 | -.040 |
| SQ_ALL | .300 | .050 | 6.029 | *** | .320 |
| CA_ALL | .081 | .043 | 1.887 | .059 | .091 |
| | | | **Consumer Committee** | | |
| CE_ALL | -.036 | .060 | -.599 | .549 | -.041 |
| GA_ALL | .007 | .132 | .051 | .959 | .008 |
| PV_ALL | -.085 | .172 | -.495 | .621 | -.080 |
| SQ_ALL | .244 | .077 | 3.177 | .001 | .264 |
| CA_ALL | .030 | .056 | .532 | .595 | .039 |
| CE_ALL | -.036 | .060 | -.599 | .549 | -.041 |
| | | | **Board** | | |
| CE_ALL | -.101 | .060 | -1.688 | .091 | -.106 |
| GA_ALL | .217 | .072 | 3.022 | .003 | .248 |
| PV_ALL | .058 | .088 | .658 | .510 | .057 |
| SQ_ALL | .282 | .065 | 4.310 | *** | .306 |
| CA_ALL | .141 | .064 | 2.212 | .027 | .135 |

If looking at only those users who were being served by the Consumer Committee, the results show a less important role of most variables for influencing satisfaction. Service quality (SQ_ALL) remains significant (p = 0.001) at a standard coefficient of 0.264, showing that even among these customers, the quality of service delivery is a factor to consider when evaluating satisfaction. But factors such as Gap Analysis (GA_ALL), Perceived Value (PV_ALL), user Expectations (CE_ALL), and user Awareness (CA_ALL) all had low and statistically insignificant coefficients. This suggests that within this category, satisfaction is primarily a function of the quality of the service provided rather than expectations, awareness, or the gap between experience and expectation. This could translate to users of the Consumer Committee being more interested in utilitarian outcomes and less in intellectual evaluations such as expectations or value judgments.

Conversely, for Drinking Water Board customers, multiple variables had more and stronger effects on satisfaction. Once more, service quality was highly significant (standardized = 0.306, p < 0.001), reaffirming its primary influence on satisfaction irrespective of provider type. Gap Analysis (GA_ALL) also emerges as a moderate and strong predictor (standardized = 0.248, p = 0.002), indicating that among Board users, how much expectations and performance of the service overlap was the key driver of satisfaction. This mirrors closely the SERVQUAL methodology, indicating the importance of closing the expectation–performance gap. In addition, user Awareness (CA_ALL) had a significant and moderate positive effect (standardized = 0.135, p = 0.027), suggesting that this well-informed user category is more

probable to be satisfied, perhaps due to having realistic expectations or being more sensitive to the challenges and work involved in delivering a service. User Expectations (CE_ALL) and Perceived Value (PV_ALL) were still not statistically significant, although CE_ALL had a comparatively bigger negative estimate value of -0.106, suggesting unmet expectations play a smaller part in dissatisfaction among Board users.

Overall, analysis indicates important differences in the formation of satisfaction among users depending on the type of provider organization. Overall, service quality is the most and best predictor of satisfaction for all groups, confirming both theoretical models. In support, Timilsena (2020) also signifies the water quality, supply timing, water quantity and water tariff as key determinants for satisfaction of users. With the broader user population, satisfaction is more affected by objective service performance than cognitive factors like expectations or perception. For Consumer Committee members, satisfaction is mostly dependent on service quality and least affected by other constructs. On the other hand, Drinking Water Board users have a more evolved response pattern for which both management of expectation-performance gaps and service quality are considerable determinants of satisfaction. Although, service quality remains as a key predictor for user satisfaction (Tangaja et al., 2021), while comparing the attitude of users towards different service vendors. In addition, ensuring continuous water supply with adequate pressure and quantity is critical. Infrastructure upgrades and regular maintenance reduce outages and service interruptions, directly increasing satisfaction (Guragain & Celestin, 2025). Therefore, different organizational structures or service models may require tailored solutions for customer satisfaction improvement. Those in policymaking and provision need to consider such differences as they design interventions that boost user satisfaction, focusing not only on service quality enhancement but also in managing expectations and awareness, particularly for the bigger institutional providers like the Drinking Water Board.

**c. Hypothesis Testing**

Based on the regression analysis, only the fourth hypothesis (H4) was accepted. This indicates that higher perceived service quality was significantly and positively associated with user satisfaction in water management services ($p < 0.001$). The remaining hypotheses (H1, H2, H3, and H5) were rejected as their corresponding variables, user awareness, user expectations, perceived value, and gap analysis, did not show statistically significant effects on user satisfaction (p-values > 0.05). Therefore, among all examined factors, perceived service quality emerged as the only strong predictor of user satisfaction in this context.

## 4. Discussion

The outcome of the SEM analysis yields significant implications to the determinants of user satisfaction with drinking water service, mediated by the theoretical assumptions of Expectancy-Value Theory (EVT) and service quality theory (SERVQUAL). According to these theories, satisfaction is moderated by a combination of user expectations, perceived performance of the service, and the accompanying value realized from the service experience. The findings identify significant differences in the strength and importance of these relationships within different categories of service providers i.e., general users, those under the Consumer Committee, and those provided for by the Drinking Water Board. Under the overall model, service quality is the most powerful predictor of Satisfaction with a standardized regression weight of 0.320 ($p < 0.001$), which confirms SERVQUAL's fundamental assumption that satisfaction stems from a comparison between perceived and actual service performance. This finding was aligned with the study of Ismail and Yunan (2016) in which it is claim with evidence that service quality does act as an important predictor of customer satisfaction and customer loyalty. These results affirm the necessity of delivering standardized, high-quality service in order to enhance user satisfaction for all user segments. User Awareness

is also positively related with satisfaction (standardized = 0.091), but just fails the conventional test of statistical significance (p = 0.059), which might suggest a growing part to be played by well-educated decision-making or sensible expectation-setting in shaping satisfaction outcomes. This finding aligns with findings from online library services, where higher awareness led to greater satisfaction (Panhilason, 2024). However, it contrasts with studies on online government services, where awareness had negligible impact compared to factors like privacy and service quality (Alderei & Sidek, 2023), highlighting the context-dependent role of awareness in shaping user satisfaction.

But both user expectations and perceived Value are negatively, though not significantly, correlated with satisfaction in the overall sample, which implies that unmet expectations or value misperceptions may not be strong drivers of dissatisfaction when one considers all users collectively. Upon examining users targeted by the Consumer Committee, service quality is the sole statistically significant predictor (standardized = 0.264, p = 0.001), while the rest of the variables; gap analysis, perceived value, user expectations, and user awareness have small and insignificant impacts. This suggests that for this subgroup, satisfaction is more driven by the tangible aspects of service delivery and not cognitive conceptions such as expectations or awareness. This finding may be mirroring a more proximal and immediate service situation, where users place more value on immediate service outcomes than on more general evaluative judgments. For Drinking Water Board users, however, a different pattern emerges. Service quality again demonstrates a high and statistically significant influence on satisfaction (standardized = 0.306, p < 0.001), further underscoring its critical influence across provider types. Gap analysis also appears as a moderately strong and statistically significant influence (standardized = 0.248, p = 0.002), and there is evidence that for this segment, expected and actual service performance congruence is a significant driver of satisfaction. This is consistent with the emphasis in the SERVQUAL model of minimizing the expectation–performance gap for greater customer satisfaction. Additionally, user awareness (CA_ALL) is revealed to have a moderate and significant positive relationship (standardized = 0.135, p = 0.027), which suggests that aware customers in this aspect tend to be more satisfied, possibly due to their more realistic expectations or enhanced awareness of limitations of service delivery. Although user expectations (CE_ALL) are not significant, their standardized estimate (-0.106) shows a pattern towards less satisfaction when expectations are violated, pointing towards an area of potential intervention. Overall, these results indicate that although service quality consistently influences satisfaction across all institutional settings, the impact of other variables such as awareness and gap management is context-dependent on the institutional setting of service delivery. They propose that tailored strategies can be needed to effectively intervene in customer satisfaction, particularly in larger and more bureaucratic organizations like the Drinking Water Board. Policymakers and service providers must consider both the structural features of the service environment and the psychological mechanisms underlying user satisfaction when crafting and implementing service improvement programs.

## 5. Conclusion

This study examined the effect of customer expectations, perceived value, service quality, and gap analysis on user satisfaction with drinking water management services. The findings confirm that service quality is the most powerful and consistent predictor of user satisfaction across all user groups and in line with expectancy-value theory and SERVQUAL. While customer expectations and perceived value did not correlate with satisfaction in general with weak or zero correlations, gap analysis was a strong driver of Drinking Water Board users with user implications for meeting expectations through performance. Variability in strength and magnitude of relationships between provider types Consumer Committee and Drinking Water Board suggest that models of organizational structure and service delivery influence

satisfaction dynamics. These results imply that service quality improvement remains the best weapon to increase customer satisfaction in water services. However, for major institutional providers, the crossing of expectation-performance gaps and user awareness raising may also be essential. The findings verify the need for differentiated solutions according to the specificity of the service delivery environment. Later research should explore other moderators and mediators within these models, including socio-demographic and behavioral intentions, to gain deeper insights into customer satisfaction within public utility services. Overall, this research contributes both theory and practice by illustrating how structural and psychological variables intersect to affect satisfaction in major service sectors.

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