# Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)

**Nur'irni Nahri Sakinah[1], Fuad Achmadi[2], Renny Septiari[3]**

[1]Master of Industrial Engineering Program, National Institute of Technology Malang, Jl. Sigura - Gura No.2, Sumbersari, Kec. Lowokwaru, Malang City, East Java 65152, Indonesia

[2,3] Master of Industrial Engineering Program, National Institute of Technology Malang, Jl. Sigura - Gura No.2, Sumbersari, Kec. Lowokwaru, Malang City, East Java 65152, Indonesia

**ABSTRACT:** PDAM Kab.Banggai is a service company that has the aim of meeting the needs in the field of clean water must provide the best service. The purpose of this research is to analyze service quality based on customer satisfaction and find out the factors that affect service quality to get a solution to the causes of problems based on service quality. This research will use the servqual method to measure service quality with the level of perceptions and expectations of consumers in the services provided by service providers. Furthermore, the *Importance Performance Analysis* (IPA) method is used in measuring the level of importance and performance so that the company can find out the attributes that need to be improved and maintained in service based on a Cartesian diagram and will produce a basis for customer satisfaction. After that, the Fishbone Diagram is used to analyze the consequences by finding and describing the factors that cause the existing problems. Then given the proposed improvements and submitted PDAM to be followed up by PDAM Kab.Banggai. The results of the Service Quality analysis of the quality of service of PDAM Kab. Banggai obtained a negative Gap in the Reliability dimension at attribute B5 (-1.200), in the Responsiveness dimension obtained a negative Gap at attribute C1 (-1.140), at attribute C2 with a negative Gap (- 1.120) and in the Assurance dimension with a negative Gap (-0.560). The results of the analysis using Importance Performance Analysis obtained 4 attributes that are among the top priorities for improvement, namely the attributes contained in quadrant I. The four attributes that are the top priorities for improvement are the ease with which customers can submit complaints online to the PDAM, employees are responsive when answering complaints from customers through online media such as whatsapp, officers contact customers when they cannot fulfill the specified repair promise and the use of PDAM services Kab. Banggai is guaranteed to be safe when making payment transactions. The proposed improvements given to PDAM Kab. Banggai are Attribute D2, namely conducting a re- check before making payment bills to customers, collaborating with third parties such as banks and outlets (indomaret, alfamidi, etc.) and making payment applications directly linked to PDAM accounts so that there is no manipulation during the payment process. Attribute C2 is instilling a sense of responsibility in officers and openness to customers to contact customers as soon as possible if something happens or cannot fulfill the specified repair promise, the need to make SOPs so that they have standard provisions for contacting customers if they cannot fulfill repair promises and provide facilities to contact customers. Attribute C1, namely recruiting Customer Service and implementing a 24-hour work shift system to be available if there are complaints via messages or calls, implementing online complaint services for 24 hours to be responsive to answering customer complaints and providing social media accounts that are always updated to provide information about PDAM and responsive when there are complaints from customers online. Attribute B5, namely implementing a work shift system for officers who are available when there are complaints via messages or calls, implementing online complaint services through social media and providing media for customers to submit complaints online such as providing PDAM contact numbers that are always active 24 hours. For further research, it is hoped that it will be able to research to implement the proposed improvements provided and analyze the quality of service after implementing the proposed improvements provided by the author so that the effectiveness of the services that have been implemented can be known.

**KEYWORDS**: PDAM Kab.Banggai, customer satisfaction, service quality, Service Quality (SERVQUAL), Importance Performance Analysis (IPA), Fishbone Diagram

## 1. INTRODUCTION

Water is one of the most important health elements for all life on earth. In modern life, water has a major role as a measure of environmental balance, and people need water everywhere, such as in agriculture, business, households, health to industrial processing needs so that the function of water is not only limited to carrying out economic functions but also social functions. The social and economic functions that water has in order to fulfill daily needs are important things that must be considered because along with the increasing population, the need for water will inevitably increase (Syah, 2019).

The need for clean water is essential for survival. Therefore, the central government through local governments formed an agency called PDAM with the aim of exploring regional resources, especially drinking water, which can contribute to the region. As a service company, PDAM is not only able to generate revenue, but also provide the best service to customers (Priyanka et al.,

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

2022).

One of the service companies in the Central Sulawesi region that provides the benefits of water resources is PDAM Banggai Regency. As one of the public services that has the aim of meeting the needs in the field of clean water, it is obliged to provide the best service. Public services provided by the government are assessed by the quality of service to the user community. The government provides services so that users can enjoy the services provided. The number of complaints that have arisen from the community about PDAM Banggai Regency services is to see how the level of service provided to the community on service quality and customer satisfaction. It aims to create a good image in the eyes of the community because if there is no improvement in terms of service quality, customer satisfaction will continue to decline and the number of consumer complaints about PDAM performance in terms of service quality will be higher (Bakhtiar, 2010). The Regional Drinking Water Company (PDAM) was formed with the aim of meeting the needs of the people who are PDAM customers.

The gaps that occur in the Banggai Regency PDAM make the author interested in conducting further research to analyze the quality of service of the Banggai Regency PDAM. This research will use the *servqual* method. The *servqual* method is a method for measuring service quality with the level of perceptions and expectations of consumers in the services provided by service providers. Then it will be continued with the *Importance Performance Analysis* (IPA) method which will be used in measuring the level of importance and performance so that the company can find out the attributes that need to be improved and maintained in service based on the Cartesian diagram and will produce a basis for customer satisfaction. Furthermore, the *Fishbone Diagram* will be used to analyze the consequences by finding and describing the factors that cause the existing problems.

## 2. RESEARCH METHODS

The research conducted is classified as a type of quantitative research. Quantitative research method is a process of finding knowledge that uses data in the form of numbers as a tool to analyze information about what you want to know. (Djollong, 2019). Researchers aim to analyze the quality of public services at PDAM Banggai Regency. In measuring reality and expectations in public services, the *Servqual* scale is used which includes five dimensions of service quality, namely *Tangibles, Reliabillity, Responsiveness, Assurance* and *Empathy*. This research will be conducted at the Regional Drinking Water Company of Banggai Regency, Central Sulawesi Province. Respondents of this study were consumers of PDAM Kab. Banggai. The independent variable in this study is service quality, while the dependent variable in this study is customer satisfaction. The population determined in this study was the community of PDAM service users in Banggai Regency and the sample used was 100 samples.

In this study, the instrument used was a questionnaire. A questionnaire is a tool used in research that contains several questions used to obtain information from respondents in terms of their personal and things that respondents know (Arikunto, 2006). The questionnaire will be distributed to customers of PDAM Kab. Banggai. The questionnaire contains questions about the quality of PDAM services that must be answered by respondents in accordance with what happened during the research. The questionnaire in this study uses the Likert scale measurement method.

Data collection techniques in this study by taking samples from the population using a questionnaire. Data analysis conducted in this study is quantitative data analysis. Quantitative data analysis is carried out with several steps, namely validity and reliability tests. Analysis of service quality in this study using data derived from the results of the questionnaire will be processed using the *Service Quality* and *Importance Performance Analysis* methods.

## 3. RESULTS AND DISCUSSION

### 3.1 Research Instrument Test

#### 3.1.1 Validity test

An instrument can be measured for validity using the validity test. The validity test criteria are if r-count > r-table (with a significance of 0.05) then the questions on the instrument are declared valid. Conversely, if r-count < r-table (with a significance of 0.05) then the question items on the instrument are declared invalid. (Engkus, 2019). Calculation of the validity test in this study using SPSS *(Statistical Program for Social Science)*. In the calculation of the validity test there is an r-table which is a table of numbers that is useful in the results of the validity test of a research instrument. The r-table is used to read and determine the value of the r-table with df = n-2 = 98 significance 0.05 so that the r-table value = 0.1966 is obtained. (IPB University, 2023). In this study there are service quality variables consisting of 5 dimensions. The following are the results of the validity test of each dimension:

### a. Tangible

**Table 1. Tangible dimension validity test results**

| No. | Statement | r Count Hope (A) | r Count Reality (AA) | r Table | Conclusion |
|---|---|---|---|---|---|
| 1. | I think the location of administrative services is built in such a way that customers feel comfortable | 0,898 | 0,801 | 0,1966 | Valid |
| 2. | Well- groomed employees | 0,861 | 0,774 | 0,1966 | Valid |

| 3. | Materials used to explain customer needs are clear and organized | 0,860 | 0,808 | 0,1966 | Valid |
|----|---|---|---|---|---|

**Source: SPSS 23 Data Processing**

Based on Table 2 shows that the 3 statement items of the *Tangible* dimension based on expectations are declared valid because the value of r count> r table, namely A.1 (0.898>0.196), A.2 (0.861>0.196) and A.3 (0.860>0.196). While based on reality, namely AA.1(0.801>0.196), AA.2 (0.774>0.196) and AA.3 (0.808>0.196).

**b. Reliabillity**

**Table 2. Results of the validity test of *theRelliability* dimension**

| No. | Statement | r Count Hope (B) | r CountReality (BB) | r Table | Conclusion |
|---|---|---|---|---|---|
| 1. | Service inserving customer complaints (murky water, non-flowing water, andleaking pipes) in accordance with the promises written in the establish regulations | 0,931 | 0,854 | 0,1966 | Valid |
| 2. | Employees are able tosolve problems (cloudy water, non-flowing water, leaking pipes)that customers complain about | 0,962 | 0,808 | 0,1966 | Valid |
| 3. | Employees deliver services clearly at thetime of initial PDAM installation | 0,928 | 0,852 | 0,1966 | Valid |
| 4. | Employees communicate that services aredelivered inthe time promised | 0,950 | 0,856 | 0,1966 | Valid |
| 5. | Ease of customers submitting online complaints to the PDAM | 0,875 | 0,725 | 0,1966 | Valid |

**Source: SPSS 23 Data Processing**

Based on Table 3 shows that the 5 statement items of the *Responsiveness* dimension based on expectations are declared valid because the value of r count> r table, namely C.1 (0.888>0.196), C.2 (0.942>0.196), C.3 (0.937>0.196), C.4 (0.916>0.196), and C.5 (0.911>0.196). While based on reality, namely CC.1(0.774>0.196),CC.2 (0.819>0.196), CC.3 (0.875>0.196), CC.4 (0.824>0.196) andCC.5 (0.824>0.196).

**c. Responsiveness**

**Table 3. Responsiveness dimension validity test results**

| No. | Statement | r Count Hope (C) | r CountReality (CC) | r Table | Conclusion |
|---|---|---|---|---|---|
| 1. | Employees arequick to respond when answering complaints from customers through onlinemedia such as whatsapp | 0,888 | 0,774 | 0,1966 | Valid |
| 2. | Officers contact customers when they areunable to fulfill the specified repair appointment | 0,942 | 0,819 | 0,1966 | Valid |
| 3. | PDAM resolves customer complaints correctly and quickly | 0,937 | 0,875 | 0,1966 | Valid |
| 4. | Employees are willing to help customer complaints based on procedures | 0,916 | 0,824 | 0,1966 | Valid |
| 5. | Responsiveness of employees in providing services tocustomer requests | 0,911 | 0,824 | 0,1966 | Valid |

**Source: SPSS 23 Data Processing**

Based on Table 2 shows that the 5 statement items of the *Relliability* dimension based on expectations are declared valid because the value of r count> r table, namely  B.1  (0.931>0.196),  B.2  (0.962>0.196),  B.3
(0.928>0.196),     B.4     (0.950>0.196),      and     B.5
(0.875>0.196). While based on reality, namely BB.1(0.854>0.196),      BB.2     (0.808>0.196),      BB.3
(0.852>0.196),    BB.4    (0.856>0.196)    and    BB.5
(0.725>0.196).

**d.  Assurance**

**Table 4. Assurance dimension validity test results**

| No. | Statement | r CountHope (D) | r Count Reality (DD) | r Table | Conclusion |
|---|---|---|---|---|---|
| 1. | Employees foster trust from customers in handling complaints (non- flowing water, cloudy water, leaking  pipes) | 0,915 | 0,720 | 0,1966 | Valid |
| 2. | The use of PDAM Kab. Banggai services is guaranteed to be safe when making payment transactions | 0,953 | 0,703 | 0,1966 | Valid |
| 3. | Employees have good knowledge of the service so that they can answer customer questions | 0,946 | 0,755 | 0,1966 | Valid |

**Source: SPSS 23 Data Processing**

Based on Table 4 shows that 3 statement items of the *Assurance* dimension based on expectations are declared valid because the value of r count> r table, namely D.1 (0.915>0.196), D.2 (0.953>0.196) and D.3
(0.946>0.196). Meanwhile, based on reality, namely DD.1  (0.720>0.196),  DD.2  (0.703>0.196)  and  DD.3
(0.755>0.196).

**e.     Empathy**

**Table 5. Empathy dimension validity test results**

| No. | Statement | r CountHope (E) | r Count Reality (EE) | r Table | Conclusion |
|---|---|---|---|---|---|
| 1. | Employees give full attention regarding service to customers | 0,954 | 0,876 | 0,1966 | Valid |
| 2. | Employees are very concerned about the interests of customers | 0,958 | 0,870 | 0,1966 | Valid |
| 3. | Employees understand the  special needs of customers in the payment process | 0,967 | 0,853 | 0,1966 | Valid |
| 4. | Employees provide  services  in  accordance with office hours so as to make customers comfortable | 0,951 | 0,775 | 0,1966 | Valid |

**Source: SPSS 23 Data Processing**

Based on Table 5 shows that the 5 statement items of the *Responsiveness* dimension based on expectations are declared valid because the value of r count> r table, namely  E.1  (0.954>0.196),  E.2  (0.958>0.196),  E.3
(0.967>0.196) and E.4 (0.951>0.196). While based on reality,  namely EE.1 (0.876>0.196), EE.2 (0.870>0.196),       EE.3
(0.853>0.196)    and    EE.4
(0.775>0.196).

**3.1.2   Reliability Test**
Reliability test is a measurement that shows that the extent to which the results of a measurement can be trusted. Reliability refers to the level of reliability of something. *Reliable* means trustworthy, so another word is reliable. (Situmorang & Purba, 2019). Reliability will be measured using the *Cronbach Alpha* Technique. The questionnaire is said to be reliable if *Alpha* Cronbach> 0.60 and cannot be declared reliable if it is equal to 60 or <0.60 (Sunyoto, 2013).

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

**a. Tangible**

**Table 6. Tangible dimension reliability test results**

| Dimensions | Cronbach's item Alpha | Cronbach's Alpha | Conclusion |
|---|---|---|---|
| Tangible Expectations (A) | 0,6 | 0,939 | Reliable |
| Tangible Reality (AA) | 0,6 | 0,895 | Reliable |

**Source: SPSS 23 Data Processing**

The results of the reliability test on the *Tangible* Expectation (A) dimension have a *Cronbach's Alpha* value (0.939) and *Tangible* Reality (AA) has a *Cronbach's Alpha* value (0.895) declared reliable because it is greater than 0.6.

**b. Reliability**

**Table 7. Reliability test results of the Reliability dimension**

| Dimensions | *Cronbach's item Alpha* | *Cronbach's Alpha* | Conclusion |
|---|---|---|---|
| Reliability Expectation (B) | 0,6 | 0,975 | *Reliable* |
| Reliability Reality (BB) | 0,6 | 0,931 | *Reliable* |

**Source: SPSS 23 Data Processing**

The results of the reliability test on the *Reliability* Expectation (B) dimension have a *Cronbach's Alpha* value (0.975) and *Reliability* Reality (BB) has a *Cronbach's Alpha* value (0.931) declared reliable because it is greater than 0.6.

**c. Responsiveness**

**Table 8. Responsiveness dimension reliability test results**

| Dimensions | *Cronbach's item Alpha* | *Cronbach's Alpha* | Conclusion |
|---|---|---|---|
| *Responsiveness* Expectations (C) | 0,6 | 0,972 | *Reliable* |
| *Responsiveness* Reality (CC) | 0,6 | 0,933 | *Reliable* |

**Source: SPSS 23 Data Processing**

The results of the reliability test on the Expected *Responsiveness* dimension (C) have a *Cronbach's Alpha* value (0.972) and Reality *Responsiveness* (CC) has a *Cronbach's Alpha* value (0.933) declared reliable because it is greater than 0.6.

**d. Assurance**

**Table 9. Assurance dimension reliability test results**

| Dimensions | *Cronbach's item Alpha* | *Cronbach's Alpha* | Conclusion |
|---|---|---|---|
| *Assurance* Expectation (D) | 0,6 | 0,971 | *Reliable* |
| *Assurance* Reality (DD) | 0,6 | 0,853 | *Reliable* |

**Source: SPSS 23 Data Processing**

The results of the reliability test on the *Assurance* Expectation (D) dimension have a *Cronbach's Alpha* value (0.971) and *Assurance* Reality (DD) has a *Cronbach's Alpha* value (0.853) declared reliable because it is greater than 0.6

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

e.     **Empathy**

**Table 10. Empathy dimension reliability test results**

| Dimensions | Cronbach's item Alpha | Cronbach's Alpha | Conclusion |
|---|---|---|---|
| *Empathy* Expectation(E) | 0,6 | 0,983 | *Reliable* |
| *Empathy* Reality(EE) | 0,6 | 0,933 | *Reliable* |

**Source: SPSS 23 Data Processing**

The results of the reliability test on the *Empathy* Expectation (E) dimension have a *Cronbach's Alpha* value (0.983) and *Empathy* Reality (EE) has a *Cronbach's Alpha* value (0.933) declared reliable because it is greater than 0.6.

**3.2      Service Quality Analysis**

Calculation of service quality using the *Servqual* method is done by looking at the performance level and the level of expectations. *Gap* value is the calculation of the reduction in the value of the perception of the service with the expected value desired by the customer. The *Service Quality* value is obtained from the calculation of each attribute using the formula. The following are the results of the calculation of the *Gap* value and Service Quality of each attribute:

**Table 11. Service Quality of each dimension**

| No. | Statement | Reality | Hope | GAP | Service Quality(Q) |
|---|---|---|---|---|---|
| | *Tangible* | | | | |
| 1 | I think the location of administrative services is built in such a way that customers feel comfortable (A1) | 3,990 | 3,100 | 0,890 | 0,777 |
| 2 | Employees are well-groomed (A2) | 3,930 | 3,460 | 0,470 | 1,136 |
| 3 | The material used to explain customer needs is clear and organized (A3) | 3,860 | 3,100 | 0,760 | 1,245 |
| | *Reliability* | | | | |
| 1 | Service in serving customer complaints (murky water, non-flowing water, and leaking pipes) in accordance with the promises written in the regulations that have been set (B1) | 3,950 | 2,760 | 1,190 | 1,431 |
| 2 | Employees are able to solve problems (cloudy water, non- flowing water, leaking pipes) that customers complain about (B2) | 4,020 | 2,980 | 1,040 | 1,349 |
| 3 | Employees convey services clearly at the beginning of PDAM installation (B3) | 3,970 | 3,240 | 0,730 | 1,225 |
| 4 | Employees convey that the service is in accordance with the promised time (B4) | 3,990 | 2,980 | 1,010 | 1,339 |
| 5 | Ease of customers submitting complaints online to the PDAM (B5) | 2,670 | 3,870 | - 1,200 | 0,690 |
| | *Responsiveness* | | | | |
| 1 | Employees are quick to respond when answering complaints from customers through online media such as whatsapp (C1) | 2,780 | 3,920 | -1,140 | 0,709 |
| 2 | Officers contact customers when unable to fulfill the specified repair appointment (C2) | 2,750 | 3,890 | -1,120 | 0,707 |
| 3 | PDAM resolves customer complaints correctly and quickly (C3) | 3,890 | 2,780 | 1,110 | 1,399 |
| 4 | Employees are willing to help customer complaints based on procedures (C4) | 3,840 | 3,010 | 0,830 | 1,276 |
| 5 | Employee responsiveness in providing services to customer requests (C5) | 3,860 | 3,010 | 0,850 | 1,282 |

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

| | *Assurance* | | | | |
|---|---|---|---|---|---|
| 1 | Employees foster trust from customers in handling complaints (non-flowing water, cloudy water, Leaking pipes) (D1) | 3,820 | 2,890 | 0,930 | 1,322 |
| 2 | The use of PDAM Kab. Banggai services is guaranteed to be safe when making payment transactions (D2) | 3,380 | 3,940 | - 0,560 | 0,858 |
| 3 | Employees have good knowledge of the service so that they can answer customer questions (D3) | 3,940 | 3,300 | 0,640 | 1,194 |
| | *Empathy* | | | | |
| 1 | Employees give full attention regarding service to customers (E1) | 3,900 | 3,140 | 0,760 | 1,242 |
| 2 | Employees are very concerned about the interests of customers (E2) | 3,880 | 3,100 | 0,780 | 1,252 |
| 3 | Employees understand the special needs of customers in the payment process (E3) | 3,840 | 3,060 | 0,780 | 1,255 |
| 4 | Employees provide services in accordance with office hours so as to make customers comfortable (E4) | 3,950 | 3,400 | 0,550 | 1,162 |

**Source: SPSS 23 data processing**

Based on Table 12 shows that there are several statement attributes that have negative *Gap* values such as attribute B5 worth (-1,200), attribute C1 worth (-1,140), C2 worth (-1,120) and D2 worth (-0,560). So it can be seen that the negative *Gap* value is still found in

4 *Servqual* dimensions, namely in the dimensions of *Tangible*, *Reliability, Responsiveness* and *Assurance.* Meanwhile, the dimension that does not have a negative *Gap* value is the *Empathy* dimension, which means that the performance of PDAM Kab. Banggai in the *Empathy* dimension has exceeded customer expectations. The lowest negative *gap* value is in the *Assurance* dimension at attribute D2 with a value of (-0.560) while the highest negative *gap* value is in the *Responsiveness* dimension at attribute C1 with a value of (-1.140). This shows that there is a mismatch between the priorities submitted by customers and the quality of service provided by the company.

In this case, the more negative the *gap* value obtained indicates that the company has the worst performance in the aspect of service quality. In table 12, it is known that there is each of the lowest to highest negative value gaps such as in the *Assurance* dimension at attribute D2, namely the use of PDAM Kab. Banggai services is guaranteed to be safe when making payment transactions with a *gap of* (-0.560). The resulting *gap* at attribute D2 is negative because one of the methods of paying bills by PDAM Kab.Banggai is still fairly insecure, namely officers still make billing from house to house with a note recording system after which it is reported back to the office to be recapitulated. This can be detrimental to customers because *double* payments can occur if payment has been made at the office but the officer is still collecting at home because the list of customers to be billed brought by the officer has not been updated so that *miss communication* can occur.

In the *Responsiveness* dimension attribute C2, namely the officer contacts the customer when he cannot fulfill the specified repair promise with a gap of (-1.120). The resulting *gap* at the C2 attribute is negative because there are reports of customer complaints such as the need for repairs to leaking pipes and have been received by the PDAM. In general, it is resolved properly and correctly but not carried out according to the promise. For example, customers receive information from officers that repairs will be carried out before the hour mentioned by the officer. But what happens in the field is that the repair time is not carried out as informed by the officer. This can cause *miss communication* between officers and customers if officers do not contact customers when they cannot fulfill the specified repair promise so that they can disappoint customers.

In the *Responsiveness* dimension at attribute C1, namely employees are responsive when answering complaints from customers through online media such as WhatsApp. The resulting *gap* at attribute C1 is negative because PDAM Kab. Banggai has not received customer complaints through online media because it still does not have an online media account such as *whatsapp* which *officially* belongs to PDAM Kab. Banggai. So that customers mostly make complaints by coming directly to the PDAM Kab. Banggai office. This causes employees to be less responsive to answering complaints from customers.

In the *Reliability* dimension at attribute B5, namely the ease with which customers can submit online complaints to the PDAM with a *gap of* (-1.200). The resulting *gap* at attribute C2 is negative because PDAM Kab. Banggai only receives customer complaints directly by coming to the PDAM Kab. Banggai office and still does not have a social media account. So it is less effective because it takes longer for customers to make complaints.

**3.3    Importance Performance Analysis**

Data analysis using the IPA model is carried out to determine the position of each attribute of each in the service of PDAM Kab. Banggai based on the level of perceptions and expectations of consumers. Cartesian diagrams will be made using SPSS *software* which will be divided into four regions bounded by the average value of the level of all attributes on the X-axis and Y- axis. Then it will be obtained in one quadrant there are attributes that most affect customer satisfaction. In the quadrant is an attribute that needs to be prioritized by the Company because the attribute is considered very important by consumers but the level of

implementationis still not satisfactory. The following is a Cartesiandiagram of the research results:
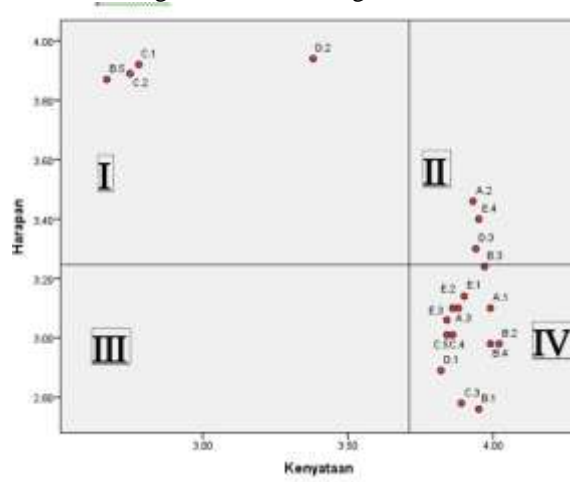


**Figure 1. Cartesian diagram of the research results The following is a mapping of service attributes**

Based on the Cartesian diagram in Figure 1 which is divided into 4 quadrants:

**a. Quadrant I**

Quadrant I contains attributes that are very important to customers and have a major effect on customer satisfaction but in reality the PDAM Kab. Banggai still cannot fulfill customer desires. Therefore, quadrant I contains service attributes that have a very low level of customer satisfaction so that the attributesin quadrant I are the top priorities that are important to make improvements. Here are some attributes containedin quadrant I that need to be improved in order to increase customer satisfaction:

Attribute D2 the use of PDAM Kab. Banggai services is guaranteed to be safe when making payment transactions

Attribute C1 employees are quick to respond when answering complaints from customers through online media such as WhatsApp.

Attribute C2 staff contact the customer when unable to fulfill the specified repair appointment Attribute B5 ease of customers submitting complaints online to the PDAM

**b. Quadrant II**

Quadrant II contains attributes that need to be maintained in quality because based on customersatisfaction, PDAM Kab. Banggai has been satisfiedwith the services provided by the PDAM Kab. Banggai so that it must continue to maintain its quality so that customers can continue to feel satisfaction so as not to disappoint customers. The following are the attributes contained in quadrant II that need to be maintained:

A2 attributeemployees are well-groomed

Attribute E4 employees provide services in accordance with office hours so as to make customers comfortable

Attribute D3 employees have good knowledge ofthe service so that they can answer customer questions

**c. Quadrant III**

Quadrant III contains attributes that are considered to have a low importance value for customers. However, the importance and satisfaction values of some of these attributes have equally low values so that they are a low priority for the Banggai District PDAM to make improvements. The existence of these attributes has no effect on the level of customer satisfaction because they are attributes whose performance is considered normal so that it would be a waste if improvements are made in the hope of increasing customer satisfaction but customers feel these attributes are not important. In quadrant III there are no research attributes that are in accordance with what is expected but are not a top priority for improvement.

**d. Quadrant IV**

Quadrant IV contains attributes that already meet customer satisfaction but have low expectation values for customers so that it is better for the PDAM Kab. Banggai focuses more on quadrant I as the top priority for improvement. The following attributes are containedin quadrant IV:

A1: The location of administrative services is built in such a way that customers feel comfortable

A3: Materials used to explain customer needs are clear andorganized

B1: Service in serving customer complaints (murky water, non-flowing water, and leaking pipes) in accordance with the promises written in the regulations that have been set.

B2: Employees are able to solve problems (cloudy water, non-flowing water, leaking pipes) that customers complain about.

B3: Employees clearly communicate the serviceat the time of initial PDAM installation.

B4: Employees convey that the service is in accordance with the promised time

C3 :PDAM resolves customer complaints correctlyand quickly.

C4 : Employees are willing to help customer complaints based on procedures

C5 : Responsiveness of employees in providing services to customer requests

D1 : Employees foster trust from customers inhandling complaints (non-flowing water, cloudy water, leaking pipes)

E1 : Employees give full attention regarding services to customers

E2 : Employees are very concerned about the interests of customers.
E3 :Employees understand the special needs of customers in the payment process.

### 3.4 Fishbone Diagram Analysis

*Fishbone Diagram* is a useful method to hypothesize thechain of causes and effects. The main function of the *fishbone* diagram is to analyze the consequences by finding and describing the factors that cause a problem. In an effort to determine factors that can be causes that have an influence on a problem. In this study, based on Figure 4.1 found in quadrant I are four attributes that arethe top priority for improvement, namely attributes D2, C2, C1 and B5. Therefore, a *Fishbone diagram* is made to find out the causes and consequences of the problemsthat exist in this study to get solutions for improvement. The following *Fishbone diagram of* the four attributes that are the top priority for improving service quality:

a. D2 Attributes

The following is a *Fishbone Diagram of* the D2 attribute which is one of the top priorities for improvement in aspects of service quality:
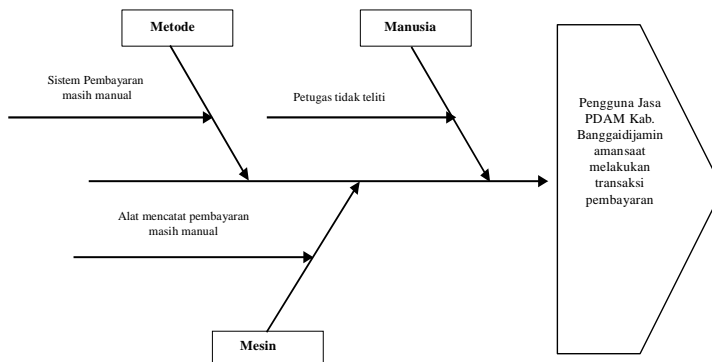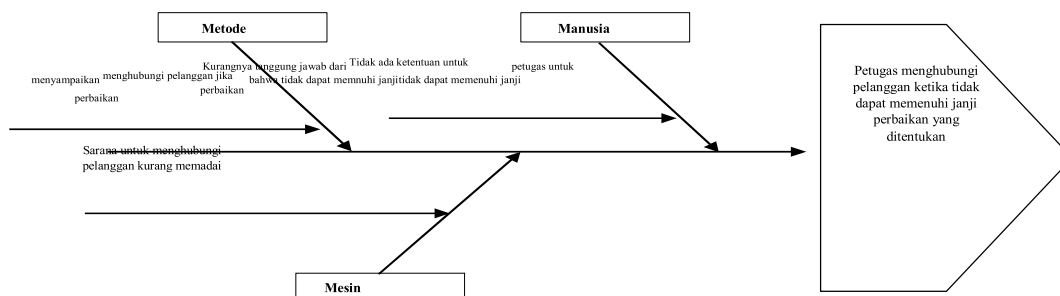


Fishbone Diagram of D2 attribute

Based on Figure 4.2 there are several things that cause the low level of customer satisfaction attribute D2. Therefore, based on several factors that are the source ofthe cause of dissatisfaction, the proposed improvements given to the PDAM Kab. Banggai are as follows:

**Table 13. Proposed improvements to the D2 attribute**

| ImprovementAttributes | Factor | Causes | Proposed Improvements |
|---|---|---|---|
| Service usersof PDAMKab. Banggai are guaranteedto be safewhen making payment transactions | Human | Officers arenot thorough during thebill payment process | Double-checkingbefore invoicingcustomers forpayment |
| | Methods | Manual paymentsystem (through counters and house-to- house billing) | Cooperate with third partiessuch as banks andOutlets (indomaret, alfamidi, etc.) |
| | Machine | Payment recording tool withmanual writing | Create a payment application that isdirectly connected to the PDAM account so that there is no manipulation during the payment process. |

b. C2 Attributes

The following is a *Fishbone Diagram of* the C2 attribute which is one of the top priorities for improvement in aspects of service quality:

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

Fishbone Diagram of C2 attribute
Based on Figure 3, it is found that the things that cause customers to feel less satisfied with the services provided by PDAM Kab. Banggai, namely contained in the C2 attribute so that several factors cause customers to feel less satisfied. Proposed improvements that can be given to the PDAM Kab. Banggai are as follows:

**Table 14. Proposed improvements to the C2 attribute**

| Improvement Attributes | Factor | Causes | Proposed Improvements |
|---|---|---|---|
| | Human | Lack of responsibility from PDAM officials to convey and provide understanding that they cannot fulfill the specified repair promise. | Instill a sense of responsibility in staff and openness to Customers to contact customers as soon as possible if something happens or cannot fulfill the repair promise as specified. |
| Employees are quick to respond when answering complaints from customers through online media | Methods | There is no provision for contacting the customer if They are unable to fulfill the repair appointment. | The need to create an SOP so that it has standard provisions for contacting customers if they cannot fulfill repair promises |
| | Machine | Inadequate means of contacting customers | Provide a means to contact customers |

**c. C1 Attributes**
The following is a *Fishbone Diagram of* the C1 attribute which is one of the top priorities for improvement in aspects of service quality:
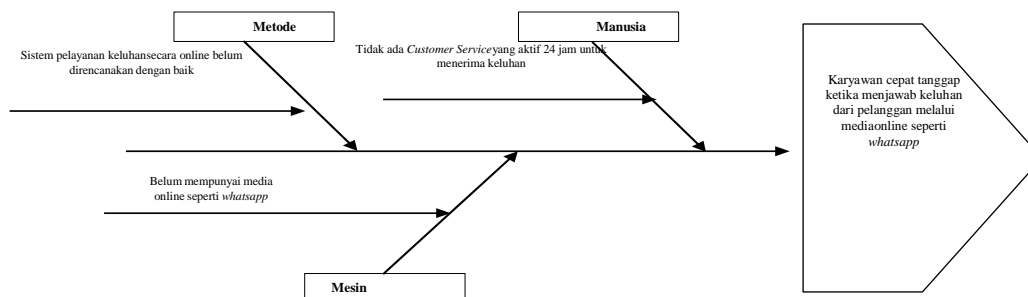


**Figure 4. Fishbone Diagram of C1 attribute Based on Figure 4. there are several things that cause the low level of customer satisfaction attribute C1. Therefore, based on several factors that are the source of the cause of dissatisfaction, the proposed improvements given to the PDAM Kab. Banggai are as follows:**

**Table 15. Proposed improvements to the C1 attribute**

| Improvement Attributes | Factor | Causes | Proposed Improvements |
|---|---|---|---|
| | Human | There is no 24-hour active *Customer Service* to receive customer complaints | Recruiting *Customer Service* and implementing a 24-hour work shift system to be available if there are complaints via message or call. |
| Employees are quick to respond when answering complaints from customers through online media such as *whatsapp* | Methods | The online complaint service system has not been well planned | Implement a 24-hour online complaint service to respond quickly to customer complaints. |
| | Machine | Does not yet have online media such as *whatsapp* | Provide social media accounts that are always *updated to* provide information about the PDAM and are responsive when there are complaints from customers online. |

d. Attribute B5

The following is a *Fishbone Diagram of* attribute B5 which is one of the top priorities for improvement in aspects of service quality:
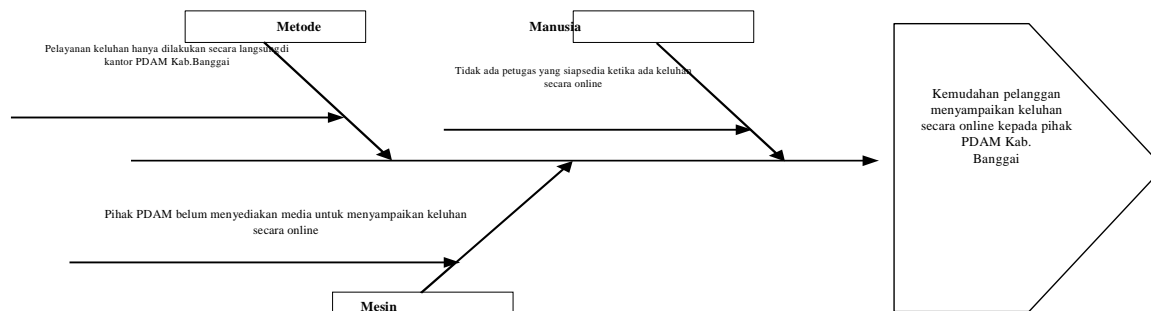


**Figure 5. Fishbone Diagram of attribute B5**

Based on Figure 5, it is found that the things that cause customers to feel less satisfied with the services provided by PDAM Kab. Banggai, namely contained in the C2 attribute so that several factors cause customers to feel less satisfied. Proposed improvements that can be given to the PDAM Kab. Banggai are as follows:

**Table 16. Proposed improvements for attribute B5**

| Improvement Attributes | Factor | Causes | Proposed Improvements |
|---|---|---|---|
| | Human | There is no officer available when there is an online complaint | Implement a work shift system for officers who are available when there is a complaint via message or call. |
| Ease of customers submitting complaints online to the PDAM Kab. Banggai | Methods | Complaint services are only carried out directly at the PDAM office in Banggai Kab. | Implement online grievance services through social media |
| | Machine | The PDAM does not yet provide a medium to submit complaints online | Provide media for customers to submit complaints online such as providing a PDAM contact number that is always active 24 hours. |

**3.5 Proposed improvements given to the PDAM**
**3.6**
**Table 17. Proposed improvements and PDAM's response to the proposed improvements**

| Proposed Improvements | Explanation from PDAM Kab. Banggai |
|---|---|
| Double-checking before invoicing customers for payment | The PDAM accepts the proposed improvements to conduct a re-inspection before billing payments to customers |
| Cooperate with third parties such as banks and outlets (indomaret, alfamidi, etc.) | The PDAM has cooperated with third parties, namely the Post Office. However, it has not yet cooperated with banks and outlets (indomaret, alfamidi, etc.).The PDAM accepted the proposed improvements so that it can further cooperate with banks and outlets (indomaret, alfamidi, etc.). |
| Create a payment application that is directly connected to the PDAM account so that there is no manipulation during the payment process. | The PDAM in the process of implementing payments through counters by using a system on a computer that can be connected directly to the PDAM account so that there is no data manipulation during the payment process. |
| Instill a sense of responsibility in staff and openness to customers to contact customers as soon as possible if something happens or cannot fulfill the repair | • The PDAM still continues to instill a sense of responsibility in staff and openness to customers to contact customers as soon as possible if something |

| | |
|---|---|
| promise as specified. | happens or cannot fulfill the repair promise as specified. <br> • The PDAM accepts the proposed improvements so that it can be planned to reward officers who behave as service officers should, such as having a sense of responsibility. |
| The need to create an SOP so that it has standard provisions for contacting customers if they cannot fulfill repair promises | • The PDAM explained that it always contacts customers when it cannot fulfill repair promises. However, it is not a standard provision so that it becomes an obligation. So there may still be officers who are negligent by not contacting customers if they cannot fulfill repair promises. <br> • Furthermore, it will be used as a standard provision for officers to contact customers if they cannot fulfill the repair promise. |
| Provide a means to contact customers | The PDAM accepts the proposed improvements and will provide a means to contact customers in the future. |
| Recruiting *Customer Service* and implementing a 24-hour work shift system to be available if there are complaints via message or call. Implement a 24-hour online complaint service to respond quickly to customer complaints. | • The PDAM is still in the process of trying to create a *whatsapp* media account that can be active 24 hours can be contacted via chat. However, it can only answer questions about payment bills. So that it has not been done to answer or receive complaints from cust                      omers <br> • The PDAM accepts the proposed improvements to further receive complaints through whatsapp media as previously done to answer questions about payment bills. |
| Implement a work shift system for officers who are available when there is a complaint via message or call. | Currently, the PDAM only receives complaints directly through the office. However, the PDAM received a proposal for improvement so that in the future it will provide officers with a work shift system who are available when there are complaints via message or <u>call.</u> |
| Implement online grievance services through social media | The PDAM is still in the process of trying to create a *whatsapp* media account that can be active 24 hours can be contacted via chat. However, it can only answer questions about payment bills. So that it has not been done to answer or receive complaints from customers <br> The PDAM accepts the proposed improvements to further receive complaints through whatsapp media as previously done to answer questions about payment bills. |
| Provide media for customers to submit complaints online such as providing a PDAM contact number that is always active 24 hours. | The PDAM accepts the proposed improvements to further receive complaints through whatsapp media for 24 hours as previously done to answer customer questions regarding payment bills. Furthermore, complaints that have been submitted will be processed during working hours. |

## 4. CONCLUSION

The results of the *Service Quality* analysis of the service quality of PDAM Kab. Banggai obtained a negative *Gap* value found in the *Reliability* dimension at attribute B5 of (-1,200), namely the ease with which customers can submit complaints online to the PDAM, in the *Responsiveness* dimension obtained a negative *Gap* value at attribute C1 of (-1,140), namely employees are responsive when answering complaints from customers through online media such as whatsapp and at attribute C2 with a negative *Gap* of (-1,120), namely the officer contacts the customer when he cannot fulfill the specified repair promise, then in the *Assurance* dimension with a negative *Gap of* (-0.560). The lowest
*Gap* value is in the *Reliabiity* dimension at attribute B5, which is equal to (-1,200).

The results of the analysis using *Importance Performance Analysis* obtained 4 attributes that are
among the top priorities for improvement, namely the attributes contained in quadrant I. The four attributes that are the top

**Analysis of Service Quality Improvement Using Service Quality (SERVQUAL) and Importance Performance Analysis (IPA) Methods (Case Study at PDAM Banggai Regency)**

priorities for improvement are the ease with which customers can submit complaints online to
the PDAM, employees are responsive when answering complaints from customers through online media such as *whatsapp*, officers contact customers when they cannot fulfill the specified repair promise and the use of PDAM services Kab. Banggai is guaranteed to be safe when making payment transactions.

The proposed improvements given to PDAM Kab. Banggai are as follows: Attribute D2       conducting       a       re-check beforebilling payments to customers, collaborating with third parties such as banks  and outlets (indomaret, alfamidi, etc.) and making payment applications directly linked to PDAM accounts so that there is no manipulation during the payment process. Attribute C2 instill  a  sense  of  responsibility  in officers and openness to customers to contact customers as soon as possible if something happens or  cannot fulfill the specified repair promise, the need to make SOPs so that they have standard provisions  for contacting customers if they cannot fulfill repair promises and provide facilities to contact customers. Attribute C1: recruit Customer Service and enforce a 24-hour work shift system so that they are available if there are complaints via messages or calls, enforce online complaint services for 24 hours so that they are quick to respond to customer complaints and provide social media accounts that are always updated  to provide information about the PDAM and  are responsive when there are complaints from customers online. Attribute B5: impose a work shift system for officers who are available when there are complaints via messages or calls, enforce online complaint services through social media and provide media for customers to submit complaints online such as providing PDAM contact numbers that are always active 24 hours.

The proposed  improvements have been given to the PDAM and have been  well  received  by  the  PDAM of Banggai Regency. There are proposed improvements that are still in the trial process for implementation and are still not fully improved because they are still being carried out in stages. However, other proposed improvements were well received by the PDAM for further follow-up by the PDAM Kab. Banggai to improve service quality.

**REFERENCES**
1) Arikunto, Suharsimi. (2018). Research Procedure: A Practical Approach. Jakarta: Rineka Cipta.
2) Bungin, Burhan. (2017). Quantitative Research Methodology: Communication, Economics and Public Policy and Other Social Sciences (Second Edition). Jakarta: Kencana Danang, Sunyoto. (2013). Questionnaire Theory and Data Analysis for Marketing and Consumer Behavior. Yogyakarta: Graha Ilmu Sumarni, Murti & Salamah Wahyuni. (2006). Business Research Methodology. 1st Edition: ANDI Muri Yusuf. (2014). Quantitative, Qualitative and Combination Research Methodologies.  InNews.Ge (August Number).
3) Achmad Suyitno, & Indung Sudarso. (2019). Design for Improving Customer Satisfaction with a Servqual and IPA Method Approach at Underpass Cafe. National Seminar on Innovation and Technology Applications in Industry 2019, 137-141.
4) Djollong, A. F. (2019). Technique of Quantitative Research. Istiqra': Journal of Education  and Islamic Thought, 2(1), 86-100.
5) Engkus, E. (2019). The Effect of Service Quality on Patient Satisfaction at the Cibitung Health Center, Sukabumi Regency. Journal of Governance, 5(2), 99-109.
6) Fernando, Y., Apriyani, C., Pasha, D., & Alamsyah, D. (2022). Website Quality Analysis Using Webqual and Importance Performance Analysis (IPA) Methods on the Website of Al-Hidayah Pringsewu Islamic Boarding School. Resolution: Engineering Informatics and Information Engineering, 2(6), 251-257. https://doi.org/10.30865/resolusi.v2i6.406
7) García, J. J. L., Lizcano, D., Ramos, C. M. Q., & Matos, N. (2019). Digital marketing actions that achieve a better attraction and loyalty of users: An analytical study. Future Internet, 11(6), 1-16.
8) Hidayat, D. F., Tosungku, L. O. A. S., & Fathimahhayati, L. D. (2023). Analysis of Service Quality Using the Servqual Method  and Importance Performance Analysis (IPA) (Case Study: PDAM Tirta Tuah Benua Kutai Timur). Journal of Industrial Engineering: Journal of Research Results and Scientific Work in the Field of Industrial Engineering, 9(1), 167.
9) IPB University. (2023). Appendix Appendix 1. R-CountTable R-Count Table. 55-71.
10) Janti, Suhar. (2014). Validity and Reliability Analysis with Likert Scale Against SI / IT Development in Determining Decision Making for StrategicPlanning Implementation in the Garment Industry. Proceedings of the National Seminar on Science &Technology Applications. ISSN: 1979-911X
11) Lou, C., & Xie, Q. (2021). Something social, something entertaining? How digital content marketing augments consumer experience and brand loyalty. International Journal of Advertising, 40(3), 376-402.
12) Prananda, Y., Lucitasari, D. R., & Abdul Khannan, M.S. (2019). Application of Service Quality (Servqual) Method to Improve Customer Service Quality. Option, 12(1), 1.
13) Priyanka, R., Indriani, S., & Priyasmanu, T. (2022). The Effect of Service Quality on Customer Satisfaction at PDAM Tirta Taman Bontang City. Valtech Journal, 5(1), 87-93.
14) Reza Nugraha, A., M. Dzikron, &  Iyan  Bachtiar. (2023). Proposed Improvements in Service Quality Using the Service Quality (Servqual) Method and the Importance Performance Analysis  (IPA) Model. Journal of Industrial Engineering Research,9-16.
15) Setyawan, W., Sutoni, A., & Erfasa, N. Z. (2017). Analysis of Customer Satisfaction with Service Quality Using Service Quality Metde andImportance Perfomance Analysis (Case Study at Pdam Office Cianjur Regency). Journal of Industrial

Services, Vol. 3 (1), 80-86.

16) Sihotang, F. P., & Oktarina, R. (2022). The Use of Importance Performance Analysis (IPA) and Customer Satisfaction Index (CSI) Methods in Analyzing the Effect of E-Service Systems on Customer Satisfaction Levels. Journal of Information Systems Technology, 3(1), 1-12.

17) Situmorang, E., & Purba, D. (2019). Designing Applications for Testing the Validity and Reliability of Research Instruments. 02, 54-58.

18) Syah, T. A. (2019). Efforts to Improve Service Quality at the Regional Water Supply Company (Pdam) of Semarang City. Solution, 17(1), 19-39.

19) Wilujeng, F. R., Rembulan, G. D., Andreas, D., & Tannady, H. (2019). Improving Customer Satisfaction in Two of the Largest E-Commerce Businesses in Indonesia Using Servqual Analysis and IPA. Proceedings of the National Seminar on Science and Technology, 1-9.