Original Article

Approaches to Reducing the Number of Claims Regarding Drinking Water Provision in Moquegua, 2019

ABSTRACT

In Peru, drinking water is administered by Sanitation Service Providing Entities (EPS by their Spanish initials). Each of these interacts with its users, and various problems and claims have emerged in relation to the service they provide. This quantitative study analyzes the reasons behind the number of claims against EPS Moquegua S.A. The purpose of this research is to determine the required approach to the reduction in claim numbers regarding drinking water provision in Moquegua in 2019. This study is applied, descriptive and explanatory-causal. It has a cross-sectional causal design. Its universe was 22,400 users from Moquegua, while the statistical sample consisted of 378 users. The data collection and research variable measurement instruments were a questionnaire-survey and documentary information from EPS Moquegua. The results obtained and validated through the mean of the sample distribution showed and determined that the appropriate management strategies that favorably influence the reduction in the number of complaints are: "Equipment and support" and the "Perception study", a tool that reflects the customers' perceptions of the service. The study results show that 66.5% of claims is due to measurement errors. From the moment they were first implemented, management strategies improved the service and the number of claims decreased from 3,074 to 2,955 in 2019.

Keywords: approaches; management; reduction; claims; drinking water.

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INTRODUCTION

In Peru, drinking water is administered by Sanitation Service Providing Entities (EPS by their Spanish initials). Each of these interacts with its users, and various problems and claims have emerged in relation to the service they provide. The number of claims against EPS indicator shows the following distribution: EPS Chavín (106 yearly claims per every thousand connections), EMAPA Cañete S.A. (123 claims), EMSAPUNO S.A. (61 claims), EPS Barranca S.A. (82 claims), EPS Tacna (215 claims). In addition, it can be noted that EPS Moquegua has a large number of claims (265) (Superintendencia Nacional de Servicios de Saneamiento [SUNASS], 2018). Resolution of claims against EPS is carried out under the regulations of the regulatory sanitation entity (Resolución CD 066-2006-SUNASS, 2006).

This research analyzes the reasons behind the considerable number of claims against EPS Moquegua and addresses its reduction through adequate plans. To this end, data on the supply of drinking water, commercial process of the service, attention to claims, and user perception (lack of a perception study in the supplier entity). "Addressing the problems giving way to claims leads to two important results: it increases customer satisfaction and allows companies to improve their processes" (Flores, 2019, pp. 23-27). Adequate management of claims is considered important because it contributes to the "optimal use of the scarce resource water" (United Nations for Education, Science and Culture [UNESCO] 2003, p. 8). Optimal production of a good or service requires adequate resource management and "also of strategies and efficient management of the processes and information to meet the clients' technical specifications" (Evans and Lindsay, 2008, p. 15).

In the process of this research, the problem that has been identified in relation to variable solution to claims is formulated as follows: How do management strategies related to equipment and perception study influence the reduction in the number of claims regarding the supply of drinking water in Moquegua, 2019?

The aim of this research is to determine management strategies (approaches to equipment, support, and perception study) influencing the reduction in the number of claims regarding the supply of drinking water in Moquegua, 2019.

METHOD

This research was quantitative (it obtained and analyzed data), of the applied type, with a descriptive and explanatory scope, and cross-sectional causal design. The general hypothesis is the following: "If management strategies influence the solution of claims, then the number of claims regarding the supply of drinking water in Moquegua 2019 will decrease".

Subsequently, the research variables, sub-variables and indicators were defined. The independent variable is "Management strategies" and the dependent variable is "Reduction in the number of claims regarding the drinking water supply in Moquegua, 2019".

The sub-variables or components are the following:

- **Management sub-variables**

  - Equipment and support in the Micro-metering, Invoicing and User Registry departments (indicator: implementation rate).

  - Study on customers' opinions on the service (indicator: implementation rate).

- **Reduction in claims sub-variables or components**

  - Number of claims (indicator: number of claims per year).

  - Users' opinion on supply (indicator: customers' opinions and expectations rate)

With the independent variable (X) and the dependent variable (Y), the research design was selected: cross-sectional and causal (X influences Y); then, the effect is dependent on the cause. Similarly, X1 influences Y1 (research based on documentary sources), and X2 influences Y2. Therefore, a plan was created to "test the relationship between variables or claims" (Córdova, 2003, p. 432).

Using Hernández *et al.* (2014) as a reference, the universe was the 22,400 customers of potable water from Moquegua in 2019. The sample consisted of 378 customers; this statistical sample was probabilistic and has a reliability score of 95%. The data collection instrument and variable measurement was a questionnaire, which was administered during the survey carried out with the sample and processed on SPSS, generating tables and statistical graphs. Then, the survey results and the documentary data were analyzed, and the management strategies for the reduction in claim numbers were determined, in accordance with the hypothesis testing.

RESULTS

Analysis of results in relation to the variable "Equipment strategy" and its influence on variable "Number of claims"

The number of claims in EPS Moquegua from 2016 to 2019 evolved as follows: 2,078 claims were made in 2016; this number rose to 2,814 in 2017—a rise of 35% which is considered high. In 2018, a total of 3,074 claims were filed, meaning an increase of 9%. In 2019, a total of 2,955 claims were filed, meaning a reduction of 4%. This trend is explained by the initial investment in the renovation of 4,000 water meters installed at the water service lines of homes.

The reasons for claims against EPS Moquegua in 2019 were the following: "measured consumption" with 1,906 claims; "pre-determined consumption", 424 claims; "items charged", 267 claims; "applied rate", 242 claims; "average consumption", 60 claims; "inaccurately timed charges", 42 claims; "excess of MAVs", 10 claims; and "wrong location of water service lines", 4 claims. As can be noted, the most common reason for claims in 2019 was "measured consumption", with a total of 64.5% of claims, referring to the mistakes in the monthly volume (in cubic meters) recorded in the metering equipment installed at each water service lines. The readings are performed by field operations personnel from the Micrometering department. The second reason is "pre-determined consumption", which constitutes 14.4% of claims, meaning that there are mistakes in the pre-determined user consumption rates. The third reason is "items charged", with 9.0% of all claims,

related to disagreements with the rate breakdown. The fourth reason is the "applied rate", with 8.2% of all claims, related to errors in the allocation of a rate for user consumption. It is followed by "average consumption", with 2.0% of all claims, related to the average consumption considered. The next reason is "inaccurately timed charges", which constitutes 1.4% of claims, related to mistakes in the measuring periods, followed by "excess of MAVs" with 0.3%, related to sewage contamination above admissible levels. Finally, "wrong location of water service lines" had 0.1% of claims, related to wrong charges for a water main that does not belong to the household. The structure of the reasons behind claims from 2019 was validated through historical information from 2017 and 2018, where the "measured consumption" (52.3% and 72.4% respectively) with the largest percentage can be viewed. This behavior, which continued for three consecutive years, needs to be addressed by the service provider.

Subsequently, claims from 2019 were grouped according to the area where the mistakes or faults occur, enabling a cluster-level analysis, with the results being as follows: the Micrometering department is responsible for most mistakes or faults, with 66.5% (64.5% for measured consumption and 2% for average consumption) of the total number of claims, which result in instances of non-compliance and then claims. The Invoicing department is placed second with 24.3%, followed by the User Registry department with 9.2%

Once the reasons behind claims were grouped by department in charge, the weaknesses of each department involved in the resolution of claims were identified. The Micrometering department evidenced errors in the recording of consumption from meters, obsolete micrometering equipment, and deficiencies in the water service lines-deep connections. In the Invoicing department, deficiencies were identified in the sales software, lack of computer equipment, typing errors, and lack of staff training. In the User Registry department, it was noted that users' information was outdated.

The necessary and adequate strategies for claim resolution or service improvement in

each weakness identified for the reduction in claim numbers are the following:

- **Micrometering Department**

  - Implementing a stable visual evaluation plan for field operators.

  - Changing 12,565 water meters.

  - Raising or properly installing 403 deep water service lines.

  - Providing periodical maintenance to 20,160 potable water service lines.

- **Invoicing Department**

  - Updating sales software.

  - Purchasing a server, three scanners, and three ticket printers.

  - Developing a software application for keeping employees' personal files up to date.

  - Training four employees in invoicing.

- **User Registry Department**

  - Updating the registry which includes the 22,400 users (2019).

Regarding the claim number reduction achievement, it is noted that the initial execution of the equipment strategy (renovation of 4,000 water meters) evidences the reduction in the number of claims from 3,074 to 2,955 in 2019. Its comprehensive execution, especially in the Micrometering department, has been crucial for the reduction in the number of claims. A strong causal relationship between variables "equipment and support" and "number of claims" is shown, thereby accepting hypothesis 1 from this study.

For the comprehensive implementation of the adequate and necessary strategies of "equipment and support", the budget has been estimated to be PEN 1,967,050 for 2019.

Analysis of results in relation to variable "Perception study" and its influence on variable "Knowledge of customers' opinions"

A perception study contributes to reducing the number of claims because access to clients' information can help lead the company. To this end, a perception study was implemented involving a sample of 378 users (universe: 22,400 users). The perception study achievements were the following: firstly, users were asked about the first aspect EPS Moquegua should improve: 28% of the sample responded "attention to claims"; 19% answered "continuity and supply"; and 15% chose "adequate information". The three above-mentioned aspects constitute the expectations of 62% of users.

Similarly, to examine "continuity and supply", the perception study gathered data on the hours of drinking water supply for each customer. The results were as follows: 4% of the sample stated that their water supply lasted 5 hours a day; 21% stated that their supply lasted from 6 to 14 hours a day; and 59% stated that their supply lasted from 20 to 24 hours a day. It can be argued that claims also come from users whose water supply only lasted a few hours.

In general terms, the perception study became a crucial tool to learn users' perceptions or expectations for management and continuous improvement. It is noted that 62% of users stated that "attention to claims", "continuity and supply" and "adequate information" should be prioritized, thereby confirming research hypothesis 2. The budget for performing the perception study was PEN 3,934.

The global budget estimated for implementing the management strategies was PEN 1,970,984 for the year 2019.

DISCUSSION

A literature review was carried out in relation to the problem of claims regarding the drinking water service, and the following is concluded: "There is a significant number of studies in the cities of Arequipa, Cusco and Lima on customer satisfaction with the supply of drinking water" (Pastor, 2014, p. 62). What could not be found was a study on claims, a problem that involves human, material resources, and equipment in the service providers. The contribution made by this pioneering research study is that it could guide other drinking water supply companies from Peru for the benefit of sustainability.

When reviewing the trends in the number of claims against EPS Moquegua in 2019, a decrease is noted in the number of claims: from 3,074 in 2018 to 2,955 in 2019. A key factor in this result was the initial execution of the equipment strategy (renovation of 4,000 water meters in 2018), improving the measuring process in terms of claim number reduction. It is evidenced that the "equipment strategy" has a favorable influence on the "reduction in the number of claims", accepting research hypothesis 1.

Management strategies comprising the "equipment and support" and "perception study" strategies have an adequate influence on the reduction in the number of claims, confirming the general research hypothesis (in accordance with hypothesis testing) that EPS Moquegua should execute them as a whole, in order to provide proper service to users.

Hypothesis Testing: Management Strategies / Reduction in Number of Claims

- *General Hypothesis*

  - HG: "If management strategies influence claim resolution, then the number of claims regarding the drinking water supply will decrease in Moquegua, 2019".

  - H0: "If management strategies influence claim resolution, then the number of claims regarding the drinking water supply WILL NOT decrease in Moquegua, 2019".

  - Hypothesis HG = μ over 70%

    "$H_0 = \mu <= 70\%$"

  - Statistic. "N. significance: $\alpha = 0.05$" then ..C = 1- 0.05= 0.95 where (p < 0.05)

    Consequently Zestad=1.64;

    n=378, X̄= 0.78 where σ or S = 0.42 and

    Zcalc= X̄-μ/s/ $\sqrt{n}$ results "Zcalc= (0.78-0.70)0.42/19= 3.70"

  - Decision. As $Z_{calculated}$ is larger than $Z_{statistic}$ and as such is found in the rejection region. Determination is H0 rejection

"the general hypothesis HG is confirmed".

- **Specific Hypotheses:**

- **Hypothesis 1**

  - H1: "If the equipment and support strategy is executed in the Micrometering, Invoicing and User Registry departments, then the number of claims regarding drinking water supply will reduce in Moquegua, 2019".

  - H0: "If the equipment and support strategy is executed in the Micrometering, Invoicing and User Registry departments, then the number of claims regarding drinking water supply WILL NOT reduce in Moquegua, 2019". In this case, samples from 2019 claims (documentary source) were gathered, with the sample being 249 claims. In each case, the claim dossier has been studied, determining if the claim resolution required equipment and support.

  - Hypothesis H1 = μ greater than 75%

    "H0 = $\mu <= 75\%$"

  - Statistic. "N. Significance: $\alpha = 0.05$" y C = 1- 0.05= 0.95 consequently

    Zestad=1.64;

    n=249, X̄=0.83 where σ or S =0.34 and

    Zcalc= X̄-μ/s/ $\sqrt{n}$ results in "Zcalc=(0.83-0.75)/0.34/16 = 3.54"

  - Decision. As $Z_{calculated}$ is greater than $Z_{statistic}$, it is therefore in the rejection region. Determination is H0 rejection - "hypothesis H1 is confirmed".

- **Hypothesis 2**

  - H2: "If a perception study involving drinking water users from Moquegua is performed yearly, then we will learn the users' perceptions on the service and claim resolution regarding the drinking water supply service in Moquegua, 2019".

- H2: "If a perception study involving drinking water users from Moquegua is performed yearly, then we NOT be able to learn the users' perceptions on the service and claim resolution regarding the drinking water supply service in Moquegua, 2019".

- <u>Hypothesis</u> H2 = μ greater than 55% and "H0 = μ <= 55%"

- <u>Statistic.</u> "N. significance: α = 0.05" and C = 1- 0.05= 0.95 consequently Zestad=1.64; n=378, X̄=0.63 where σ or S =0.48 and

  Zcalc= X̄-μ/s/ √n resulting in "Zcalc = (0.63-0.55)/0.48/19 = 3.24"

- <u>Decision.</u> As $Z_{calculated}$ is greater than $Z_{statistic}$, it is therefore in the rejection region. Determination is H0 rejection - "hypothesis H2 is confirmed".

CONCLUSIONS

In this paper, through a quantitative analysis, evidence is shown of the influence of management strategies on the reduction in the number of claims at a significance level of 0.05 where (p < 0.05), namely the "equipment and support" strategy and "perception study" strategy. It was found that management strategies favorably influence the reduction in the number of claims regarding the supply of drinking water.

It is shown that EPS Moquegua has a substantial number of claims mainly concerning the Micrometering department (66.5%). To change this situation, the execution of the "necessary equipment and support strategies" has been advised. The effect is that variable "equipment and support" favorably influences the reduction in the number of claims. It is concluded that there is certainty about the strong causal relationship between variables "equipment and support" and "change in number of claims".

The perception study on the drinking water service and claim resolution is a strategy that makes it possible to learn user perception and expectations, because 62% of users stated that "attention to claims", "continuity and supply" and "appropriate information" should be prioritized for the correct management of the company. It was determined that research on user perception is crucial and contributes adequately to reducing the number of claims regarding the supply of drinking water.

The contribution of this research, with the management strategies established and specified, is how to approach claims in a municipal entity tasked with supplying drinking water, apart from reducing or solving problems.

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Competing interests

The author declares that there is no conflict of interest.

Authors' Contribution

Angélica Lizarme Rivas (lead author): Conceptualization, data curation, formal analysis, research, methodology, project administration, validation, visualization, writing (original, revision and edition).