Implementation of the Servqual Method as a Service Support Decision Support System in Hotels

Anita Wahyu Melinda[1], Riza Arifudin[1], Alamsyah[1]
[1] Department of Computer Science, Faculty of Mathematics and Sciences, Universitas Negeri Semarang, Semarang, Indonesia
*Corresponding author: anitawm016@gmail.com

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ABSTRACT

Hospitality is one component of the tourism industry as a means of moving in the field of services that provide services to visitors. In the current era of globalization, several companies focus on the priority of customer satisfaction. The rapid development of information technology requires companies in various fields to provide fast and appropriate solutions to address the needs or desires of the customer, included in the field of hospitality. For finding out the service quality attributes, a support decision system can be developed for service improvements in hotels. The data used in this research are data obtained from one of the four-star hotels in the city of Semarang, which are 150 data for hotel visitors and 80 for employees in the hotel, this study began in April-May 2018. Implementation of the Decision Support System (DSS) on the system produces a gap value that has the greatest value will be a concern and a priority in improving hotel services. By applying the Service Quality (Servqual) method, the first rank is Assurance with the gap value of -0.11, the second is Empathy with the gap value of -0.17, the third is Reliability with the gap value of -0.19, the fourth is Responsiveness with the gap value of -0.31, and the fifth is Tangibles with the gap value -1.39. So, it was concluded that the overall value is negative, which means it has not met customer expectations. These findings indicate that the dimensions of Tangibles need to be revisited.

1. Introduction

Service quality is a difficult thing when measured even compared based on an opinion per person only. In the current era of globalization, several companies focus attention on the priority of customer satisfaction. Companies begin to realize the importance of the role of customers in their business because they are the reason for the existence of a business that is running and recognized by other general audiences.

The rapid development of information technology requires companies in various fields to provide a fast and appropriate solution in dealing with customer needs or desires. So, there is a long relationship with customers. With the existence of intuition every time you make a decision between what strategies are used, it is necessary to make a decision support system that helps company leaders, especially hospitality, in determining quick and appropriate decisions related to improving the service quality. Quality is a term that is considered indicative of a high level of customer satisfaction and refers to the factors and characteristics of a product or service (Stefano, Casarotto, Barichello & Sohn, 2015).

Service quality will determine customer loyalty to certain companies and increase profits (Atiqah, Roslan, Wahab & Hazana, 2015). Service quality or widely known as Servqual is the ability of a region to consistently meet customer desires, needs, and expectations. In addition, it is also supported by good customer service, so as to produce customer satisfaction (Winoto, Fathoni & Haryono, 2016). The advantage of using the Servqual method is to make easier in capturing a

perception or view of the results of data collection with the questionnaire that has been prepared. In addition, it can determine which variables should be considered more to improve the service.

The assessment criteria for the questionnaire usually use a five-point Likert scale, from very unsatisfactory to very satisfying. The assessment of service in the field of services is based on individual perceptions. The problem discussed in this study is how the hotel provides services for hotel visitors based on five Servqual dimensions, namely Tangible, Reliability, Responsiveness, Assurance, and Empathy.

Stefano's et al. (2015) study evaluated the quality of a large hotel located in Santa Catarina, Brazil. Stefano et al. developed a Servqual-based questionnaire. A number of 87 hotel visitors participated in their study, the coefficient test results obtained was 0.8852. in this regard, data can be applied because the minimum value is 0.70. The first dimension is Tangibles, the lowest gap is 0.20 and the highest gap is 4.44. The second dimension is Reliability, in which the lowest gap is 4.4 different from the first dimension, and the highest gap is 4.55. The third dimension is Responsiveness which results in the highest gap is 4.50 (the author says this third dimension is not good). The fourth dimension is the lowest Assurance gap is 1.83 and the highest gap is 4.38. The fifth dimension is Empathy which has the highest gap value is 4.5 / 5. Whereas, research conducted by Silalahi, Handayani and Munajat (2018), this study aims to analyze the quality of online transportation services that focus on technological aspects, which this time only includes 3 dimensions and 20 criteria. By using data analysis with entropy technique, then the normalized score is divided by all scores, and calculate the entropy, dispersion and weight scores for each criterion. The final results will emerge from each criterion.

The purpose of this research is to implement a decision support system using the Servqual method and finding the results of the calculation Servqual method for improving hotel services.

2. Methods

2.1. Decision Support System

Decision Support System (DSS) is a system used by decision-makers in helping decision-making processes that are semi-structured or unstructured (Kurniawan & Windiasani, 2017). While according to Setyawan, Arini and Akhlis (2017), DSS used computers as a media for decision-makers that any decisions can be made in a short time. This system is used to assist decision making in semi-structured situations and unstructured situations, where no one knows for sure how decisions should be made.

Decision support systems have been widely applied in sharing fields to help solve problems and to evaluate profits (Josaputri, Sugiharti & Arifudin, 2016). Decision support system (DSS) is an interactive information system that provides information, modeling and data manipulation (Rukmana & Muslim, 2016). DSS is part of a computer-based information system that is used to support decision making in an organization or a particular company.

2.2. Servqual

Servqual is defined as the difference between reality or fact with consumer expectations regarding the services received by the consumers. Servqual also includes fuzzy. Fuzzy logic was first introduced by Zadeh in 1962 (Sutojo, Mulyanto & Suhartono, 2011). In classical logic, it is stated that everything is binary, which means it has a membership value of 0 or 1, false or true. Where in fuzzy logic recognize membership values that are between 0 and 1.

Fuzzy is a value that can be valued right or wrong simultaneously. But how much the truth values and errors depend on the degree of membership. Basic Fuzzy logic is fuzzy set theory. Fuzzy logic contained within the membership function (Hikmawati, Arifudin, & Alamsyah. 2017). According to Arifin et al. (2015), the membership function is a curve that shows the mapping of points of input data into membership values that have intervals between 0 and 1.

The steps in processing data using the Servqual method in the Triangular Fuzzy Number (TFN) Theory are as follows:

Determining the number of samples

The Bernoulli formula was employed in this current study.

$$n = \frac{N}{1+Ne^2} \quad (1)$$

Note:
N : Number of populations
n : Sample size
e : Error tolerance limit 10%

The research variables were obtained based on the services provided by one of the four-star hotels in Semarang. The approach used is descriptive-quantitative. The descriptive method is used to find facts with the right interpretation, which aims to portray the situation or event so that it can accumulate the basic data (Alamsyah & Muna, 2016). Then grouped based on five Servqual dimensions namely Tangibles, Reliability, Empathy, Responsiveness, and Assurance. The details of the questionnaire assessment criteria are determined using a scale that is (Stefano et al., 2015):

Category 1 = very unsatisfactory (score 1)

Category 2 = unsatisfactory (score 2)

Category 3 = satisfying enough (score 3)

Category 4 = satisfying (score 4)

Category 5 = very satisfying (score 5)

Validity and Reliability Testing

The purpose of the validity testing is to determine the accuracy of a questionnaire. Formula (2) is the formula for the validity of perceptions and expectations:

$$r\ count = \frac{n\,(\sum xy) - \sum x \sum y}{\sqrt{\{n\sum x^2 - (\sum x^2\}\{n\sum y^2 - (\sum y)^2\}}} \quad (2)$$

Note:
r : correlation
x : score of each item
y : total score minus the score of each item
n : sample size

Reliability testing in this study was carried out using the Cronbach Alpha formula (3):

$$r_{11} = \left[\frac{k}{(k-1)}\right]\left[1 - \frac{\sum \sigma_n^2}{\sigma_t^2}\right] \quad (3)$$

Note:
r_{11} : instrument reliability
k : number of questions
σ_n^2 : number of items or item variants
σ_t^2 : total variant

Data Processing

In data processing, there are results of recapitulation, perception and expectation scores (in table form). Furthermore, the determination of fuzzy sets is done to determine the scores of respondent answers, based on the criteria according to number 1. The next step is fuzzification, it is done to get the lower limit value (c), the middle limit (a), and the upper limit (b) which is the value of TFN, namely by the formula (4):

$$c = \frac{b_{i1}*n_1+b_{i1}*n_2+b_{i2}*n_3+\ldots+b_{i(k-l)}*n_k}{n_1+n_2+n_3+\cdots+n_k}$$
$$a = \frac{b_{i1}*n_1+b_{i2}*n_2+b_{i3}*n_3+\cdots+b_{ik}*n_k}{n_1+n_2+n_3+\cdots+n_k} \quad (4)$$
$$b = \frac{b_{i1}*n_1+b_{i3}*n_2+\cdots+b_{ik}*n_{i(k-1)}+b_{ik}*n_k}{n_1+n_2+n_3+\cdots+n_k}$$

Note:

b_i : average fuzzy set value per importance level

n : number of respondents per interest level

Defuzzification Calculations and Gap Values

Defuzzification is conducted to get a single representative value, that is by using the arithmetic mean formula (5):

$$\mu\, a \cap b = (\mu a[x] + \mu b[y])/2 \quad (5)$$

The value of the formula (5) corresponds to the results of the value of step 3. The gap is used to determine how much ranking is generated, then rank can be sorted from 1 - 100 for example. Then total all based on the 5 dimensions of Servqual. Then the final rank will be obtained from 1-5, from the biggest value to the smallest value. The gap that is preferred in service improvement is the smallest gap value.

3. Results and Discussion

In this research, a decision support system was developed to implement the Servqual method. The method used in developing the system was the waterfall method. The development stage began with the analysis of hardware, software, and interface implementation. Then, it is continued by applying and transforming algorithm functions from manual methods into computational models. The transformation was conducted by implementing the functions of the algorithm into a programming language. After that, the system was being tested to be able to provide the output in accordance with the design and analysis of system requirements that have been made.

The participant of the study were hotel visitors and employees of one of the four-star hotels in Semarang city. A total of 150 hotel visitors and 80 employees in the hotel participated in the current study. Data collections were carried out in April-May 2018. The Servqual method was applied in this study. A number of 150 perception data were gathered from hotel visitors, while the expectation data were gained from 80 hotel employees. The data are summarized in Table 1.

Table 1. The results recapitulation data of perception and expectation

	Perception						Expectation					
Attribute	K1	K2	K3	K4	K5	Total	K1	K2	K3	K4	K5	Total
X1	0	0	3	60	87	150	0	0	1	28	51	80
X2	0	0	3	67	80	150	0	0	0	27	53	80
…	…	…	…	…	…	…	…	…	…	…	…	…
X22	0	0	2	48	100	150	0	0	0	18	62	80

To check the validity of the data¸ the reliability testing was conducted. Table 2 presents the validity test result from 22 attributes. The validity test is fulfilled.

Table 2. The test results of perception validity and expectations

	Perception			Expectation		
Attribute	rCount	rTable	Validity	rCount	rTable	Validity
X1	0.4787	0.1348	Valid	0.2443	0.1852	Valid
X2	0.5816	0.1348	Valid	0.2812	0.1852	Valid
…	…	…	…	…	…	…
X22	0.4517	0.1348	Valid	0.3158	0.1852	Valid

After that the calculation of the reliability test, the perception got the value of $\alpha = 0.8764$, and the expectation got the value of $\alpha = 0.6206$. Based on the guidelines for interpreting the correlation coefficient, the perception value of the category was very strong, and the value of expectations was strong.

The fuzzification stage was conducted to get the lower limit value (c), the middle limit (a), and the upper limit (b) which was the value of the TFN. The next step was calculating the defuzzification value. In the defuzzification process, there was a rank made to see the level of 1-22 in the research data, the data made it easier to get a little conclusion where the data value was greater and smaller value. Fuzzification and defuzzification results on each attribute can be seen in Table 3.

Table 3. The fuzzification and defuzzification results of the attributes

Attribute	Perception					Expectation				
	TFN			Defuzzification	Rank	TFN			Defuzzification	Rank
	C	A	B			C	A	B		
X1	8.12	9.62	11.12	10.37	12	8.25	9.75	11.25	10.50	18
X2	8.03	9.53	11.03	10.28	17	8.33	9.83	11.33	10.58	13
X3	8.27	9.77	11.27	10.52	4	8.25	9.75	11.25	10.50	18
X4	8.09	9.59	11.09	10.34	13	8.08	9.58	11.08	10.33	22
X5	8.07	9.57	11.07	10.32	16	8.53	10.00	11.53	10.78	8
X6	8.08	9.58	11.08	10.33	15	8.58	10.10	11.58	10.83	5
X7	6.68	8.18	9.68	8.93	21	8.75	10.30	11.75	11.00	2
X8	6.52	8.02	9.52	8.77	22	8.55	10.10	11.55	10.80	6
X9	6.71	8.21	9.71	8.96	20	8.20	9.70	11.20	10.45	20
X10	8.00	9.50	11.00	10.25	19	8.80	10.30	11.80	11.05	1
X11	8.24	9.74	11.24	10.49	6	8.45	9.95	11.45	10.70	9
X12	8.09	9.59	11.09	10.34	13	8.30	9.80	11.30	10.55	14
X13	8.17	9.67	11.17	10.42	10	8.15	9.65	11.15	10.40	21
X14	8.17	9.67	11.17	10.42	10	8.30	9.80	11.30	10.55	14
X15	8.01	9.51	11.01	10.26	18	8.43	9.93	11.43	10.67	10
X16	8.20	9.70	11.20	10.45	8	8.63	10.1	11.63	10.88	4
X17	8.27	9.77	11.27	10.52	4	8.28	9.78	11.28	10.53	17
X18	8.19	9.69	11.19	10.44	9	8.68	10.2	11.68	10.93	3
X19	8.23	9.73	11.23	10.48	7	8.30	9.80	11.30	10.55	14
X20	8.40	9.90	11.40	10.65	1	8.40	9.90	11.40	10.65	11
X21	8.29	9.79	11.29	10.54	3	8.40	9.90	11.40	10.65	11
X22	8.31	9.81	11.31	10.56	2	8.55	10.10	11.55	10.80	6

The gap values of each attribute are obtained through deducting the value of perception defuzzification by the value of expectation defuzzification. Once the gap values are attained, the rank can be generated. The gap values and its ranks for all the five dimensions of Servqual can be seen in Table 4.

Table 4. The results of the gap

Dimensions	Attribute	Perception Defuzzification	Expectation Defuzzification	GAP	Rank
Empathy	X1	10.37	10.50	-0.13	9
	X2	10.28	10.58	-0.30	13
	X3	10.52	10.50	0.017	3
	X4	10.34	10.33	0.018	2
	X5	10.32	10.78	-0.46	16
Tangibles	X6	10.33	10.83	-0.49	18
	X7	8.93	11.00	-2.35	22
	X8	8.77	10.80	-2.03	21
	X9	8.96	10.45	-1.49	20
	X10	10.25	11.05	-0.80	19
Reliability	X11	10.49	10.70	-0.21	11
	X12	10.34	10.55	-0.21	10
	X13	10.42	10.40	0.023	1
	X14	10.42	10.55	-0.13	8
	X15	10.26	10.67	-0.41	14
Responsiveness	X16	10.45	10.88	-0.43	15
	X17	10.52	10.53	-0.01	5
	X18	10.44	10.93	-0.49	17
Assurance	X19	10.48	10.55	-0.07	6
	X20	10.65	10.65	0	4
	X21	10.54	10.65	-0.11	7
	X22	10.56	10.80	-0.24	12

In Table 4, it can be seen that the average gap results from perceptions and expectations have negative values, there are only four attributes that have positive values, namely the attributes of X3, X4, X13, and X20. This finding indicates that hotel visitors were satisfied with these 4 attributes, while the rest attributes did not meet their expectations. Based on the five dimensions of Servqual, from the results of the gap calculation between dimensions, the results of the gap and rank are presented in Table 5.

Table 5. Results of five Servqual gap dimensions

Dimensions	Perception	Expectation	Gap	Rank
Empathy	10.34	10.52	-0.17	2
Tangibles	9.42	10.81	-1.39	5
Reliability	10.37	10.56	-0.19	3
Responsiveness	10.45	10.76	-0.31	4
Assurance	10.54	10.65	-0.11	1

Table 5 shows that all gaps have negative values. The first rank is Assurance with a gap value of -0.11, the second rank is Empathy with a gap value of -0.17, the third rank is Reliability with a gap value of -0.19, the fourth rank is Responsiveness with a gap value of -0.31, and fifth place is Tangibles with gap value -1.39. From these data, it can be concluded that the overall value is negative, which means it has not met the expectations of the visitors. It can be seen that the gap calculation results from each of the priority dimensions that need more attention are dimensions of Tangibles.

4. Conclusion

This study has examined the service support system of a hotel using the Servqual method. The first step to take is ensuring whether the data is valid by using the reliability test. Then, the calculation of reliability test to interpretation coefficient correlation on the perception and expectation value. Next step, fuzzification count for getting lower limit value (c), midline value (a), and upper limit value (b) on every attribute. After getting the result of the fuzzification count, used defuzzification count which is arithmetic means for simply to get data description which value is bigger or smaller. After data is obtained, the perception value is then subtracted by the expectation value to find the gap

value and rank in every dimension. The implementation results of the DSS found that the average value is 0.39 out of 5. That is number obtained from 5 dimensions, from 1 to 5 ranking. The value of the Assurance gap becomes the first, the Empathy gap is in the second, Reliability gap is in the third, the Responsiveness gap is in fourth, and the last Tangibles gap is in the fifth. The lowest result on the Tangibles dimension gap values was felt by guests of the hotel when it was not met with their expectations. Dimensions with lower dimension gap values need to be revisited and evaluated so that they can improve their services.

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