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DESIGN AND DEVELOPMENT OF SURABAYA WASTE AND ENVIRONMENT MANAGEMENT SERVICE WITH QUALITY FUNCTION DEPLOYMENT METHOD

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ABSTRACT:- *In addition to the garbage problem, other problems facing Surabaya city and possibly other cities in Indonesia are the problem of city park. If we observe the streets in the city of Surabaya, the number of trees or City Park that serves as a producer of O2 in the city of Surabaya are fewer in number. The city of Surabaya is located near the coast and with an average temperature of 30 degrees Celsius, if the handling of garbage and city landscape is not implemented properly, what will happen is the natural scenario caused by both of these things.*

QFD or Quality Function Deployment in this research is a method used to translate and make priority input of Surabaya society into the design and specification of hygiene service in Surabaya city. QFD in this research is used to: a. Choosing and prioritizing environmental and hygiene issues cities that need to be improved based on the needs of the people of Surabaya and the present performance. B. Assess the performance of Hygiene and environmental services
c. Translating the needs of Surabaya society into performance measurement. D. Design, test, and define new services..

From the data above, the greater the level of improvement, the greater the improvement that must be done, in order to meet customer requirements. Thus, the attribute that has the highest value as a city park as a place of entrepreneurship development; a city park as a facility for the community development activities; city parks as a means of environmental, cultural, social and art development; the adequacy of the number of parks, forests and green spaces; repair and maintenance of drains and rivers must be improved in terms of the improvement made by city officials in the city sanitation services and the existence of a city park.

Keywords: *Garbage problem, Quality Function Deployment, Surabaya City*

1. Introduction

The main input in the QFD application is information about the Surabaya community's need for cleanliness and city parks. In this study, the needs of the Surabaya community are identified through the voting process or the most dominant public vote of all services provided. By paying attention to its importance, it was determined the needs of society are components with high interest or dominant values of each dimension of service quality (SERVQUAL). Thus the variable needs of the Surabaya community for the public service system for sanitation and city park of Surabaya are as follows:

1. Environmental cleanliness for a year in Surabaya
2. Level of beauty of Surabaya City
3. Adequacy of janitorial service facilities (bins, truck carrier, and TPA)
4. The adequacy of the number of the park / forest / urban green space
5. Sanitation service and city park as a social support system
6. Improvement of the city environment
7. Composting management and city waste system
8. Repair and maintenance of water channels and rivers
9. Reduction of environmental pollution
10. Construction and development of the city parks, forests, and green spaces
11. The city park as a place of entrepreneurship development
12. As a facility for the development of community activities
13. Reconstruction and reorganization of social infrastructure
14. Reduction of environmental and social damage
15. As a means of developing cultural, social, tourism, and art environments
16. Promotion of healthy lifestyle and recreational facilities

2. Validity Test and Reliability

To start a study, started with the test instrument. This instrument consists of test validity and reliability testing of the items in the questionnaire questions to attribute interest. Tests on this attribute to find out whether or not the question asked to the respondent.

2.1 Validity Test

Validity means the degree of accuracy and precision of a measuring instrument in performing it's size function (Azwar: 1986). In addition, validity is a measure that indicates that the variables measured are the variables to be investigated by researchers (Cooper and Schindler, in Zulganef, 2006).

Meanwhile, according to Ghozali (2009), validity test is used to measure valid, or invalid a questionnaire. A questionnaire is said to be valid if the question on the questionnaire is able to reveal something to be measured by the questionnaire.

A validity test is said to be valid if r count is greater than r table (r count> r table). In this study, to test the validity, sampling is taken as much as 36, so that the value of r table and r count as in table (5.4). From the table, it can be seen that the question on the questionnaire overall is valid, this is because the acquisition value of r count is greater than r table value.

Table 1. Validation of each attribute

No.	Surabaya Society Needs For The Environment	r count	r Table	Validation
1	Environmental cleanliness for a year in Surabaya	0.558	0.22034	**Valid**
2	Level of beauty of Surabaya City	0.44	0.22034	**Valid**
3	Adequacy of janitorial service facilities (bins, truck carrier, and TPA)	0.546	0.22034	**Valid**
4	The adequacy of the number of the park / forest / urban green space	0.430	0.22034	**Valid**
5	Sanitation service and city park as a social support system	0.330	0.22034	**Valid**
6	Improvement of the city environment	0.382	0.22034	**Valid**
7	Composting management and city waste system	0.360	0.22034	**Valid**
8	Repair and maintenance of water channels and rivers	0.326	0.22034	**Valid**
9	Reduction of environmental pollution	0.321	0.22034	**Valid**
10	Construction and development of the city parks, forests, and green spaces	0.46	0.22034	**Valid**
11	The city park as a place of entrepreneurship development	0.225	0.22034	**Valid**
12	As a facility for the development of community activities	0.236	0.22034	**Valid**
13	Reconstruction and reorganization of social infrastructure	0.282	0.22034	**Valid**
14	Reduction of environmental and social damage	0.324	0.22034	**Valid**
15	As a means of developing cultural, social, tourism, and art environments	0.467	0.22034	**Valid**
16	Promotion of healthy lifestyle and recreational facilities	0.157	0.22034	**Invalid**

2.2 Reliability Test

Reliability test refers to an understanding that the instrument used in the research to obtain information can be trusted as a data collection tool and able to reveal actual information in the field (Sugiharto and Situnjak: 2006)

Reliability is a tool for measuring a questionnaire that is an indicator of a variable or construct. A questionnaire is said to be reliable if one's response to a statement is consistent or stable over time. Reliability of a test refers to the degree of stability, consistency, predictability, and accuracy. Measurements that have high reliability are measurements that can produce reliable data (Ghozali: 2009)

A questionnaire is called reliable if Cronbach's α value is greater than the value of α used. To find the value of α Cronbach's can use SPSS. From the calculation of SPSS can be ascertained if the data to be used on the questionnaire is reliable, because the value of α Cronbach's is greater than the value of α used. Cronbach's α value generated on SPSS 16, ie 0.779, it can be said that the reliability of the questionnaire is strong. This is because the value of α Cronbach's obtained is greater than 0.5.

3. Determination of Population and Sample

The population is a composite of all elements in the form of events, things, or people with similar characteristics that are central to the universe of research (Ferdinand, 2006: 223). In a study it is impossible to examine all members of the

population. Therefore it is necessary to establish a representative of the so-called sample population. Sugiyono (1999: 34) said the sample is part of the number of characteristics possessed by the population.

In this study the population is the people of Surabaya. Due to the large number of samples taken, the technique of determining the number of samples for the infinite population (Rao Purba, 1996: 44), is as follows:

$$N = \frac{z^2}{4(moe)^2}$$
$$= \frac{1{,}96^2}{4(0{,}1)^2}$$
$$= 96.04$$
$$= 97$$

Which:

N = number of samples

Z = normal distribution rate at a significant level 5% (1,96)

Moe = *margin of error max* the margin of error max is a maximal sampling error rate of 10%.

From the calculation above the number of samples taken is 97.

4. Customer Requirement Analysis

What is meant by Customer Requirement in this case, is everything that is desired by the consumers (Surabaya society) in order to do improvements on the quality, both in the form of resources and quality of the product or service.

The first step is to collect opinion of Surabaya society about the desire or the things that they are concerned in the selection of quality in urban sanitation service and City Park. The results of Customer Requirement can be seen in the following table:

Table 2. the Result of *Customer Requirement*

No.	Customer Requirement
1	Environmental cleanliness for a year in Surabaya
2	Level of beauty of Surabaya City
3	Adequacy of janitorial service facilities (bins, truck carrier, and TPA)
4	The adequacy of the number of the park / forest / urban green space
5	Sanitation service and city park as a social support system
6	Improvement of the city environment
7	Composting management and city waste system
8	Repair and maintenance of water channels and rivers
9	Reduction of environmental pollution
10	Construction and development of the city parks, forests, and green spaces
11	The city park as a place of entrepreneurship development
12	As a facility for the development of community activities
13	Reconstruction and reorganization of social infrastructure
14	Reduction of environmental and social damage
15	As a means of developing cultural, social, tourism, and art environments

5. Importance to Customer Analysis (Level of Importance)

Analysis of Importance to Customer is an analysis done by distributing questionnaires directly to the people of Surabaya which aims to find out how much expectation of the community against a number of attributes that have been classified based on customer requirements analysis.

At this stage people are asked to fill questionnaires with a scale of 1-5 that have information ranging from not important to very important, then the questionnaire is processed with excel program to determine the mode of these attributes. The reason to use the mode is: (1) to avoid the rounding of scores, because the assessment used is a likert scale with a score of round 1-5. (2) From the results of data collection, the scores obtained are not extreme data. (3) In order not to damage the trend (Riyanto: 2006)

From the results obtained, it can be known what items are desired by the community, associated with cleaning services and city parks. This helps the Surabaya City Government to make continuous improvements to the sanitation and urban parks provided to the community. More data are listed in the table below:

Table 3. The Result of Level of Importance

No.	*Customer Requirement*	*Importance to Customer* (IC)
1	Environmental cleanliness for a year in Surabaya	**5**
2	Level of beauty of Surabaya City	**5**
3	Adequacy of janitorial service facilities (bins, truck carrier, and TPA)	**5**
4	The adequacy of the number of the park / forest / urban green space	**4**
5	Sanitation service and city park as a social support system	**4**
6	Improvement of the city environment	**4**
7	Composting management and city waste system	**4**
8	Repair and maintenance of water channels and rivers	**4**
9	Reduction of environmental pollution	**4**
10	Construction and development of the city parks, forests, and green spaces	**4**
11	The city park as a place of entrepreneurship development	**3**
12	As a facility for the development of community activities	**3**
13	Reconstruction and reorganization of social infrastructure	**3**
14	Reduction of environmental and social damage	**4**
15	As a means of developing cultural, social, tourism, and art environments	**4**

6. Analysis of *Improvement Ratio* (Level of Improvement)

The improvement-level analysis contains the evaluation of attributes aimed at identifying unqualified attributes. To determine the level of improvement by sharing the results of the working standard value (5) with the level of performance.. For example the item number 1, "the level of environmental hygiene for 1 year in Surabaya", the degree of improvement is obtained by the formula IC / CS (5 / = 1.25) and so on. More data can be seen in the following table:

Table 4. Value Analysis improvement level (Improvement Ratio)

No.	Customer Requirement	Improvement Ratio (IR)
1	Environmental cleanliness for a year in Surabaya	**1.25**
2	Level of beauty of Surabaya City	**1.25**
3	Adequacy of janitorial service facilities (bins, truck carrier, and TPA)	**1.25**
4	The adequacy of the number of the park / forest / urban green space	**1.67**
5	Sanitation service and city park as a social support system	**1.25**
6	Improvement of the city environment	**1.25**
7	Composting management and city waste system	**1.25**
8	Repair and maintenance of water channels and rivers	**1.67**
9	Reduction of environmental pollution	**1.25**
10	Construction and development of the city parks, forests, and green spaces	**1.67**
11	The city park as a place of entrepreneurship development	**2.5**
12	As a facility for the development of community activities	**1.67**
13	Reconstruction and reorganization of social infrastructure	**1.67**
14	Reduction of environmental and social damage	**1.25**
15	As a means of developing cultural, social, tourism, and art environments	**1.67**

Conclusion

The main input in the QFD application is information about the Surabaya community's need for cleanliness and city parks. In this study, the needs of the Surabaya community are identified through the voting process or the most dominant public vote of all services provided. By paying attention to its importance, it was determined the needs of society are components with high interest or dominant values of each dimension of service quality (SERVQUAL).

Analysis of Importance to Customer is an analysis done by distributing questionnaires directly to the people of Surabaya which aims to find out how much expectation of the community against a number of attributes that have been classified based on customer requirements analysis.

From the data above, the greater the level of improvement, the greater the improvement that must be done, in order to meet customer requirements. Thus, the attribute that has the highest value as a city park as a place of entrepreneurship development; a city park as a facility for the community development activities; city parks as a means of environmental, cultural, social and art development; the adequacy of the number of parks, forests and green spaces; repair and maintenance of drains and rivers must be improved in terms of the improvement made by city officials in the city sanitation services and the existence of a city park.

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