Analysis of Customer Satisfaction Level in Accredited Laboratory Testing ISO/IEC 17025 Before and After Pandemic Covid-19 Occurred: A Case Study

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Abstract

The massive and rapid spread of Covid-19 has prompted almost all government to implement social distancing, lockdown, and even to impose temporary closures on several sectors. Many service sectors felt a significant impact due to this pandemic, one of them is accredited laboratory testing. Maintaining customer satisfaction seems to be difficult due to the change of the way people interact each other caused by the pandemic. It was a new challenge for the laboratory to maintain their customer satisfaction. This study takes CMPFA Laboratory as the object of case study which aims to analyze customer satisfaction in Accredited laboratory testing industry before and after pandemic Covid-19 occurred. Through this study, it is found that CMPFA Laboratory testing succeed in increasing customer satisfaction in every dimension of the service. It happened due to the right strategy that implemented by CMPFA during pandemic Covid-19. Descriptive statistic was used to understand and analyze the data. Therefore, this study helps the laboratories to evaluate and understand the effect of pandemic on customer satisfaction and the strategy that implemented to maintain their satisfaction during pandemic Covid-19.

Keywords
Accredited Laboratory Testing, Customer Satisfaction, Service Quality, COVID-19

1. Introduction
The presence of COVID-19 provides new challenges for many industries engaged in the service sector. The pandemic conditions that spread to various countries prompted the government to enforce social distancing, lockdown, and even temporarily close in several business sectors (Bonfatnti et al. 2021). This condition has an impact on the pattern of interaction between the organization and its customers. One of the service organization that has experienced this impact, is an accredited laboratory testing. According to Karthiyayini and Rajendran (2021), the challenges faced by accredited laboratories today are not only consistency in implementing and maintaining their accreditation, but also must be able to handle customers and understand their needs. Understanding customer needs helps the organization in increasing their customer satisfaction (Williams and Naumann 2011)

Customer satisfaction is very important for an organization. Competitive environmental conditions encourage the organization to improve the quality of services, products, customer satisfaction and loyalty, so that they can compete with their competitors (Army et al. 2021). This is in accordance with the clause in ISO 17025 that the Laboratory must also identify the level of customer satisfaction (ISO 2017).

Due to the relevance of above issues, the researcher aims to explore and analyse customer satisfaction in an accredited laboratory testing ISO/IEC 17025 before and after the pandemic occurred. This study will take CMPFA FTUI as an object of the study to explore and analyse the satisfaction level. This is important because according to Virtue and Rainey (2015), improving service quality is an important requirement to retain customers and maintain good relations with them

1.1 Objectives

The objectives of this research are formulated to be as follows:
(1) To identify customer satisfaction level before pandemic Covid-19 occurred
(2) To identify customer satisfaction level after pandemic Covid-19 occurred
(3) To compare the satisfaction level before and after pandemic Covid-19 occurred
By answering aforementioned research objectives, the research will contribute to the knowledge on how the pandemic Covid-19 affect customer satisfaction level in accredited laboratory testing ISO/IEC 17025.

2. Literature Review

2.1 Five Dimension of Service Quality

Service quality are result between customers and expectations about services and perceptions are performed (Parasuraman et al. 1985). According to Rauch et al. (2015) in order to conduct a comprehensive evaluation of a laboratory, the management has to compare its performance with its customer expectations and with the performance of other companies in the same industry. Service quality is briefly defined as how companies meet or exceed customer expectations. Service quality improves customer satisfaction and will correlate to increases profit (Pakurár et al., 2019)

Service quality in the SERVQUAL model consists of five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. Reliability is the ability of personnel to perform the promised service dependably and accurately in a timely manner. It is regarded as the most important determinant of perceptions of service quality (Ahmad et al. 2019). Responsiveness, according to (Parasuraman et al. 1985) highlighted that the responsiveness of willing employees involves telling customers exactly when things will be done, giving them undivided attention, promoting services, and responding in accordance with their requests

Assurance is the knowledge and courtesy of employees and their ability to gain trust and confidence and the laboratory and make them feel safe. In addition, employees have the ability to answer the customers' questions (Al-Ababneh 2016). Empathy is Customers need to feel that they are made priority by the organization providing services. Empathy means caring, paying personal attention, and providing services to customers. The core of empathy is conveying the feeling that the customer is unique and special. Tangible is physical facilities (equipment, personnel, and communications materials). It is the physical image of the service that customers will use to assess quality

2.2 Customer Satisfaction

Customer satisfaction is a major issue for organizations or companies in today's highly competitive market. It is important for a company to improve the quality of service, products, and customer loyalty in order to survive in the competitive market. Measuring CS provides information on how a firm is managing the relationships that they have with their customer base, and in turn, how successful the firm is in the marketplace (Davis and Gomes 2021)

The basic objective of satisfying customers is to improve profitability by expanding the business by gaining market share, earning customer loyalty, improving a product's reputation, selling more to current markets, increasing margins, and other strategies (Barsky and Labagh 1992).

2.3 Company Background

Central Manufacturing Process and Failure Analysis (CMPFA) is one of the accredited laboratory testing in Indonesia. This laboratory serves various types of customers, both from industry and individuals such as students. The total number of CMPFA customers is around 1000 clients per year, but this number has decreased since 2020 to around 659 clients in 2020. CMPFA has been providing services to industry since 2005 and keep increasing its competency in becoming problem solving center for industries. CMPFA is supported by accredited laboratories under Lab Management System ISO/IEC 17025 (CMPFA 2020)

ISO/IEC 17025 Accreditation is an objective way to assure the customers that laboratories have demonstrated technical competence to provide reliable and accurate test or calibration results. Accreditation is objective because an independent, third party accreditation body performs annual assessments to verify whether the system is meeting all of the requirements of ISO/IEC 17025. The application of standards in laboratory testing is closely related to achieving the quality objectives contained in the laboratory. By using the standard ISO/IEC 17025, the product is guaranteed in security, reliability and certainly has quality (Nurcahyo et al. 2018). Quality management systems in laboratory based

on ISO/IEC 17025 will be effectively work when some of the key factors in the effectiveness clause can be well executed, including organization, management system, management review, personnel, testing methods and quality assurance of test results (Sari and Nurcahyo 2020)

3. Methods

In order to comprehensively show and compare the satisfaction level of customer before and after pandemic occurred, researcher collected the satisfaction questionnaire from 2019-2020. All the data were analysed and compared using descriptive statistic method with SPSS tool for the calculation.

4. Data collection

Researchers get the data from customer satisfaction questionnaires which were collected from 510 respondents in 2019. On the other hand, the questionnaires after Covid-19 also were collected from 293 respondents in 2020. The evaluated attribute is shown in Table 1 below.

Table 1. Evaluated attribute based on SERVQUAL Dimension

Item	SERVQUAL Dimension	2019	2020	Remarks
The information included in the test report	Tangible	0.881	0.878	Valid
Reception and Customer Services	Responsiveness	0.842	0.832	Valid
Completion time of the testing	Reliability	0.709	0.735	Valid
Communication during the test	Assurance 1	0.824	0.816	Valid
Delivery and submission of final reports	Assurance 2	0.880	0.919	Valid
Providing and delivery information	Empathy 1	0.876	0.883	Valid
Conformance of the testing meet customer request	Empathy 2	0.869	0.881	Valid

5. Results and Discussion

5.1 Validity and Reliability Test

Validity and reliability test were conducted using SPSS tool to evaluate the quality of the research. The validity result showed that all item in questionnaire are valid as can be seen in Table 1. Pearson value both in 2019 and in 2020 are above r table. Moreover, reliability test of customer satisfaction questionnaire also conducted to examine the consistency of the research. Reliability of the data in 2019 and 2020 mentioned in below Table 2 and Table 3 showed Cronbach's Alpha value 0,928 and 0,935 respectively.

Table 2. Reliability of the questionnaire in 2019

Reliability Statistics	
Cronbach's Alpha	N of Items
0,928	7

Table 3. Reliability of questionnaire in 2020

Reliability Statistics	
Cronbach's Alpha	N of Items
0,935	7

5.2 Descriptive Statistic of Survey Result

Based on survey result which conducted in 2019, customer satisfaction score of CMPFA showed an average value 4.3 form a scale of 5. As can be seen in Figure 1, the highest satisfaction score is in reliability dimension which concern

on completion time of testing. Whereas, the lowest satisfaction score is in empathy dimension which concern on providing and delivering information to the customer.

The pandemic Covid-19 that occurred in first quartile 2020 gave a big challenge for CMPFA to maintain their quality of service in order to satisfy their customer. Based on survey result which was conducted in 2020, CMPFA has succeeded increasing their average customer satisfaction score to 4.5 of 5. The increase in customer satisfaction score occurs in every service dimension that has been observed. The highest satisfaction score is still on reliability dimension that concern on Completion time of testing. However, the lowest satisfaction score experienced a change to the assurance dimension. Assurance dimension is about communication during the test and delivery and submission of final report.
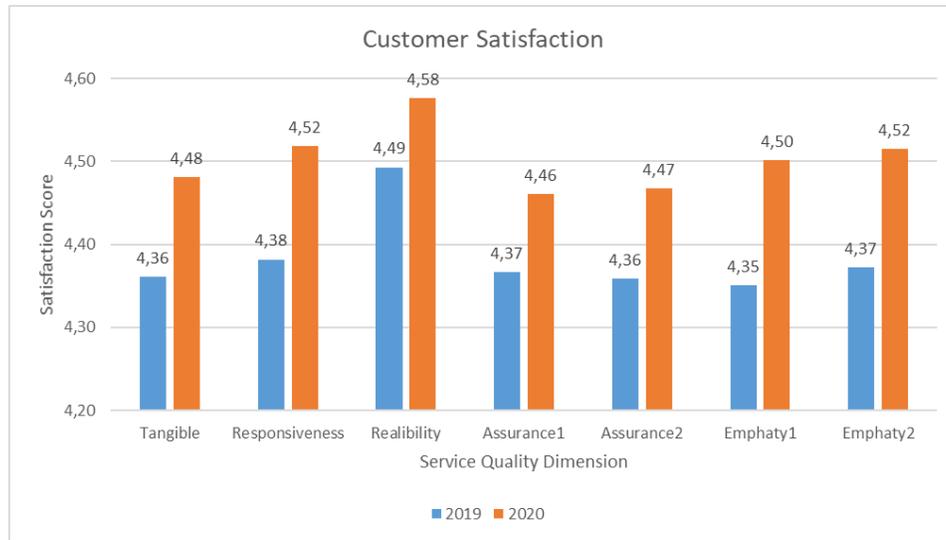

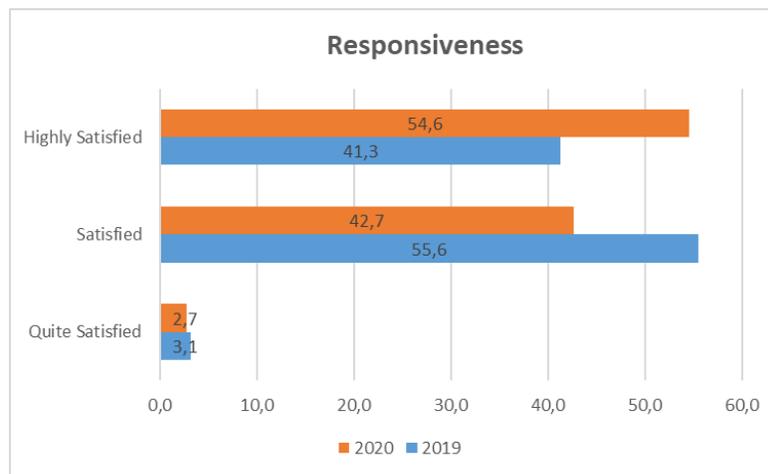**Figure 1**. Comparison of customer satisfaction between 2019 and 2020

Figure 2. Satisfaction level of reception and customer service

Figure 2. shows the increasing percentage on highly satisfied level from 41.3% in 2019 to 54.6% in 2020. The customers feel very satisfied with the way of employee receiving them and understand their needs and problem. On the other hand, percentage on quite satisfied level decreased from 3.1% to 2.7%. Figure 3 shows similar condition with Figure 2. In 2020, percentage on highly satisfied level increased from 40,9% to 50.2%. Whereas, quite satisfied level decreased from 4.9% to 4.1%.
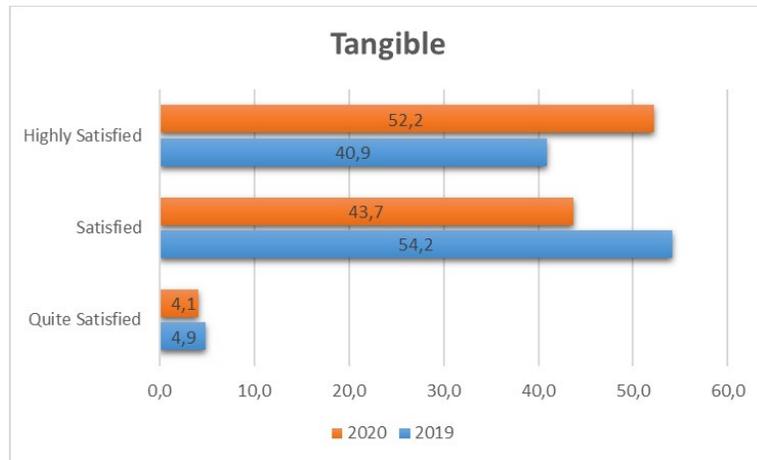
Tangible

Highly Satisfied	52,2 (2020) / 40,9 (2019)
Satisfied	43,7 (2020) / 54,2 (2019)
Quite Satisfied	4,1 (2020) / 4,9 (2019)

Legend: ■ 2020 ■ 2019

Figure 3. Satisfaction level of the information included in test report

Realibility

Highly Satisfied	63,1 (2020) / 56,5 (2019)
Satisfied	31,5 (2020) / 36,5 (2019)
Quite Satisfied	5,4 (2020) / 6,8 (2019)
Less Satisfied	0,0 (2020) / 0,2 (2019)

Legend: ■ 2020 ■ 2019
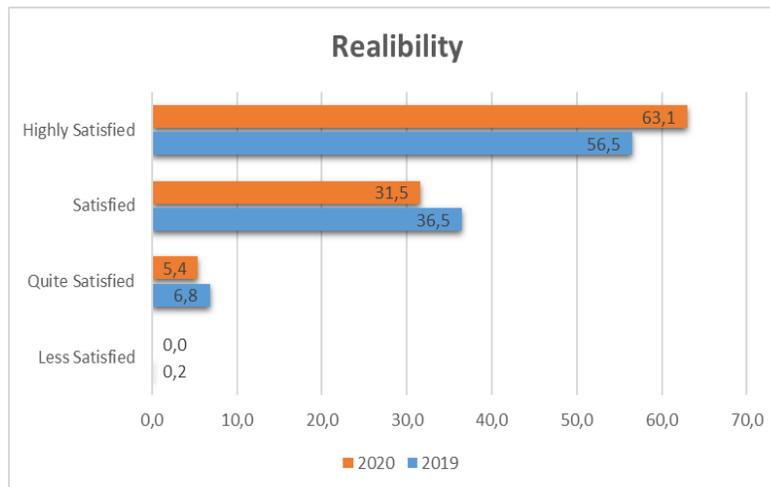
Figure 4. Satisfaction level of completion time of testing

Assurance 1

Highly Satisfied	50,2 (2020) / 42,7 (2019)
Satisfied	45,8 (2020) / 51,5 (2019)
Quite Satisfied	4,1 (2020) / 5,7 (2019)
Less Satisfied	0,0 (2020) / 0,2 (2019)

Legend: ■ 2020 ■ 2019

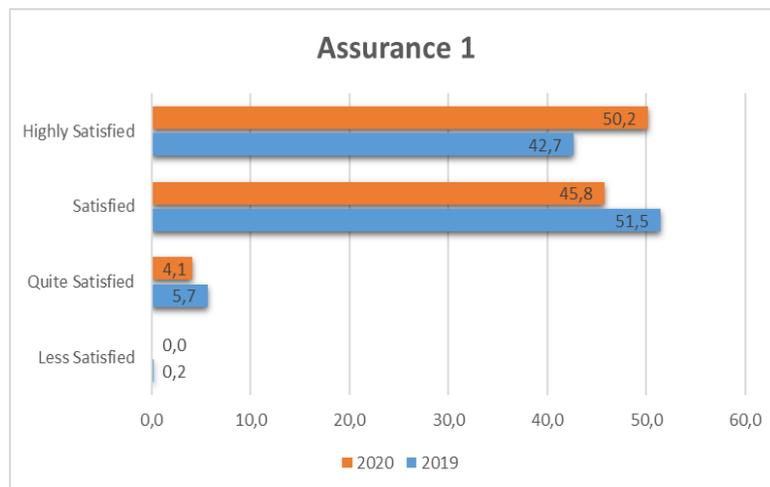**Figure 5.** Satisfaction level of communication during the test

In 2019, both Figure 4 and Figure 5 shows that there are 0.2% customer feel less satisfied in completion time of testing and in communication during the test. According to CMPFA procedure, customer which feels less satisfied on a service should be approach personally to identify and to understand more about the problem that they had. This personal approach can be a good insight for CMPFA to improve their services. Therefore, there is no one customer feel less satisfied in 2020.
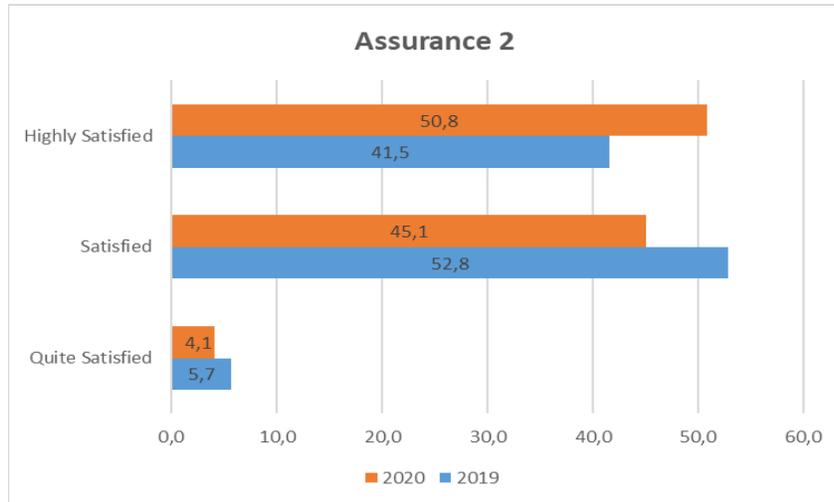

Figure 6. Satisfaction level of delivery and submission of final report
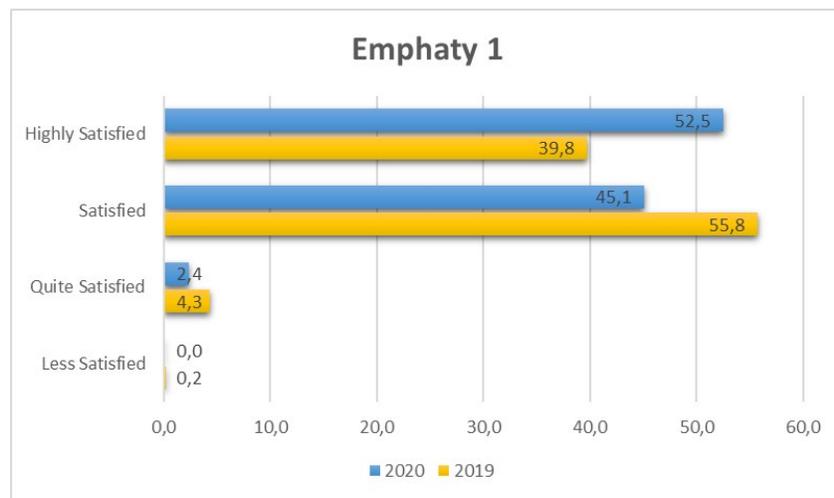

Figure 7. Satisfaction level of providing and delivery information

Figure 6 shows satisfaction level of delivery and submission report to client. Quality of this service showed that customer feels more satisfied in 2020 than in 2019. The percentage of highly satisfied level increased from 41.5% in 2019 to 50.8% in 2020. Similar with Figure 6, Figure 7 shows highly satisfied level increased significantly from 39.8% in 2019 to 52.5% in 2020. On the other hand, quite satisfied level decreased from 4.3% to 2.4% in 2020, even less satisfied level is no longer found in 2020.
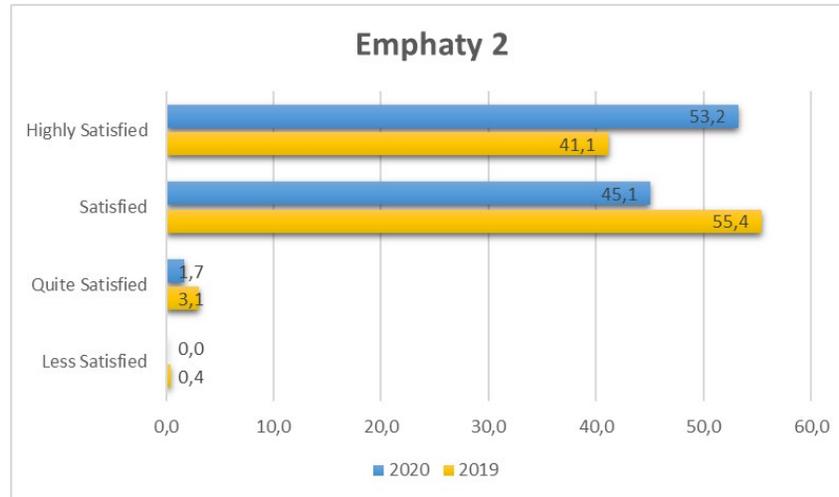
Figure 8. Satisfaction level of conformance of the testing meet customer request

Figure 8 shows the increasing percentage of highly satisfied level from 41.1% to 53.2%. while less satisfied decreased from 0.4% in 2019 to 0% in 2020. Highly satisfied customer significantly increased in 2020 with the percentage above 50% for all over dimension of services. While, in 2019 highly satisfied level is under 50% which means in 2020 customer fells more satisfied than 2019. In Addition, percentage of less satisfied customer is no longer found in 2020.

6. Conclusion

Average of customer satisfaction score in CMPFA increased from 4.3 in 2019 to 4.5 in 2020. This increase even occurred in every dimension of service provided by CMPFA to its customers. It was recorded that in 2019, several service dimensions such as completion time of testing, communication during the test, delivery of information and conformance on customer requests still had 0.2-0.4% of customers with less satisfied levels. However, based on a survey conducted in 2020, the satisfaction level of less satisfied customers were no longer found. In addition, the percentage of highly satisfied levels has increased from 2019 to 2020. In 2020, the percentage of customers who are at the highly satisfied level is more than 50% in each service dimension. This shows that CMPFA is able to improve the quality of its services and is able to understand the customer need well, especially in facing new challenges due to Covid-19. CMPFA continues to improve service quality in order to continue to improve customer satisfaction. One of the strategies used is to carry out a personal approach procedure. This has a good effect on customer satisfaction.

This result only focus on CMPFA as one of an accredited laboratory testing. Therefore, there might be some differences strategic, goals, and the evaluated item of service. Extensive study which focus on understanding and identifying gap between customer expectation and perceived value in accredited laboratory testing might be conducted to understand deeply about customer need.

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