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## STRUCTURAL FACTORS OF EXPECTATIONS REGARDING THE PUBLIC DRINKING WATER SERVICE IN A TOWN IN CENTRAL MEXICO

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**Abstract.** *In the context of the health and economic crisis, indicated by the confinement and social distancing as mitigation and containment policies of the SARS CoV-2 pandemic, the expectations regarding public services are intensifying. In addition to this scenario, local elections exacerbate those expectations regarding the deterioration in the quality of the drinking water supply. The objective of the present work was to contrast a model in order to be able to discuss the findings with the state of the art. A cross-sectional, psychometric and correlational work was carried out with a selection of 100 tenants from a municipal market in central Mexico. A factorial structure was found that explained 56% of the total variance, which suggested the emergence of a common factor that would explain the synchronicity of the economic and social crises in a political crisis.*

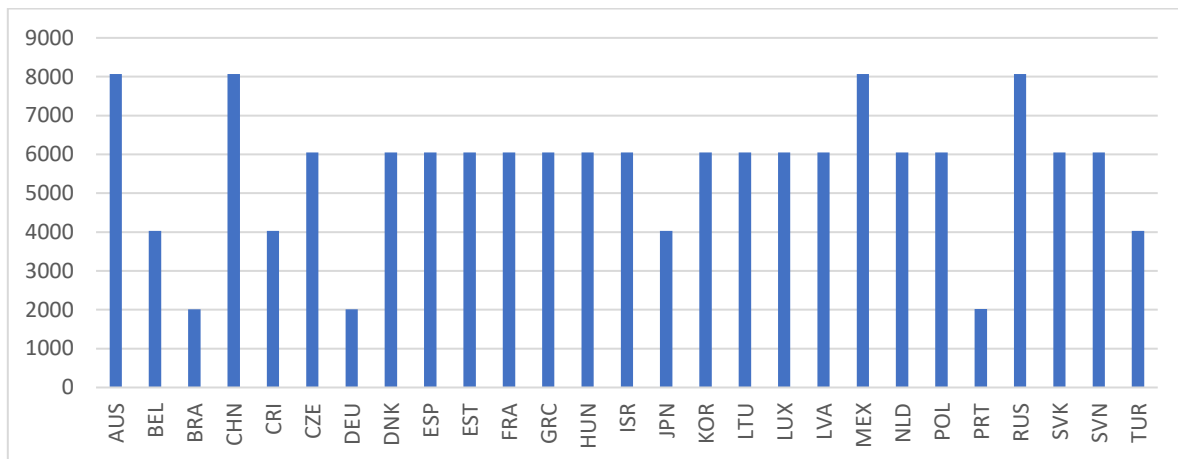
**Keywords:** *Expectations, supply policies, service quality, tariff system, water resources.*

### Introduction

The SARS CoV-2 pandemic has claimed the lives of two million people. Among the prevention measures, frequent hand washing stands out, but the shortage of water in a town in central Mexico, suggests the emergence of expectations regarding water supplies before the federal elections (WHO, 2021). In this scenario, the strategy to mitigate the pandemic consists of confinement and social distancing coupled with the use of masks and disinfectant, the healthy distance being recommended to reduce infections, but in Mexico about 170 thousand have died and it is expected to increase considerably because an underreporting of asymptomatic patients is recognized that exposes the risk scenario (PAHO, 2021). In this scenario, the extraction of millions of cubic meters per inhabitant has increased among the member countries of the OECD as a result of mitigation policies focused on confinement and social distancing, propitiating a greater supply for an intensive demand during the pandemic (see Figure 1).

Psychological studies of water sustainability have focused their interest on the prediction of a behavior favorable to the sustainable use of water (Garcia, 2020). This is the case of reasons for saving as determinants of water care, or positive emotions as antecedents of low water consumption. The psychology of water sustainability has also observed correlations between

the expectations of risk and utility of the supply service regarding the timely payment of the bill. Even, the acceptance and payment of a system of collection and rates according to the quality of the service is also explained from the user's expectations.



**Figure 1. Water withdrawals**

*Note: Elaborated with data OECD (2021)*

However, psychological studies of water sustainability have also shown a high degree of distrust of the users of the drinking water service regarding the supply and collection policies of their local governments (Garcia, 2019). In this sense, the expectations of the quality of the service and the collection of the same would be determining not only the saving of water, but also the payment of the bill.

In this way, the psychology of water sustainability has shown that risk expectations are associated with caring for water and utility expectations are closer to wasting water (Soto, 2012).

In the framework of the management and administration of water resources and services, psychological studies of sustainability have shown that when the authorities exercise intermittent supply strategies combined with an increase in water consumption, they lead to water savings in income areas. Economic environment generates solidarity and cooperation in areas of low income and a growing demand in high - income areas (Anaya, 2014).

In the case of areas with medium economic income, local customs and practices are factors that measured the impact of the cut in the water supply to communities and neighborhoods peripheral to cities (Flores, 2013). In this way, expectations for the quality of the drinking water service and the subsequent charging system are influenced by local values and consumption standards. This is so because it is assumed that the availability of water resources corresponds to the public supply service. In other words, if the bodies of water are available to consumers, then they tend to consider that the supply is a right that the State must guarantee, extracting, distributing and making water drinkable continuously and free of charge to the citizens.

Despite the fact that the psychology of sustainability has established that user expectations regarding the quality of the service and the charging system are determining factors in saving water and paying for the public service, conflicts between users and authorities have been exacerbated insofar as the quality of the water is low and its cost is high (Pérez and Soler, 2013).

Psychological studies of water sustainability have also shown that conflicts between authorities and users of the public water supply service are a precedent for violence and local

crime since, while the quality of the service decreases and its costs increase (Quintero et al., 2016). The Citizens not only distrust their authorities even more, but also organize themselves for self-management, excluding authorities from their decisions and self-supply actions in the best of cases, but also another less organized sector of civil society has generated protest actions, boycotts of supply networks, kidnapping of supply units, roadblocks, reports of leaks and confrontations with the forces of order.

The study by Carreón et al., (2014) has shown that the national press, in its monitoring of conflicts over the management and administration of water resources and services, has generated hopelessness among its readers to the extent that which attributes responsibility to the authorities and users. In another study carried out by Aguilar et al., (2015) found that audiences that follow local news about water leaks are less likely to report irregularities in local and residential supply networks than audiences that follow global news of natural disasters, floods and droughts.

In both studies, the expectations of the quality of the supply service and the rates of the consumption units are indicators that reflect the relationship between authorities and users regarding the public water service (Gomera et al., 2013).

García et al., (2016) warn that users' expectations regarding government decisions and actions in terms of cutting supply and increasing rates reveal power relationships in which both actors are not only immersed, but also condition its possibilities of management and administration of water resources and services.

García et al., (2016) propose that the differences between authorities and users are observed in conflicts and violence, but both are crystallized in the waste of water and late payment of the public water service. This process intensifies as political elections approach (Carreón et al., 2015). That is, the expectations of users in relation to the supply and collection of water services are an instrument for the management and administration of water resources and services in electoral periods, during elections and after the race (Gudynas, 2010).

The objective of this work is to establish the reliability and validity of an instrument that measures the expectations of users regarding the cut in supply and the increase in rates carried out by their local authorities. Given that user expectations are an essential factor in explaining conflicts with the authorities, it is necessary to explain the trajectories of the dependency relationships between the variables used in order to anticipate scenarios of boycotts, seizures and security units. Supply, confrontations with the police, closing of avenues and collective mobilizations.

Therefore, this study proposes a formulation: Do the theoretical relationships relative to the expectations of the users of the drinking water service conform to the measurements of these expectations regarding the quality of the service and the rate system during proselytizing elections in a demarcation of Mexico City?

The answer to this question consists in assuming that the theoretical, conceptual and empirical relationships reviewed in the state of knowledge will be linked to the observations and measurements made in an empirical study with a sample of a locality during an electoral period (Garza et al., 2021). If the theoretical, conceptual and empirical relationships related to user expectations are different from the results obtained, then it will be assumed that the quality of the service and the water service tariff system are different phenomena that belong to dimensions of management and administration without any link with the expectations of the users and therefore far from the anticipation of conflict scenarios.

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## Method

**Design.** An exploratory, cross-sectional and correlational study was carried out.

**Stage.** The study was carried out in the Los Angeles and El Manto neighborhoods, both belonging to the Iztapalapa delegation of Mexico City, in the center of the country of the same name. It is possible to notice that the electoral preference has changed according to the party and the alliances carried out. In the case of the two study demarcations, they have been governed by the Party of the Democratic Revolution (PRD), the Labor Party (PT) and the alliance between the latter two PRD and PT the Alliance Party.

However, the study boundaries were influenced by high abstentionism and null votes in the last local election (34,226 = 5.58%) out of a 1,434,427 electoral roll but with a nominal list of 1,375,852 and a vote of only 613,340 voters (one 44.58% share). The winning candidate only obtained 224,910 votes (36.6% of the total votes cast) followed by the Morena Party candidate with 198,063 votes (32.29% of the total votes cast). In other words, the alliances between the winning parties prevented the party with the highest number of votes from winning the delegation leadership.

**Sample.** A non-probabilistic selection was made of 100 tenants from the colon and La Purisima, Iztapalapa Delegation, Mexico City.

**Instruments.** We used the Scala Employed by Carreon et al., (2015) 14 which includes reagents that measure quality expectations of the service supply and charge system. Each item includes six answer options; 0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = somewhat likely, and 5 = very likely. The instrument includes reagents that measure expectations of possible decisions and actions that users expect with respect to their authorities regarding the quality of the drinking water supply service and the collection of the public service. Unlike other instruments that weigh the opinion of users, their consumption and their ability to pay, the instrument was selected because it measured a possible conflict scenario between authorities and users. The instrument also weights future situations that exacerbate or minimize the user's distrust of the strategies of their authorities.

**Procedure.** The Delphi technique was used, which establishes similarities and differences between the answers to a series of questions related to a specific topic or problem, adjusting the meanings of the words included in each of the items by providing feedback on their interpretations. In the case of the quality of the supply service and the rate system for the volume of consumption observed in the meter and the receipt, the Delphi technique allowed to establish the meanings around the concepts of "subsidy", "forgiveness" and "extemporaneity". The three concepts not only had a different interpretation that had to be adjusted among those who had the lowest income with respect to those who reported the highest income, but their relationship with the expectations of future scenarios was also clarified.

Respondents were informed about the purposes of the study and warned that the results of the study would not affect the quality of the water service in terms of supply, the level of potability and cost. The sample was surveyed in their place of residence and the information was processed in the Statistical Package for Social Sciences (SPSS for its acronym in English version 18,0) and Analysis of Structural Moments (AMOS for its acronym in English version 5.0).

**Analysis.** The descriptive mean and standard deviation were estimated to establish the distribution of the responses to the items and to be able to make the decision for more detailed analyzes (Hernandez et al., 2014). Then, the reliability was calculated with Cronbach's alpha parameter in order to establish the internal consistency of the instrument, or the similarity of results under the assumption of applying the instrument in different contexts and samples. They

estimated the adequacy and sphericity with Bartlett's test and statistical Kayser-Meyer Olkin (KMO) to investigate the relevance of detailed analysis of the structure of the answers to the reagents. Validity was weighted with an exploratory factorial analysis of main axes with promax rotation in order to be able to interpret the configuration of factors or dimensions that the instrument measures with respect to the distinction between supply expectations and service quality expectations. Finally, the adjustment was carried out with the Chi squared parameter and the indices of goodness of fit (GFI), comparative goodness of fit (CFI) and mean square residual (RMSEA) to be able to conclude if there is any relationship between the relationship structure Theoretical between indicators and constructs with respect to the observed and weighted structure of relationships.

## Results

The internal consistency of responses to the items that measure expectations in general (alpha of 0.884), the internal consistency of the responses to the items that measure supply expectations (alpha of 0.881) and the internal consistency of the responses to the items measuring the quality expectations of the public drinking water (alpha 0.884) reached values higher than minimum or required 0.700 and explained 34% and 22% of the total variance explained respectively (see Table 1).

**Table 1. Descriptive reliability and validity of the instrument**

Source: Prepared with the study data; Extraction method: main axes, varimax rotation, exploratory factor analysis. Suitability and sphericity [ $\chi^2 = 324.35$  (214 gl)  $p = 0.000$ ;  $KMO = 0.538$ ].  $M$  = Mean,  $SD$  = Standard deviation,  $F1$  = socio-political objectification of the quality and cost of the water service (34% of the total variance explained),  $F2$  = Anchoring of the quality and cost of the water service (22% of the total variance explained). All items include the same response options: 0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = somewhat likely, 5 = very likely

| R   | Subscale / reactants   | M    | SD   | A     | F1    | F2    |
|-----|--|------|------|-------|-------|-------|
|     | Expectative of supply water free   |      |      | 0.881 |       |       |
| r1  | The State caters ra water tax evaders  | 4,23 | 1.01 | 0.801 | 0.403 |       |
| r2  | S water supply was free for those who promote the elections                  | 4,35 | 1.03 | 0.843 | 0.405 |       |
| r3  | The state subsidizes ra who support him in elections                         | 4,46 | 1.43 | 0.805 | 0.404 |       |
| r4  | The water supply s and restring will who are forgiven their debts            | 4,29 | 1.26 | 0.816 | 0.407 |       |
| r5  | The State increases ra fees to pay taxes                                     | 4,03 | 1.47 | 0.832 | 0.461 |       |
| r6  | The water service s was fair to those who finance political campaigns        | 4,52 | 1.49 | 0.805 | 0.437 |       |
| r7  | The State condones ra payment of the water service to save water             | 4,68 | 1.85 | 0.803 | 0.497 |       |
|     | Expectative of the quality of the service hydric                             |      |      | 0.884 |       |       |
| r8  | Intermittent water supply will occur when paid on time                       | 4.24 | 1.93 | 0.831 |       | 0.415 |
| r9  | The State will supply only those who make the late payment                   | 4.02 | 1.06 | 0.842 |       | 0.482 |
| r10 | The tandeo will be for those who owe the State                               | 4.81 | 1.26 | 0.853 |       | 0.465 |
| r11 | The shipment of water pipes will occur when the State forgives debts         | 4.92 | 1.58 | 0.871 |       | 0.476 |
| r12 | The boycott of water intakes will take place when people have debts          | 4.21 | 1.94 | 0.832 |       | 0.415 |
| r13 | The closure of avenues will be a measure against the increase in water rates | 4.43 | 1.05 | 0.854 |       | 0.406 |
| r14 | Citizen mobilization will emerge after the State forgives debts              | 4.27 | 1.37 | 0.815 |       | 0.417 |

The adequacy and sphericity [ $\chi^2 = 324, 35$  (214 df)  $p = 0.000$ ;  $KMO = 0.538$ ] allowed the exploratory factorial analysis of principal axes with promax rotation. To find and be able to

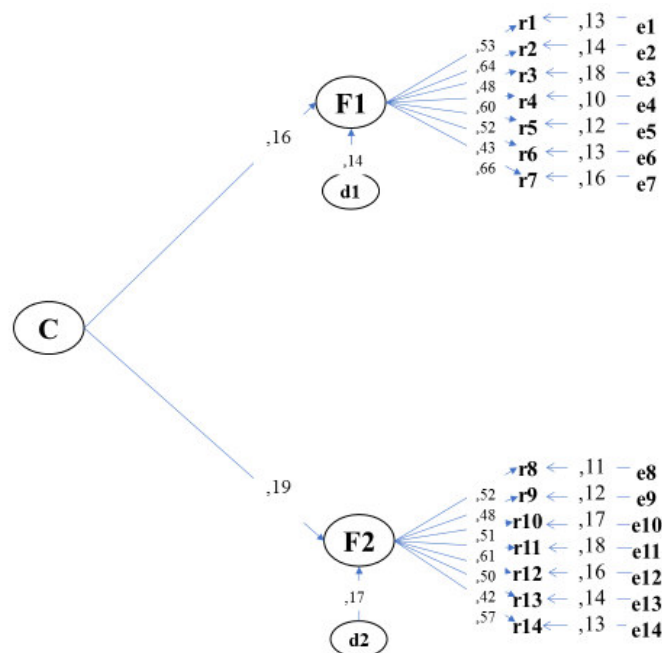
observe their relationships, the association forces between the factors were estimated, as well as the incidence of other factors with respect to the relationship between the factors (see Table 2).

**Table 2. Relations between factors**

Source: Elaborated with data study; M = Mean, SD = Standard deviation, F1 = Socio-political objectification of the quality and cost of the water service, F2 = Anchoring of the quality and cost of the water service, \*  $p < ,01$ ; \*\*  $p < ,001$ ; \*\*\*  $p < ,0001$

|    | M     | SD    | F1      | F2    | F1    | F2    |
|----|-------|-------|---------|-------|-------|-------|
| F1 | 23,21 | 13,21 | 1,000   |       | 1,892 | ,612  |
| F2 | 29,12 | 10,14 | ,328*** | 1,000 |       | 1,932 |

The relationships between the factors reveal that a third common factor of the first order emerges as an explanatory construct of the expectations regarding the water service in the electoral situation of Mexico City. This is so because users expect their authorities to improve public service on the eve of local elections. In order to confirm this hypothesis of expectations of the local service, we proceeded to estimate a model to investigate the axes and trajectories of relationships between factors and indicators (see Figure 2)



**Figure 2. Structural equation modelling**

Source: Elaborated with data study; M = Mean, SD = Standard deviation, F1 = Socio-political objectification of the quality and cost of the water service, F2 = Anchoring of the quality and cost of the water service, r = Reactive, e = Error measurement, d = Disturbance measurement factor, ← relation between error and indicators, → relations between constructs and factors, factor and indicators, disturbance and factors.

In the case of the construct validity established through the calculation of a structural model [ $\chi^2 = 246.34$  (354gl)  $p = 0.000$ ; GFI = 0.970; CFI = 0.990; RMSEA = 0.004] both factors were positively determined by a second-order factor relative to the expectations of users regarding intermittent supply and the increase in rates. In other words, the continuity of the service supply and collection system seems to show that the expectations of the users are limited to the quality and rate of the service. Users not only differentiate both issues, quality and rates,

but also link them to possible consumption scenarios based on the authorities' supply and collection strategies.

## Discussion

Public services such as the drinking water system are essential in a scenario of massive contagion such as the pandemic. In addition to this threat, local elections involving the interests of sectors that support the party in power, or the opposition, generate expectations in the rest of the citizenry regarding the deterioration of local service. In other words, not only expectations are generated about the probable decrease in the quantity of water and the lack of maintenance. In addition, another reason is added, such as the political dispute that suggests the boycott of initiatives to improve the service, as well as the electoral use of the water supply.

Hill et al., (2020) reviewed the quality of drinking water, considering the mitigation strategies of the pandemic where water and its pathogens predict infections through this oral route. In the present work, two factors were established, one of a political nature and the other social to explain 56% of the total variance, being a concern that intensifies as the elections approach and the pandemic worsens.

Kayula (2020) warns that the shortage and shortage, indicators of the quality of the drinking water service, is a consequence of the lack of support from the State for citizens in the face of unemployment. This work shows that the two political and social expectations reveal the synchronization of the health and economic crises. In other words, the elections significantly increase these scenarios.

Switzer et al., (2020) warn that public services, as they remain in force and are connected, imply the exchange of personnel to optimize maintenance to the detriment of service quality, generating expectations of shortages and unhealthy conditions. In the present work, two factors have been established, one that explains the expectations of the quality of the drinking water service in the pandemic and the other one that explains the expectations of the same distribution system in electoral times. The association between the factors led to the emergence of a socio-political expectation.

Lines of study concerning the previous phase, the contest and after the elections will make it possible to measure citizens' expectations about municipal services. From the establishment of differences between the sectors and the electoral phases, it will be possible to anticipate a scenario of conflict between citizens and their local authorities.

## Conclusions

The contribution of this work to the state of knowledge lies in the establishment of the reliability and validity of an instrument that measures two dimensions, supply expectations and collection expectations regarding the quality and rates of water service.

However, the study is limited by its exploratory and non-confirmatory design of the instrument, as well as the non-probabilistic selection of the sample that, during the election season, answered 14 statements that blamed the State for the quality and cost of the water service drinking water supply, supply and supply, as well as its direct responsibility in the increase, subsidy and forgiveness of tariffs and its indirect responsibility in unhealthy conditions, hydro-transmitted diseases and conflicts with defaulting or dissident users of the system.

Thus, supply expectations and collection expectations appear to be a biased diagnosis of supply strategies and their effects on the economy and residential lifestyles. In this vein, the

literature consulted warns that, since it is considered a public good, water is condemned to be sponsored by the State through a system of increasing rates, subsidies, and forgiveness.

If it is considered a common good, water would determine permanent care regardless of quality and cost, since the sole consideration of a common good would influence its respect and care, as occurs with the patrimonies of civil society.

A confirmatory study of principal components with varimax rotation is recommended to confirm the factorial structure of the construct in other samples and study contexts, as well as a probabilistic selection for the elaboration of universal policies around the conservation of water, its optimization, reuse and recycling.

In addition, a comparative study is proposed between user samples in electoral scenarios or free from proselytism and political contest in order to establish the differences between rulers and ruled with respect to the contexts and measurements of heterogeneous constructs.

In the sample and study context, expectations are a construct that explains and anticipates conflict scenarios between local authorities and domestic users regarding the quality and cost of the drinking water service. Expectations of supply and expectations for recovery are two dimensions from which prevailing trend disagreements are observed between political and social actors, expectations and intentions that make up scenarios of war for the management and administration of water resources in its various forms and availabilities.

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