

## IMPLEMENTATION OF SERVQUAL AND TRIZ METHOD TO IMPROVE QUALITY SERVICE (Case Study : PT. JNE -Tiki Jalur Nugraha Ekakurir)

Nofi Erni<sup>1)</sup>, Iphov Kumala Sriwana<sup>2)</sup> and Wira Tri Yolanda<sup>3)</sup>

<sup>1), 2)</sup>Industrial Engineering, Esa Unggul University

<sup>3)</sup>Industrial Engineering, Tarumanagara University  
nofi.erni@esaunggul.ac.id, wiratriyolanda@gmail.com

### ABSTRACT

*This research was conducted in PT Tiki Jalur Nugraha Ekakurir ( JNE ) branch Pondok Indah and Pondok Pinang , one of freight forwarder and logistics service companies at Jakarta. The purpose of this research was to identify the factors that affect customer satisfaction and provide proposals to improve quality of service in PT JNE. The method used in this research using SERVQUAL method to analyze problems related to quality of service , and TRIZ method for solving the problems. The result of this research shows improvements done on the 5 attributes that have the greatest value gap which that any gap between perception and expectation costumers. Based on analysis result with TRIZ method, give an idea for the repair of service quality that is put the queue numbers at a height of 1325mm in front of the entrance, separating and classifying the items to be sent into several categories, change the HVS paper into the paper with good quality and thickness and using bright color such as blue as the background on information boards , provide regular training to staff and provide rewards to staff who provide the best service and the punishment to staff who provide bad service.*

**Keywords :** Quality of service , customer satisfaction , SERVQUAL , TRIZ .

## 1. INTRODUCTION

Globalization brings a huge impact for the development of businesses around the world. The market is open wide and opportunities become increasingly. But instead, competition is becoming increasingly fierce and difficult to predict. This condition requires each company to improve product quality to achieve customer satisfaction.

PT Tiki Jalur Nugraha Ekakurir (PT JNE) is a company engaged in shipping and logistics services. The company is in the course of its business, there are several problems that occur, such as delays and damage in transit. The problems can lead to decreased satisfaction of its customers.

The scope of research problem is the location of research and data collection in PT JNE branch Pondok Indah and Pondok Pinang, South Jakarta conducted since September-November

2013 and the quality of service that is observed only in the aspect of service delivery. The purpose of this research was to identify the factors that affect customer

satisfaction and provide proposals to improve quality of service in PT JNE.

## 2. THEORITICAL BACKGROUND

Service quality is defined as the combined characteristics of products and services resulting from marketing, engineering, production, and maintenance that make it can be used to meet the expectations of customers or consumers. Quality services should be able to meet or exceed customer expectations can be explained through the things that are often called quality dimensions where there are eight dimensions of quality (Parasuraman et.al 1988).

Customers are all people that requires companies to meet a certain quality standard, because it will affect the company performance. Customer satisfaction is a person's feelings of pleasure or disappointment that emerged after comparing between perceptions of performance of a product and its expectations. If performance exceeds expectations, the customer is highly satisfied

(Parasuraman et.al 1988; Tan and Theresia, 2001). Factors that influence the perceptions and expectations of the customers according is the need and desire are relating to things perceived customer, past experience, communication through advertising and the experience of friends (Gaspersz, 2001).

The Service Quality (SERVQUAL) is a method of measuring the quality of service that can determine the quality of service aspects that need improvement. This method is able to translate customer expectations are still not fully accommodated by the company, thus requiring an increase in the quality of services provided . There are five dimensions of SERVQUAL are tangible, reliability, responsiveness, assurance and empathy (Parasuraman et.al 1988). Important Performance Analysis (IPA) is used to obtain the factors that affect the results obtained from the SERVQUAL dimensions. The results of the SERVQUAL dimensions Importance presented in the form of Cartesian diagram with 4 quadrant (Gasperz, 2001).

The TRIZ method is the Russian acronym for the Theory of Inventive Problem Solving is described as a creative method that shows how technology solves the obstacles. A better approach to solving problems that rely on technology rather than on the psychological approach was first developed by Genrich S.Altshuller, who was born in the former Soviet Union . Find a principle that needs to be changed then find the principle of unintended effects. To represent this technical contradiction, TRIZ

has selected 39 parameters of the system that causes the conflict. To find analogous solutions and adapt to the solution of researchers, there are 40 TRIZ principle which is a clue to help a researcher find a solution of the existing problems (Mazur, 2013).

### 3. RESEARCH METHODS

Methodology of this research starts from formulating the problem, determine the purpose, determining the basic theory, preliminary data collection to determine the attributes of SERVQUAL, the prequestionnaires were then acquired the attributes that will be used in the SERVQUAL questionnaire. Specifies the number of samples for distribution of the questionnaire and then a questionnaire distributed and collected .

Questionnaires that have been collected are then tested the validity and reliability to determine whether the questionnaire that has been distributed and used as a reliable measurement tool to obtain information in the research. After the data valid and reliable next calculation of the value gap and the importance performance analysis in the form of Cartesian diagram. From the calculation of the value gap and IPA acquired attributes that have the lowest quality to the next attribute is used for development and problem solving with TRIZ method. Flowchart of the research can be seen in Figure 1.

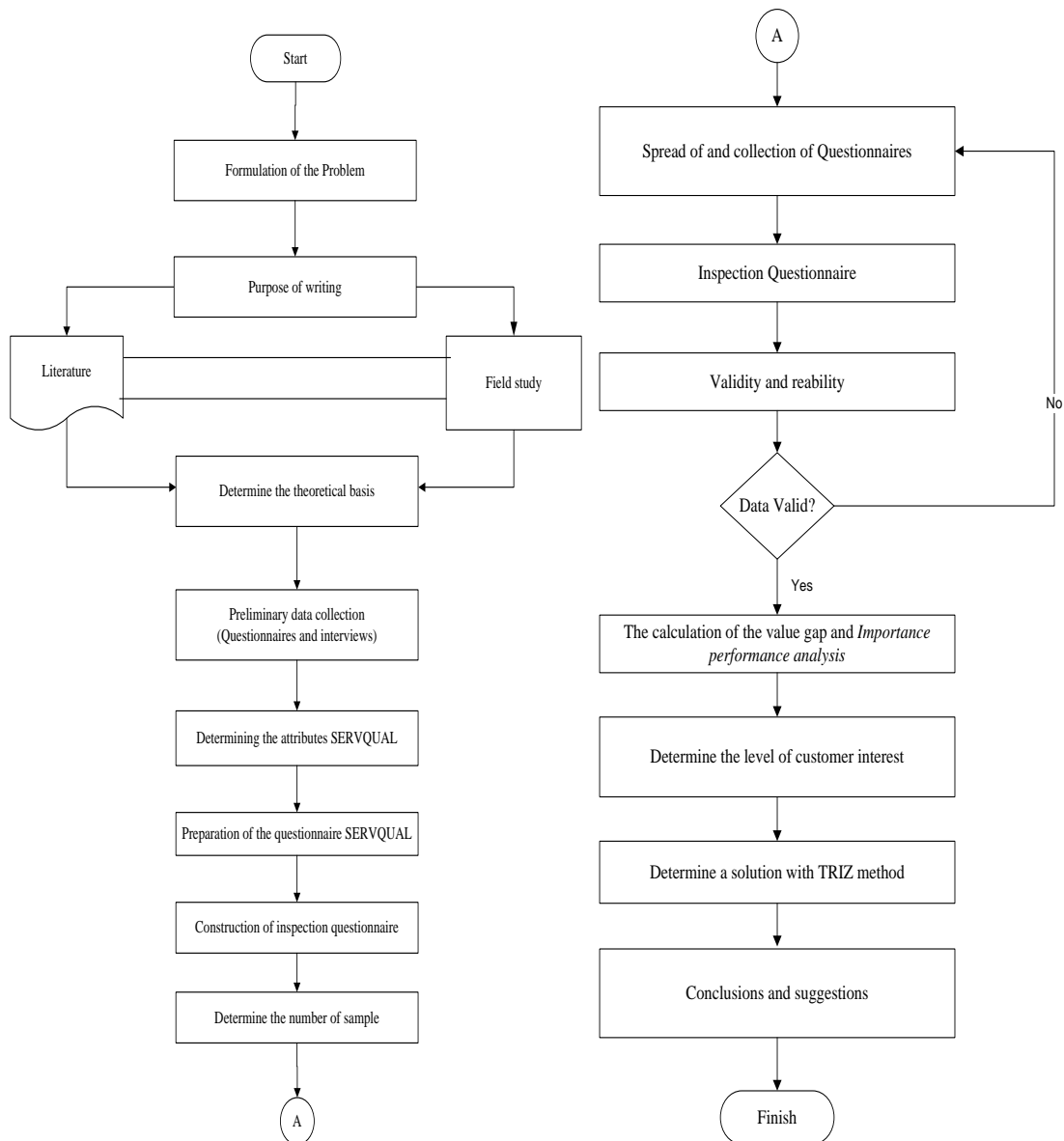


Figure 1 Research flow diagram

## 4. RESULTS AND DISCUSSION

### 4.1. SERVQUAL Attributes

In this research, are used prequestionnaire that distributed from 30 costumer of PT JNE branch Pondok Indah and Pondok Pinang conducted of September-November 2013. The prequistioners have distributed to collect the

service attributes of servqual dimension. The attributes are used as a measuring tool in the questionnaire to find out the customer satisfaction index and the magnitude of the gap between the perceptions and expectations of consumers. Attributes measured in the questionnaire SERVQUAL can be seen in Table 1.

Table 1. Attributes of Questionnaire Servqual

| No. | Attributes | Explanation   |
|-----|------------|---|
| 1   | T1         | Cleanliness and tidiness registration the room                                    |
| 2   | T2         | Completed facilities of waiting room  |
| 3   | T3         | Equipment for wrapping items to be delivered                                      |
| 4   | T4         | Package of services for each product specification                                |
| 5   | T5         | Parking lot   |
| 6   | T6         | Strategic location  |
| 7   | T7         | Information board layout and contents   |
| 8   | T8         | queue number  |
| 9   | E1         | Reminded to bring and keep proof of delivery                                      |
| 10  | E2         | Recommend the best type of packaging used   |
| 11  | E3         | Handle customer complaints properly   |
| 12  | E4         | Maintaining transaction records   |
| 13  | E5         | Willingness of the staff to help customers  |
| 14  | R1         | Speed in serving customers  |
| 15  | R2         | Timeliness of items to place the goal   |
| 16  | R3         | Products are delivered free of damage   |
| 17  | R4         | Good explanation of the cost and time estimates                                   |
| 18  | R5         | Able to use the Internet  |
| 19  | R6         | Patience of staff in serving customers  |
| 20  | RV1        | Ease of registration process  |
| 21  | RV2        | Solve the problem as soon as possible   |
| 22  | RV3        | Checking the items to be shipped with customers                                   |
| 23  | RV4        | Informing about the delivery time, before the registration is considered complete |
| 24  | RV5        | Receipt number for tracking the items on delivery of evidence                     |
| 25  | A1         | The staff polite and friendly   |
| 26  | A2         | Guarantee of products delivered by packaging used                                 |
| 27  | A3         | Corporate responsibility for the loss of items shipped                            |
| 28  | A4         | Price in accordance with the service  |

#### 4.2. Sample Determination

To determine how many samples need to be taken to carry out research, Slovin formula is use:

$$n = \frac{N}{N.d^2 + 1}$$

Questionnaire distribution carried out in two branches, the sampling is done with the proportional sampling technique. Determination of the number of samples of each branch is determined by comparing the number of customer serviced in PT JNE

branches Pondok Indah and Pondok Pinang. Where 60% Pondok Indah branch and 40% Pondok Pinang branch, thus the number of samples required in this research is 60 in Pondok Indah branch and 40 in Pondok Pinang branch. Total of respondent is :

$$n = \frac{4920}{4920 \times (0,1)^2 + 1} = \frac{4920}{50,2} = 98$$

#### Validity test

After the questionnaire distributed and collected, further testing validity of data. The test is performed by correlating the statement with a total value of 100 respondents. Steps taken in a test the validity of the statement for each item in the questionnaire are:

1. Determine the hypothesis  
 $H_0$  = There is a correlation between each item with a statement of the total assessment value.  
 $H_1$  = There is no correlation between each item with a statement of the total assessment value.
2. Determine the value of r table  
 R table value obtained from statistical tables for 2-way test with significance level ( $\alpha$ ) of 5% with a sample size of 100 then  $n = 100$ ,  $DF = 98$  then r table = 0.196
3. Calculate the r count  
 Finding r count using product moment correlation technique as follows:

$$r \text{ count} = \frac{N(\sum XY) - (\sum X \sum Y)}{\sqrt{\{(N \sum X^2) - (\sum X)^2\} \{(N \sum Y^2) - (\sum Y)^2\}}}$$

Sample calculations for the count r on T1 attributes:

$$T1 = \frac{100(39344) - [(374)(10369)]}{\sqrt{\frac{[100(1460) - (374)^2][100(1089089) - (10369)^2]}{3934400 - 3878006} = \frac{56394}{92353,31} = 0,6106}}$$

4. Make a decision
5. Decision

So it can be concluded accept  $H_0$ , which means there is a correlation between each item with a statement of Accept  $H_0$  if the r count > r table, and otherwise the total appraised value so that Data is considered valid.

**Reability test**

The reliability tests using SPSS version 17 software and the techniques used are Cronbach alpha of the data obtained from the questionnaire. Reliability analysis calculations performed using the SPSS program, which will then be obtained coefficient alpha ( $\alpha$ ) Cronbach. The statement can be said to be reliable if the alpha value exceeds 0.6 (Crobach, 1996). From the results obtained alpha values as follows:

1. Alpha value for perception = 0,931
2. Alpha value for expectation = 0,919

From these two values is known that perceptions and expectations for statement has a value of more than 0.6. It can be concluded that the questionnaire has been reliable and can be used for this research.

**4.3. Value of customers Perception**

To get the value of each customer's perception of service attributes is to calculate the total score of each attribute of service divided by the number of respondents. Example calculations to obtain the value for the attribute perceptions T1 is:  
 $P_1 = 0$  ;  $P_2 = 5$  ;  $P_3 = 32$  ;  $P_4 = 47$  ;  $P_5 = 16$

$$TP_{T1} = \frac{(0 \times 1) + (5 \times 2) + (32 \times 3) + (47 \times 4) + (16 \times 5)}{100} = \frac{374}{100} = 3,74$$

For diagram the value perception of each service attributes can be seen in Figure 4.

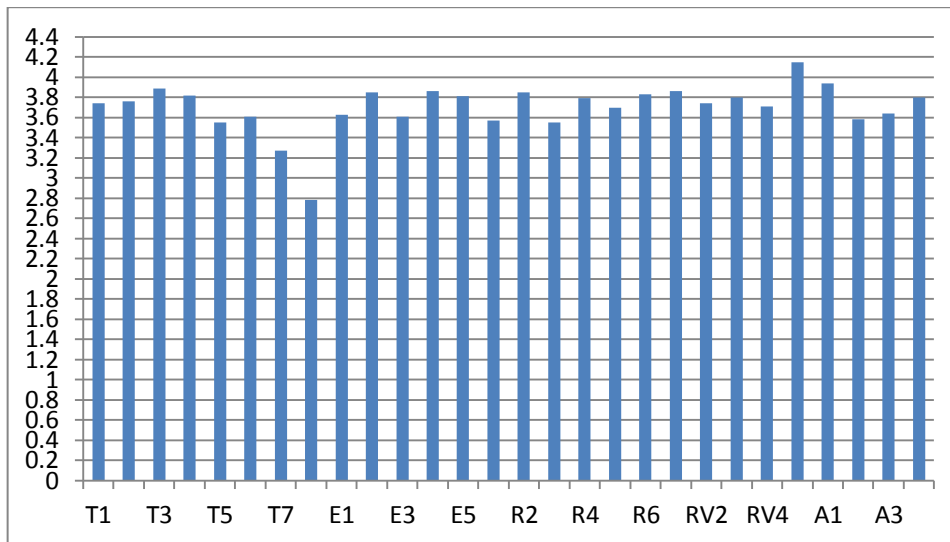


Figure 4. Chart the value perception

#### 4.4. Value of customers expectation

Expectation value is the value to measure the importance level of service quality attribute. To get the value of customer expectations for each attribute the same as in the calculation of the value of perception is to calculate the total score of each attribute of service divided by the number of respondents. Example calculations to obtain the expected value for the attribute T1 is:

$$H_1 = 0 ; H_2 = 0 ; H_3 = 8 ; H_4 = 57 ; H_5 = 35$$

$$\begin{aligned}
 TH_{T1} &= \frac{(0 \times 1) + (0 \times 2) + (8 \times 3) + (57 \times 4) + (35 \times 5)}{100} \\
 &= \frac{427}{100} = 4,27
 \end{aligned}$$

For diagram the value expectation of each service attributes can be seen in Figure 5.

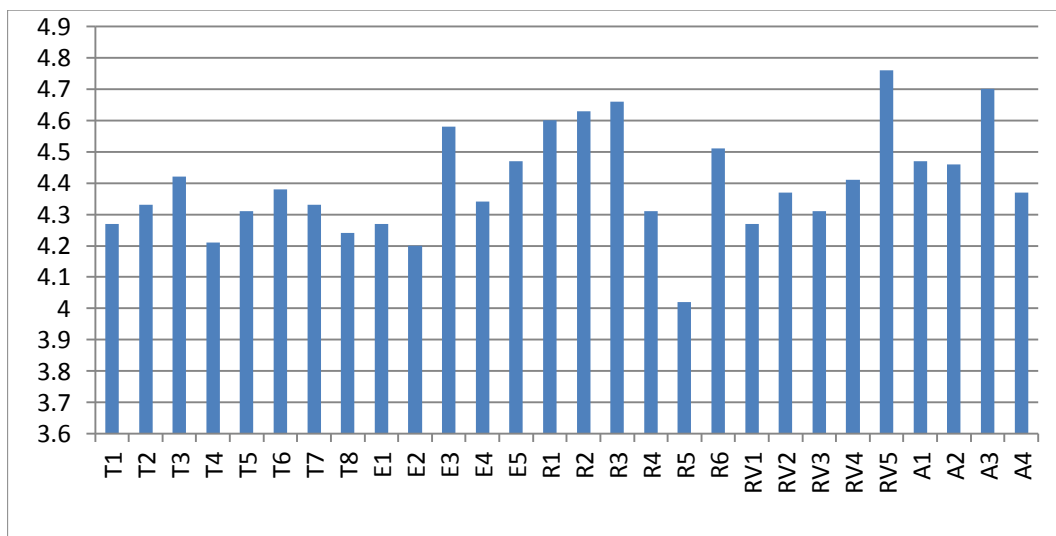


Figure 5. Chart the value expectation

**4.4 Value of gap**

Value of gap is obtained from the calculation of the average value perception minus the average value

expectation of respondents on each attribute. The results of the calculation of the value of gap between perception and expectation can be seen in table 2.

Table 2. Value of gap between perception and expectation

| No | Attribute | Average perception (x) | Average expectation (y) | Value of gap (x-y) |
|----|-----------|------------------------|-------------------------|--------------------|
| 1  | T1        | 3.74                   | 4.27                    | -0.53              |
| 2  | T2        | 3.76                   | 4.33                    | -0.57              |
| 3  | T3        | 3.89                   | 4.42                    | -0.53              |
| 4  | T4        | 3.82                   | 4.21                    | -0.39              |
| 5  | T5        | 3.55                   | 4.31                    | -0.76              |
| 6  | T6        | 3.61                   | 4.38                    | -0.77              |
| 7  | T7        | 3.27                   | 4.33                    | -1.06              |
| 8  | T8        | 2.78                   | 4.24                    | -1.46              |
| 9  | E1        | 3.63                   | 4.27                    | -0.64              |
| 10 | E2        | 3.85                   | 4.2                     | -0.35              |
| 11 | E3        | 3.61                   | 4.58                    | -0.97              |
| 12 | E4        | 3.86                   | 4.34                    | -0.48              |
| 13 | E5        | 3.81                   | 4.47                    | -0.66              |
| 14 | R1        | 3.57                   | 4.6                     | -1.03              |
| 15 | R2        | 3.85                   | 4.63                    | -0.78              |
| 16 | R3        | 3.55                   | 4.66                    | -1.11              |
| 17 | R4        | 3.79                   | 4.31                    | -0.52              |
| 18 | R5        | 3.7                    | 4.02                    | -0.32              |
| 19 | R6        | 3.83                   | 4.51                    | -0.68              |
| 20 | RV1       | 3.86                   | 4.27                    | -0.41              |
| 21 | RV2       | 3.74                   | 4.37                    | -0.63              |
| 22 | RV3       | 3.8                    | 4.31                    | -0.51              |
| 23 | RV4       | 3.71                   | 4.41                    | -0.7               |
| 24 | RV5       | 4.15                   | 4.76                    | -0.61              |
| 25 | A1        | 3.94                   | 4.47                    | -0.53              |
| 26 | A2        | 3.58                   | 4.46                    | -0.88              |
| 27 | A3        | 3.64                   | 4.7                     | -1.06              |
| 28 | A4        | 3.8                    | 4.37                    | -0.57              |

Diagram of result value of gap between perceptions and expectations of

the customer (the value of gap in a minus) can be seen in Figure 2.

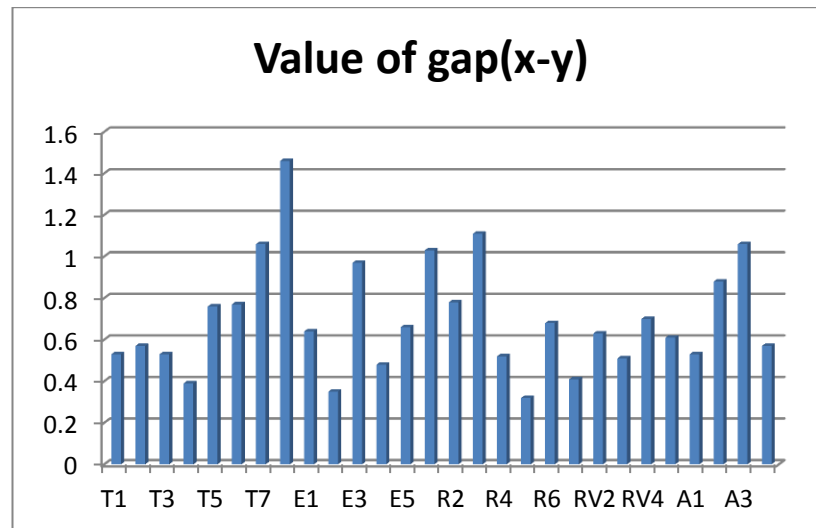


Figure 2. Chart of result value of gap between perceptions and expectations

**Importance Performance Analysis**

Importance Performance Analysis is used to determine the factors that affect the results obtained from the SERVQUAL dimensions. Importance Performance Analysis Results of a diagram to locate the quadrant of each attribute. Diagram of Importance performance analysis results can be seen in Figure 3.

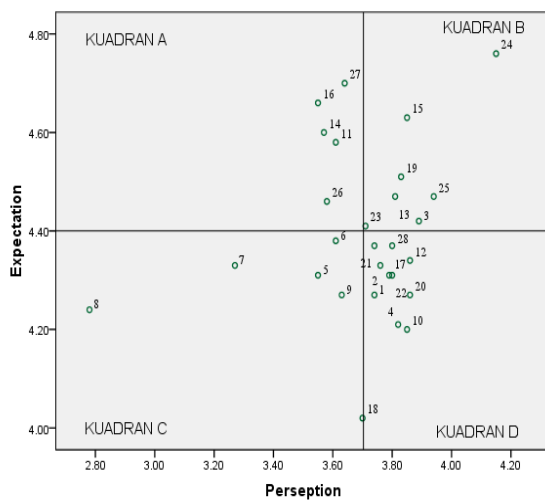


Figure 3. Diagram of Importance performance analysis results

The value of attributes that have lower value of perception and high value of expectation are priority to improve.

**4.4. Priority of Improvements**

Improvements were made to the attributes that have the greatest value gap and allow for the development of

problem solving can be done, so that the attributes that will repair consists of five attributes, are:

- T8 : Queue number
- R3 : Products are delivered free of damage
- T7 : Information board layout and contents
- R1 : Speed in serving customers
- E3 : Handle customer complaints properly

In order to increase service quality in PT JNE, some of effort will be purpose through TRIZ method. There are five attributes will improve ;

1. Queue number  
Of the four principles are detected, only the principle of no. 32 and 23 were chosen as the reference solution.
  - Principle no.32 (color change), that is put the queue number in front of the entrance queue so it look directly when the customer enter the room and placed on a table at high in accordance with an eye on anthropometry the people of Indonesia is 1325 mm.
  - Principle no. 23 (*Feedback*) is to provide guidance to the staff so that when calling the next customer based on queue number and ask for the paper queue numbers drawn customers.
2. Products are delivered free of damage  
The damage that occurs as dents, broken, and torn as spilled liquids and



food. This can be solved by using 2 TRIZ principles, that is:

- Principle no.1 (segmentation) is separate and classify the items to be shipped into several categories according to the type items.
- Principle no. 9 (*preliminary anti action*), because procedures for inspection of goods can not always be done, so always inform the customer to honestly inform the content of the items to be shipped to a special handling.

### 3. Information board layout and contents

The information boards are too small and located in places that are less visible to the content that is less attractive because it only contains the words. Of the four principles are detected, only the principle of no. 35 were chosen as the reference solution.

Principle no.35 (*parameter change*), that is by changing the material of the information sheets of white HVS paper into the paper with good quality and thickness that is more durable and not easily damaged. Using bright colors like blue color that matches the color of the background and JNE black writing on the board for information.

### 4. Speed in serving customers

Complaints from customers that have service long enough. 3 The principle of only 2 principles used as a reference for problem-solving:

- Principle no. 29 (*pneumatic or hydraulic construction*) to speed up service provide regular training to the staff.
- Principle no. 34 (*discarding and recovering*) that is replacing staff whose performance has decreased with the new staff that has better performance.

### 5. Handle customer complaints properly

Customers who are not satisfied because the services provided will complain. Staff who do not respond to customer complaints led to a sense of dissatisfaction of customers increases. This can be solved by using 2 TRIZ principles, that is:

- Principle no. 8 (*anti weight*) that is listening to customer complaints properly and patiently, noting complaints given, immediately improve the customer complaint and establish communication with the requested phone number in order to review whether a customer is satisfied after the complaint is repaired.
- Principle no.23 (*feedback*) that is, with reward and punishment that is to reward staff who provide the best quality service and provide penalties for staff who provide services badly.

## 5. CONCLUSION

The factors that affect customer satisfaction be seen from the highest expected value of each service attribute, there are receipt number for tracking the items on delivery of evidence, Corporate responsibility for the loss of items shipped, Products are delivered free of damage, Timeliness of items to place the goal and Speed in serving customers.

Improvements were made on 5 attributes, 3 attribute has the value biggest gap is in high priority quadrant and 2 attributes have values that are the biggest gap in the low priority quadrant. The fifth attribute that is Queue number, products are delivered free of damage, information board layout and contents, handle customer complaints properly and speed in serving customers. Improvement attributes using TRIZ method, where each attribute is analyzed, and then obtained to do the development, that is put the numbers in front of the entrance queue and on a table with a height of 1325mm, separating and classifying the items to be shipped, replacing paper information board with good quality paper that is more durable, provide regular training to staff, and provide rewards and punishments to employees.

## 6. REFERENCES

- (a) Gaspersz, Vincent, (2001), *Total Quality Management*, Gramedia, Jakarta.

- (b) Mazur, Glenn., TRIZ.USA.  
<http://www.mazur.net/triz/> (diakses pada 3 November 2013)
- (c) Parasuraman, A., V.A. Zeithaml, and L.L. Berry. (1988). *SERVQUAL : A Multiple- Item Scale for Measuring Consumer Perceptions of Service Quality*. Cambridge, Mass : Marketing Science Institute.
- (d) Sari, Diana Puspita dan Harmawan, Andry, (2012), *Usulan oerbaikan kualitas pelayanan pada instalasi rawat jalan dengan metode Servqual dan Triz (studi kasus di RS. Muhammadiyah Roemani)*. *Jurnal J@TI Undip*. Vol.VII. No. 2: 95-104.
- (e) Tan, Kay,C.and A.P., Theresia. (2001). Integrating Servqual and Kano's Model into QFD for Service Excellence Development, *Managing Service Quality*, Volume 11, Number 6.
- (f) Yuliarmi, Ni Nyoman dan Riyasa, Putu, (2007), *Analisa factor-faktor yang mempengaruhi kepuasan pelanggan terhadap pelayanan PDAM kota Denpasar*. *Jurnal Buletin Studi Ekonomi*, Vol.12. No. 1: 9-28.