Efforts to Improve Service Quality with Fuzzy Approach and Service Quality Methods at Dunia Barusa Inc.

Defi Irwansyah1*, Dina1, Cut Ita Erliana1, Ayu Esteka Sari2, Deky Hamdani3, Karona Cahya Susena3, Tito Irwanto3, Asmara Indahingwati4, Nur Aida5, Tatas Ridho Nugroho6, Aditya Halim Perdana Kusuma Putra7, Dadang Sudrajat8, Fery Murtiningrum9, Sri Isfantin Puji Lestari10, Sujinah11, Hendra Syahputra12, Yusri12, Anita12 and I Ketut Sudarsana13

1Department of Industrial Engineering, Universitas Malikussaleh, Aceh, Indonesia
2Department of Management, STIE Sakti Alam Kerinci, Jambi, Indonesia
3Department of Management, Universitas Dehasen Bengkulu, Indonesia
4School of Economics Indonesia “STIESIA” Gempol, Pasuruan, Indonesia
5Department of Management, Sekolah Tinggi Ilmu Ekonomi (STIE) Gempol, Pasuruan, Indonesia
6Department of Accounting, Universitas Islam Majapahit, Mojokerto, Indonesia
7Department of Management, STIM Lasharan Jaya, Indonesia
8Department of Information Technology, STMIK IKMI Cirebon, Indonesia
9Department of Agribisnis, Sekolah Tinggi Ilmu Pertanian Rejang Lebong, Bengkulu, Indonesia
10Department of Management, STIE Wijaya Mulya Surakarta, Indonesia
11Faculty of Education, University Muhammadiyah of Surabaya, Surabaya, Indonesia
12Department of Management, Faculty of Dakwah and Communication, UIN Ar-Raniry, Banda Aceh, Indonesia
13Department of Religious Education, Institut Hindu Dharma Negeri Denpasar, Indonesia

*defiirwansyah@unimal.ac.id

Abstract. Dunia Barusa, Inc. is a business institution engaged in Toyota car sales services, spare parts and periodic service. Service quality is an important factor in determining the success of this business. Services provided by Dunia Barusa, Inc., includes a comfortable waiting room with prayer rooms and toilets, responsiveness of service complaints, friendly and professional attention of employees, providing a complete and comprehensive service, using equipment and that is in accordance with standards, selling authentic Toyota spare parts and coupled with various promotional gifts for periodic service and purchase of spare parts. The steps of data collection are done by observing and distributing questionnaires from several criteria. The criteria were obtained through interviews and literature studies. The method used to measure service quality using Fuzzy Servqual. From the results of the calculation of customer expectations Defuzzyfikation can be known, the value of the highest expectations of customers to improve service quality at Dunia Barusa Inc. is in attribute X8, which is the timeliness of service provided with a value of 2.80 and the lowest value is attribute X12, which is the greeting given on arrival with a value of 1.97. The criteria that have the highest gap value
are timeliness of the service provided. Accordingly, this criteria is a criteria that many customers complain and needs to have an improvement.

1. Introduction
The rapidly changing industrial world has brought immediate consequences to increased competition between companies. While the consumer community is beginning to turn into an increasingly critical society, this is due to increasingly high demands for quality products or services. In today's business competition, each service provider must be able to provide the best service in order to satisfy the customer, so that they are able to win the competition with other similar service providers. Service quality is an important thing to pay attention and always corrected its shortcomings, to be able to increase customer satisfaction. Quality services, can create customer satisfaction and encourage customers to reuse the service. Every consumer always expects, to get optimal service and they can get the goods or services they want. This kind of thing, if not have quickly response and best thing of the service provider will result in a decrease in interest from consumers to come and use the services and services they provide.

Service Quality method is built on the comparison of two main factors, that is customer perception of services that are perceived as real (service) with services that are actually expected to be expected (expected service). If the reality is more than the customer expects, then the service can be said to be quality, whereas if the reality is lacking from what the customer expects, is not qualified. Thus, this Service Quality method defines the quality of service as how far the difference between reality and expectations for services that customers receive[1]

2. Related Works
The development of the automotive world in the country is always increasing. The automotive industry also has a significant role in driving the economy in Indonesia because many of the world's automotive producers invest. Having more than one vehicle is a natural thing for the upper middle class. But if the vehicle is used every day without intensive maintenance, the performance of the vehicle will decrease. So many automobile or car dealers not only sell their products but provide vehicle service services to fill the need for these services. Vehicle service services in addition to improving the performance of the vehicle, there is good service for customers to feel comfortable when servicing and will affect the satisfaction of these customers. Customer satisfaction is determined by the quality of the product, which is desired by the customer, so that quality assurance is a top priority for every company, which in fact is used as a benchmark for the company's competitive advantage [2].

3. Research Methodology
Data processing techniques in this study used:
1. Sample Number Determination
   The method used to determine the number of samples is Slovin formula as follows :
   \[ n = \frac{N \times e^2}{1 + Ne^2} \]  
   Information:
   \( n \) = Number of samples
   \( N \) = Total population
   \( e \) = Error tolerance limit
   Forming and distributing Servqual questionnaires
   The servqual questionnaire includes sections on consumer expectations, consumer perceptions, and weights for each servqual dimension.
2. Validity Test and Reliability
   Through these tests it will be known that each attribute of the questionnaire question is valid and reliable [3]
3. Calculation of Gap Value and Weight of Servqual
   The results of the Gap must or in the form of customer voice
4. Integrating Fuzzy-servqual for measuring customer perceptions and expectations, calculating customer perceptions and expectations, calculating service quality gaps, calculating weights, calculating weighted servqual values and assessing the importance of a criteria.

The variables used in this study are:
1. Tangible
   In the tangible part observed, there are workshop facilities, waiting rooms and complete workshop equipment.
2. Reliability
   In the reliability section observed, the timeliness and service provided by the service part employees to customers.
3. Responsiveness
   In the Responsiveness section observed, the alacrity of employees in the service section when responding to customer requests.
4. Assurance
   In the assurance section observed, the services and politeness provided by employees Dunia Barusa, Inc. especially in the service center.
5. Emphaty
   In the empathy section observed, it includes ease of contact and good communication between employees of Dunia Barusa, Inc.

4. Result and Discussion
The method used to determine the number of samples is to use the Slovin formula as follows:
\[ n = \frac{N}{1 + Ne^2} \]
Total population owned by PT. The world of Barusa, the Lhokseumawe branch that has used services in 2016 is 45 consumers. With the error rate used is 5\% where the accuracy value is 95\%. Then the number of samples can be calculated as follows:
\[ n = \frac{45}{1 + 45(0.05)^2} \]
\[ = 40 \]
From the results of the calculation, the sample is 40 samples. The number of questionnaires that must be distributed is for 40 customers randomly as long as they use the service.

4.1. Questionnaire Identification
Identification of questionnaire attributes can be seen in the following table 4.4:

| Dimension     | Attribute                                                                 |
|---------------|---------------------------------------------------------------------------|
| **Tangible**  | The equipment in the workshop is complete and modern (X1)                 |
|               | The workshop environment is clean and healthy (X2)                        |
|               | Workshop technicians dress neatly and attractively (X3)                  |
|               | Service support facilities are available in the workshop adequately (X4)  |
|               | Clean and comfortable waiting room conditions (X5)                       |
|               | Easy location to find (X6)                                                |
| **Reliability**| Available queue facilities (X7)                                           |
|               | Timeliness of service provided (X8)                                       |
| **Responsiveness**| Number of technicians available (X9)                                   |
|               | Technician understanding of automotive problems (X10)                    |
Based on table 1, questionnaire identification can be seen that the questionnaire is based on customer needs, which are classified into five dimensions of SERVQUAL are tangibles, reliability, responsiveness, assurance, and empathy.

4.2 SERVQUAL Method Analysis
After knowing the answers of each respondent amounting to 40 respondents, the next step is to test the validity and reliability. Through these tests obtained valid and reliable data results. Then proceed with the SERVQUAL method analysis using Gap 5 (perception) analysis.

Gap 5 is the gap between perceived services and expected services. This gap occurs when consumers measure the performance or achievements of the company in different ways and wrong in perceiving the quality.

Calculation of Gap 5 can be calculated by using the following method:

\[
\text{Gap 5} = \text{Performance} - \text{Expectation}
\]

\[
\begin{align*}
\text{Performance} &= \frac{\text{number of questionnaires for each performance attribute}}{\text{number of questionnaires}} = \frac{132}{40} = 3.3 \\
\text{Expectation} &= \frac{\text{number of questionnaires for each attribute of expectation}}{\text{number of questionnaires}} = \frac{119}{40} = 2.97 \\
\text{Gap 5} &= \text{Performance} - \text{Expectation} = 3.3 - 2.97 = 0.33
\end{align*}
\]

Gap calculation results from each attribute can be seen in the following Table 2:
Based on the Gap Calculation Table Results 5 the questionnaire shows that the level of employee performance is lower than the level of expectations expected by consumers. This is evidenced by many negative gaps obtained, which are 9 attributes (X4, X5, X6, X7, X8, X9, X11, X12, X13) of the 15 attributes assessed. From the results of Servqual calculation above can be seen that there are several attributes with the largest Gap value. That is, attributes such as X8, X12, and X13 require special attention from the company, especially in the location of service should be able to improve service according to consumer expectations.

4.3. Integrating Fuzzy-Servqual

Fuzzy set determination is done to determine the score that must be given by the respondent for each criteria submitted by the questionnaire. From the results of the questionnaire obtained the average calculation of the value of the perception gap and consumer expectations.

Weight value is obtained by assuming that the value of the total weight is 1 and the value of each criterion is the same, that is equal to 1 / N with N is the number of criteria, are 15 criteria. So that we will get the weight for each criterion is 1/15 = 0.06. Therefore, the value we use in determining the weight (score) for calculating the fuzzyfication value is not good (NG) with a value of 1, 2, 3, 4 for good enough (GE) 3, 4, 5, 6 and for very good (VG) 5, 6, 7, 8.

In calculating the value of Fuzzyfication questionnaire perception and customer expectations, the value of Fuzzyfication is the average value of the score of each questionnaire given. Then the ranking is done from the highest value to the lowest value. While the results of the calculation of the value of Fuzzyfication can be seen in table 3 below:

| No. | Criteria | TFN   | Defuzzyfikation | Ranking |
|-----|----------|-------|-----------------|---------|
|     |          | KB    | CB              | SB      |
| 1   | X1       | 0.53  | 7.20            | 0       | 2.57    | 2      |
| 2   | X2       | 0.66  | 7.13            | 0       | 2.59    | 1      |
| 3   | X3       | 0.66  | 7.00            | 0       | 2.56    | 3      |
| 4   | X4       | 1.66  | 5.46            | 0       | 2.37    | 7      |
| 5   | X5       | 2.20  | 4.53            | 0       | 2.24    | 14     |
| 6   | X6       | 2.06  | 4.86            | 0       | 2.30    | 10     |
| 7   | X7       | 1.79  | 5.20            | 0       | 2.33    | 8      |
| 8   | X8       | 2.66  | 4.06            | 0       | 2.25    | 13     |
| 9   | X9       | 2.26  | 4.60            | 0       | 2.28    | 12     |
| 10  | X10      | 2.26  | 4.66            | 0       | 2.31    | 9      |
| 11  | X11      | 2.19  | 4.66            | 0       | 2.29    | 11     |
| 12  | X12      | 1.26  | 6.13            | 0       | 2.46    | 5      |
| 13  | X13      | 1.12  | 4.26            | 0       | 1.79    | 15     |
| 14  | X14      | 1.26  | 6.00            | 0       | 2.42    | 6      |
| 15  | X15      | 1.2   | 6.46            | 0       | 2.55    | 4      |
From the results of the calculation of Defuzzyfication in Table 3 above it can be seen that the highest perception / performance value of the quality of service at Dunia Barusa, Inc. in customer is attribute X2, the workshop setting is clean and specifically with a value of 2.57 and the lowest value is the X13 attribute, that is the comfort and security available with a value of 1.79.

5. Conclusion

From the description and discussion discussed in the previous chapter, some conclusions can be drawn:

1. Factors that influence consumer valuation of service quality based on the calculation of Gap 5 value is the level of service they receive such as punctuality of service, welcome given on arrival and availability of comfort and secure.

2. From the results of the calculation of customer expectations Defuzzyfikasi can be admitted the highest value of expectations from customers to improve service quality at Dunia Barusa, Inc. is found in attribute X8, which is the punctuality of service provided with a value of 2.80 and the lowest value is attribute X12, which is the greeting given on arrival with a value of 1.97.

3. From the results of the calculation of Defuzzyfication in Table 4.6 above it can be seen that the highest perception / performance value of the quality of service at Dunia Barusa, Inc. in the customer is attribute X2, that is the workshop environment is clean and healthy with a value of 2.57 and the lowest value is the X13 attribute, the comfort and security available with a value of 1.79.

4. Based on processing and data analysis fuzzy-servqual can be seen that the level of service quality of PT. Barusa's world is dominated by negative values. This shows that customers have not satisfied with the services provided by Dunia Barusa, Inc. The criteria that have the highest gap value are the timeliness of the service provided. Therefore this criteria is a criteria that many customers complain and it is needs to be improved.

References

[1] J. Supranto, “May. Measurement of Customer Satisfaction Levels including Analysis of Interest and Performance Levels.” Usahawan, 1997.

[2] K. Suryadi and M. A. Ramdhani, “Sistem Pendukung Keputusan,” Remaja Rosdakarya, Inc., Bandung, 1998.

[3] Sugiyono and E. Wibowo, Statistika untuk penelitian dan aplikasinya dengan SPSS 10.00 for Windows. ALFABETA Publisher, 2001.