

Design of service quality and analysis of customer satisfaction in SME culinary products with the quality function deployment method

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Abstract. SMEs are medium-level community businesses with limited capital. The type of business that can revive the economy, especially the economy for families, is the SMEs culinary business which is consumed by the community every day. One of the SMEs that is still surviving despite experiencing a decline is the SMEs in the culinary field. The results of observations and interviews with one of the SMEs culinary businesses, in a period of 12 months, sales decreased by an average of up to 50%. The cause of the decline in sales is not known with certainty, so it is necessary to evaluate the performance of these SMEs. QFD is one method that can be used to obtain a clear and objective picture of Customer needs. The research method involves Customers as respondents, the number of samples is 80 with 26 valid and reliable attributes. The results of the analysis using Importance Performance Analysis (IPA) show that there are five attributes that are considered important for Customers to become priority improvements. These attributes are related to the Tangible aspect, namely the presentation of Durian sticky rice products that are attractive, the portion according to expectations, Assurance, namely the consistency of the ripeness of the durian fruit, the taste of the durian fruit is felt in every portion, Empathy, namely the ethics in serving Customers. Based on the QFD approach, the priority is the technical importance rating by making standard operating procedures for each technical response in the form of standard operating procedures for checking raw materials and the amount of raw materials used in each serving, re-examining, providing the composition of the main raw materials so that the taste remains consistent (Assurance). Serving techniques with serving portions, cleanliness of physical facilities (Tangible), service to Customers and socialization of Customer service standards (Empathy), and ordering techniques (reliability). So that in order to maintain and maintain the quality of SMEs products and services in the culinary field, it is necessary to conduct a performance assessment, especially related to the four aspects of service quality Assurance, Tangible, Empathy and Reliability as a design in assessing service quality

Keywords: QFD, HoQ, IPA, SMEs

1. Introduction

SMEs are medium-level community businesses with limited capital. The type of business that can revive the economy, especially the economy for families, is the SME culinary business consumed by the community daily (Ibrahim et al., 2018). Various types of culinary preparations are available to be an alternative for Customers in choosing a menu. The community has no difficulty finding various culinary preparations with various flavors. However, the COVID-19 pandemic that has occurred throughout the world, especially in Indonesia, has had an impact on the sustainability of SMEs, many SMEs have suffered significant losses and have even ended up closing businesses that have been established for decades. One of the SMEs in the culinary field is still surviving, even though it is experiencing a decline. The results of observations and interviews with one of the SME culinary businesses located near industrial areas in the past 12 months have experienced a decline in sales by an average of up to 50% even though the COVID-19 pandemic has ended. The cause of the decline in sales is not known with certainty, because so far there has been no response from Customers regarding product and service quality. So it is necessary to evaluate related to the performance of these SMEs. The QFD method is a method that can be used to obtain a clear and objective description of Customer needs or to improve the quality of products/services (Halim, et al., 2014). QFD is a better framework compared to other methods for analyzing and improving quality, as well as product development (Song, 2020), for evaluation related to function and appearance

(Ishaka & Ginting, 2020). In the manufacturing industry, QFD functions to identify operator needs related to comfort at work (ergonomics) (Azwir et al., 2021) as well as improving engine capacity, material specifications and storage (Azizah., 2018).

QFD is a systematic approach in determining Customer desires/ VOC (Voice of Customer), and translated accurately into technical, manufacturing and production planning appropriately (Anggraini & Nursanti, 2021). QFD is a structured approach to defining Customer needs, describing Customer needs by means of direct interviews, surveys, Customer specifications, observation of reports in the field and others which are then poured into the House of Quality matrix (Sanjaykumar, 2018). QFD as a quality tool in planning to introduce new products and improve/develop product quality (Sukma et al., 2022). In QFD there are several terms that are used in determining attributes, namely the voice of Customer Complaints/ voice of customer, steps for improvement/ quality function deployment and customer satisfaction/customer satisfaction (Kristianto, 2016). The QFD approach provides benefits in product development and implementation in the food industry because it is based on Customer needs and desires (Purba et al., 2018 ; Erdil & Arani, 2019). QFD is described in the form of a House of Quality aimed at fulfilling Customer desires by creating and implementing a HoQ/House of Quality design that is oriented to Customer needs (Lukman & Wulandari, 2018). The HoQ section consists of two main sections that form a horizontal section containing information related to Customers or known as the customer table, and a vertical section containing technical information which is part of the customer's input response or known as the technical table (Marisa & Darmawan, 2019).

In the service industry, QFD produces priority quality attributes based on Customer requirements relating to taste, arrangement, friendliness, courtesy, appearance and technical requirements related to finance (Farhatan & Harisudin, 2020). Improving taste, processing to the packaging stage, adding information and increasing promotion are suggestions for developing products and improving services (Anwar et al., 2014). To find out the quality of QFD products and services, it can be applied to the food-type SMEs industry (Noer et al., 2021). QFD can determine product quality which is a priority based on Customer perceptions (Astuti et al., 2020). The implementation of QFD in product services based on true customer needs includes technical characteristics and critical parts to achieve the targets set (Septariadi et al., 2019). The link between Customer needs, attributes and planning is included in the evaluation process, the results of the study show that the application of QFD helps in implementing improvements efficiently (Erkarlan & Yilmaz, 2011) . Research on food products using QFD , taste, processing results that produce texture and aroma are part of product quality (Rif'ah et al., 2020) and construction projects (Suhara et al., 2023).

The results of product analysis determine how the quality of the product is, while the quality of service, Customer desires can be known by assessing using the Customer Satisfaction Index (CSI) and the Importance Performance Analysis (IPA) and Kano methods (Haris, 2020 ; Rotar & Kozar, 2017), identification, evaluation and analysis with Servqual/ service quality, Kano and QFD (Alfatiyah, 2018; Lukman & Wulandari, 2018 ; Sanjaykumar, 2018), and improvements with a priority scale (Vanany, 2019 ; Wibawa et al., 2017). The quality of products and services is a key factor for success in business. A part of the analysis of product and service quality, increasing customer satisfaction with the QFD approach is a technical characteristic which is part of the HoQ (Kurnia & Listanti, 2019 ; Anwar et al., 2014 ; Singh et al., 2018). In addition to analyzing product quality, technical characteristics are a priority in supporting the successful development of new products in small industries (Hartanto & Manggalarini, 2018). Technical characteristics and Customer desires are factors that influence the weight of the assessment of Customer satisfaction (Xie., 2020). Customer satisfaction is a non-financial performance indicator that influences company image (Hallencreutz & Parmler, 2021). Improvement is an effort to improve into a better change, to make improvements it is necessary to know the condition of the quality of products and services. This study analyzes the quality of products and services in food products. The results of the research are expected to help SMEs to find out the performance of their business so that they can make improvements so as to increase sales (Popoff, 2017; Haber, 2020).

2. Method

This research is a quantitative descriptive research, involving respondents as a population and research sample. According to Sugiyono (2005) in (Sjarifudin et al., 2022) that the quantitative research methods were used in researching samples and research populations, sampling techniques were carried out randomly while data collection was carried out by utilizing research instruments in the form of observation by making observations, interviewing culinary SMEs owners, and distributing questionnaires.

Steps in the research process

1. Determining attributes related to the quality of products and services, there are 5 dimensions of service quality according to Parasuraman et al. (1988) in (Bakhtiar et al., 2012) . The operational definition of the research variable and the expectation measurement scale are the respondents desire for SMEs services which can be known from a structured questionnaire. The operational definition of the research variable and the measurement scale are the actual state of the service received by the respondent which can be known from a structured questionnaire. There are 5 service quality variables, (1) Reliability, compatibility between service expectations and the reality received by Customers. The ability to provide services promptly, accurately, satisfactorily, including Customer acceptance, serving inquiries to buying and selling transactions. (2) Assurance, namely conformity between service expectations and reality of service received, including knowledge, ability, courtesy and trustworthiness of SMEs owners and support services that are free from all hazards, risks or doubts in providing services to Customers. (3) Direct/ tangible evidence, namely the conformity between service expectations and the reality of services received, including parts of the appearance of the service (spacious/adequate space), equipment (completeness and cleanliness of the products offered), sellers (tidiness, cleanliness of waiters and means of communication). (4) Empathy/ emphaty namely the suitability between service expectations and the reality of service received, is a form of attention from waiters and Customers, good communication, attention, and understanding of the needs of Customers. (5) Responsiveness, namely the suitability between service expectations and the reality of services received, including the willingness to help Customers such as the time needed to provide clear information, resolve Customer complaints and fast service to Customers.
2. Developing and distributing questionnaires based on the quality dimension attributes, before distributing the questionnaires, the initial step of the research is to determine the population that has purchased the SMEs culinary products. After the number of population is known, the next step is to determine the number of samples that will be distributed to Customers. The data collection technique uses probability sampling with a random sample technique which is a technique for taking samples from members of the population at random without regard to level with having the same opportunity to be selected. Attributes in the questionnaire to assess the level of satisfaction and the level of interest in the quality of SMEs products and services. The scale used in the assessment uses a Likert scale of 1-5. So that the selected sample represents the population, the number of samples is determined according to the Slovin formula in (Haris et al., 2020).

$$n = \frac{N}{1+N.(e)^2} \dots \dots \dots (1)$$

Where:

n = sample size

N=population size

e = Margin of error / maximum tolerated error (0.05)

$$n = \frac{100}{1 + 100.(0,05)^2}$$

$$n = \frac{100}{1,25}$$

$$n = 80$$

- The collected questionnaires were then processed for data to be tested for validity and reliability

Validity test

Validity test is used to find out whether these attributes are the desires or specifications desired by Customers that need to be considered in terms of product and service quality. Pearson product moment correlation is used to test the validity of research instruments (Novia, Wijayantini, 2019). To find out whether the questionnaire is valid or not, if the questions on the questionnaire are able to reveal something that will be measured by the questionnaire. Validity to measure whether the questions on the questionnaire that have been prepared can measure what will be measured. Validity test analysis was carried out correlating each item's score with the total score. Question items that have a significant correlation with the total score indicate that these items can be used to analyze quality. Data is declared valid if the value of $r_{count} > r_{table}$.

Reliability Test

Reliability test is used to determine the reliability of the measuring instrument used. This reliability test uses Alpha Cronbach's coefficient. This coefficient is a coefficient that is often used because it describes the variation of items, either for true or false or other formats, such as formal on a Likert scale. A variable is said to be reliable if it gives a Cronbach's Alpha value > 0.700 (Anwar et al., 2014). The tool used to test the validity and reliability is SPSS 22.

- Analysis with IPA to determine priority Customer needs

Importance Performance Analysis (IPA)

To measure the attributes and compare the importance of Customers with the satisfaction felt by Customers on product performance, an analysis was carried out using importance performance analysis/IPA. IPA is an analytical technique used to identify important performance factors that must be demonstrated in meeting customer satisfaction. The results of the analysis of each variable are mapped into 4 quadrants of the Cartesian diagram, which consists of Quadrant I (Top Priority), Quadrant II (maintain Achievement), Quadrant III (Low priority), Quadrant IV (Excessive) (Wilujeng & Rembulan, 2019).

To measure a comparison of performance levels, it is shown in the following formula (Gozaly & Talar, 2021)

$$\bar{X} = \frac{\sum_{i=1}^k X_i}{n} \dots\dots\dots (2)$$

Where

- \bar{X} = Skor rata – rata tingkat kepuasan
- \bar{X}_i = Skor tingkat kepuasan responden ke – i
- n = Number of respondents

Measuring the level of importance is done using the formula:

$$\bar{Y} = \frac{\sum_{i=1}^k XY_i}{n} \dots\dots\dots (3)$$

Where:

- \bar{Y} = Skor rata – rata tingkat kepentingan
- \bar{Y}_i = Skor tingkat kepentingan responden ke – i
- n = Number of respondents

To compile the level of Customer satisfaction and interest, a level five Likert scale is used (Aasa, 2020) as presented in Table 1.

Table 1 Likert Scale

Score Weight	5	4	3	2	1
Interest Level	Very important	Important	Quite important	Not important	Very unimportant
Satisfaction Level	Very satisfied	Satisfied	Quite satisfied	Not satisfied	Very dissatisfied

5. Approach with Quality Function Deployment (QFD) by including the results of IPA analysis and brainstorming with SMEs owners to determine the technical response & include it in the House of Quality (HoQ).

Quality Function Deployment

QFD method to determine the level of quality of products and services. The steps for preparing a QFD consist of several stages (Marisa & Darmawan, 2019):

1. Compile a list of customer requirements (Whats Matrix)
 - Compile a matrix of Customer needs (voice of customers), which is a customer requirement
 - whats matrix based on IPA/Importance Performance Analysis
2. Developing a Technical Descriptor (Hows Matrix)
 - Make technical engineering (hows) by conducting interviews with SMEs owners to provide a technical response as a corrective action plan for the Voice of Customer
 - Arrange into a technical response matrix
3. Developing Relationships between Whats Matrix and Hows Matrix
 - Questions for Customers are in the whats matrix
 - While the answers to the questions are in the hows matrix, so there is a relationship between the two matrices according to certain symbols
4. Developing Relationships between Hows Matrix, this matrix is an alternative answer to the whats question, these relationships can influence each other or conflict with each other.
 - Develop Prioritized Customer Requirements
 - In Prioritized Customer Requirements, there is a value of importance in each attribute where the value of importance comes from processing data resulting from distributing questionnaires in the column of interest

3. Results and Discussion

Research in the SMEs Industry is conducted to determine the quality of products and services (Yolanda et al., 2020). The purpose of research on small industries is related to the quality of products and services as evaluation material for the improvement and development of the industry (Hartanto & Manggalarini, 2018). In this study the attributes/instruments used refer to the five dimensions of service quality (Rahmawati, 2022). Furthermore, measuring the validity and reliability of the research attributes that have been compiled, distributed and assessed by 80 respondents with the help of SPSS. The results of data collection and processing show that the validity test as shown in Table 2, $r_{count} > r_{table}$ (0.22) with a significant level of 5% means that all attributes are declared valid (Kamilah, 2015). Furthermore, the data is declared reliable if the value of Cronbach's Alpha > 0.700 (Anwar et al., 2014), seen in Table 3 the Cronbach's Alpha value is 0.947.

Table 2. Validity Test Results

No	Attribute	Score_Total	validity
1	Portion as expected	,266 *	Valid
2	The taste of durian fruit is felt in every portion	,618 **	Valid
3	Ethics in serving Customers	,591 **	Valid
4	Price match with taste	,677 **	Valid
5	Compatibility of price with product quality	,677 **	Valid
6	Durability of take-away products	,689 **	Valid
7	SMEs consistency in providing the desired product image	,402 **	Valid
8	Not too long in line to order	,402 **	Valid
9	Not wrong in giving a refund	,590 **	Valid
10	Services are the same regardless of social status	,511 **	Valid
11	Cleanliness of the shop is always maintained	,511 **	Valid
12	Packaging when ordering take away is always neat and clean	,511 **	Valid
13	Precise hours of operation	,402 **	Valid

No	Attribute	Score_Total	validity
14	The services provided are in accordance with standard operating procedures	,511 **	Valid
15	SMEs are responsible for Customers if there is an error	,511 **	Valid
16	Speed in making Customer orders	,904 **	Valid
17	Appropriateness of the given Durian sticky rice ice product image	,904 **	Valid
18	Willingness of employees in serving Customers	,904 **	Valid
19	The taste of durian sticky rice is as expected	,904 **	Valid
20	Convenience to place an order	,904 **	Valid
21	Customer confidence in Durian sticky rice	,904 **	Valid
22	Availability of ample parking space	,948 **	Valid
23	Ease of access to reach the location	,969 **	Valid
24	Have good communication with Customers	,829 **	Valid
25	Durian fruit ripeness consistency	,780 **	Valid
26	The presentation of Durian sticky rice products is interesting	,816 **	Valid

Table 3 Reliability Test Results

Cronbach's Alpha	N of Items
,947	26

After testing the validity and reliability, distributing questionnaires to compare the level of Customer interest with perceived Customer satisfaction with product and service performance (Novrianto, 2016). As shown in Table 4, there are several attributes with negative (-) Gap values, meaning that what Customers currently feel is not in line with their expectations or desires.

Table 4 Value and GAP Score

Indicator	Importance	Performance	GAP
P1	4,21	3.38	-0.84
P1	4,21	3.38	-0.84
P2	4.71	3.64	-1.08
P3	4.73	3.61	-1.11
P4	4.66	4.00	-0.66
P5	4.66	4.00	-0.66
P6	4.68	4.00	-0.68
Q7	4.03	3.80	-0.23
Q8	4.03	3.75	-0.28
Q9	4.08	4.03	-0.05
P10	4,13	4,26	0.14
P11	4,13	4,25	0.13
Q12	4,13	4,26	0.14
Q13	4.03	3.75	-0.28
P14	4,13	4,18	0.05
P15	4,13	4,19	0.06
Q16	3.93	3.71	-0.21
Q17	3.93	3.84	-0.09
P18	3.93	3.76	-0.16
P19	3.93	3.83	-0.10
P20	3.93	3.84	-0.09
P21	3.93	3.78	-0.15
P22	3.89	3.56	-0.33
P23	3.88	3.54	-0.34
P24	4.76	4,20	-0.56
P25	4.45	3.06	-1.39
P26	4,28	2.55	-1.73

The results of data processing are described in the Importance Performance Analysis (IPA) Cartesian diagram showing these attributes spread across 4 different quadrants with each level of importance and expectation (Iswari et al., 2015).

Quadrant 1 is a quadrant that contains attributes that are considered important so that they become priorities for improvement (Bambang et al., 2012). Attributes that are in quadrant 1, Direct evidence /Tangible, namely the presentation of Durian sticky rice products is attractive (26), Assurance is the consistency of ripeness of durian fruit (25), portions according to expectations (1), taste of durian fruit is felt in each portion (2), Empathy related to ethics in serving customers (3). These attributes indicate that Customer desires are not as expected.

Quadrant 2 contains attributes that are considered important and are in accordance with Customer expectations. Attributes that are in quadrant 2, price match with taste (4), price match with product quality (5), take-away product durability (6), have good communication with Customers (24). These attributes indicate that the attributes have fulfilled Customer desires and need to be maintained.

Quadrant 3 contains attributes that are considered less important by Customers and whose performance is considered normal. Even though it is considered not important, it has been carried out well by SMEs owners. Attributes that are in quadrant 3, accuracy of operating hours (13), not too long in line to order (8), Customer confidence in Durian sticky ice (21), ease of access to locations (23), willingness of employees to serve Customers (18). These attributes are considered less important and the performance is mediocre.

Quadrant 4 is an attribute that is considered unimportant by Customers but has been carried out very seriously by SMEs. Attributes that are in quadrant 4, the consistency of SMEs in providing the desired product image (7), SMEs are responsible for Customers if there are errors (15), the packaging when ordering take away is always neat and clean (12), the services provided are according to operational standards procedures (14), the service is the same regardless of social status (10), the cleanliness of the shop is always maintained (11), there is no mistake in giving a refund (9), the suitability of the image of the given Durian sticky ice product (17), the ease of placing an order (20). The cartesian diagram Importance Performance Analysis (IPA) can be seen in Figure 1.

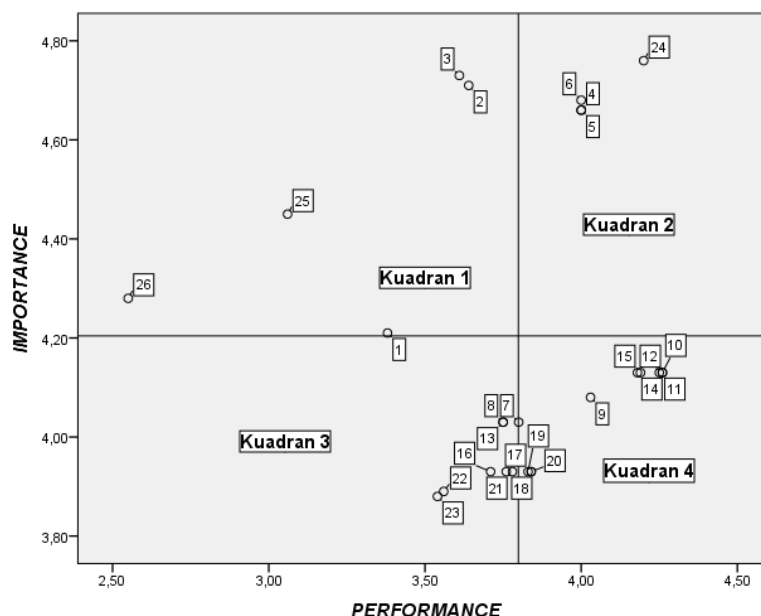


Figure 1 Cartesian diagram Importance Performance Analysis (IPA)

House of Quality (HoQ)

House of quality (HoQ) functions to improve quality based on attributes that are in accordance with Customer desires and product development (Lukman & Wulandari, 2018). The results of the analysis using Importance Performance Analysis (IPA), attributes in quadrant 1 are the priority for Customer requirements/ Voice of Customer. For this reason, it is necessary to carry out an analysis with the formation of HoQ through the development of Customer requirements as shown in Table 5.

Table 5 Customer Requirements

No	Attribute
1	The presentation of Durian sticky rice products is interesting
2	Durian fruit ripeness consistency
3	The taste of durian fruit is felt in every portion
4	Ethics in serving customers
5	Portion as expected

Meanwhile, to make improvements to the requirements of Customers/ Voice of Customer, interviews were conducted. Results interviews with SMEs, obtained eight technical requirements to respond to Customer desires (Voice of Customer) as a solution for improvement plans. To analyze the relationship between Customer requirements and technical requirements, a house of quality was created (HoQ) (Septiardi et al., 2019) can be seen in Table 6.

Table 6 Technical Requirements

No	Engineering requirements
1	Durian fruit ripeness consistency
2	The presentation of Durian ice products is interesting
3	Friendliness in serving Customers
4	Durian fruit flavor consistency
5	Convenience to place an order
6	Maintain cleanliness of tables & other physical equipment
7	Double-check orders before sending them to Customers
8	Guarantee food replacement if there is a problem with taste (stale etc.)

Based on the results of distributing and evaluating questionnaires to customers through the development of HoQ, each attribute gets a different level of importance score, attractive Durian sticky rice product presentation score 4.28, durian ripeness consistency 4.45, portion according to expectations 4.21, ethics in serving Customers 4.73, taste durian fruit tasted in each portion 4.71, as shown in Figure 2.

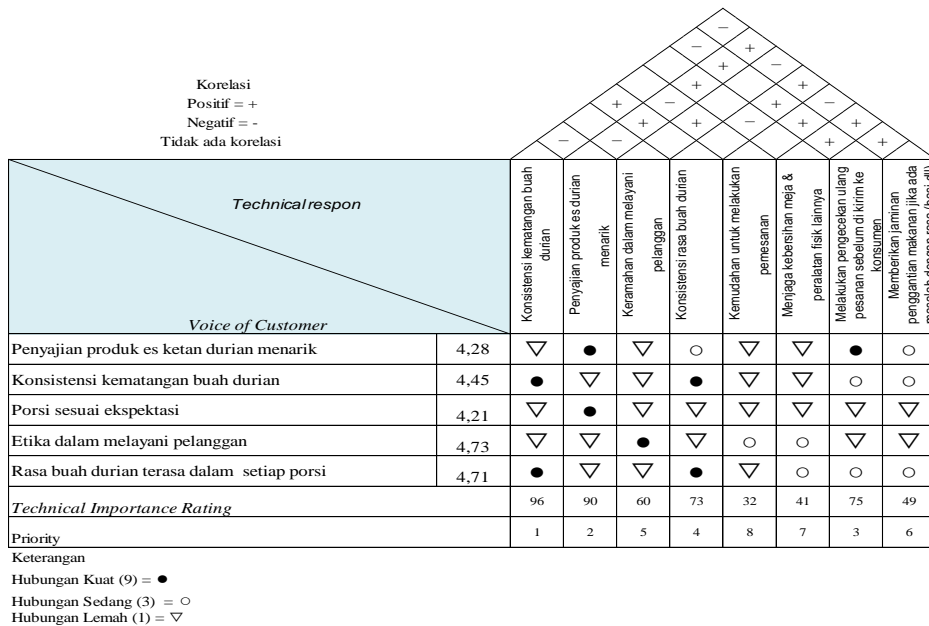


Figure 2 House of Quality

The results of the brainstorming that have been compiled into the House of Quality (HoQ) technical response matrix show that:

1. There is a strong relationship between the presentation of Durian sticky rice products that are attractive to Customers and the technique of serving Durian ice products. Product presentation is an attraction for Customers so that it becomes one of the voices of Customers that SMEs must pay attention to. For this reason, it is necessary to improve how to present these products so that they look more attractive to Customers. In addition to ensuring that the presentation is in accordance with SOP (standard operational procedures), double-checking of orders must be carried out before being sent to Customers
2. The consistency of ripeness of durian fruit desired by Customers has a strong relationship with how to maintain consistency of ripeness of durian fruit and consistency of the taste of the fruit by conducting quality control of each product before being sold to Customers
3. Portions according to expectations have a strong relationship with product presentation techniques. Improvements made by SMEs by using serving sizes, so that the portions served are always consistent
4. Ethics in serving customers has a strong relationship with how to improve service and show hospitality in serving customers. The way to do this is to provide and socialize to employees how standard customer service
5. The taste of the durian fruit is felt in every portion desired by the customer, it has a strong relationship with the consistency of ripeness and the taste of the durian fruit is maintained by carrying out quality control of raw materials for standard maturity levels

4. Conclusions and Recommendations

Priority improvements made by SMEs based on QFD technical importance rating with making standard operating procedures for each technical response in the form of standard operating procedures for checking raw materials and the amount of raw materials used in each serving, re-examining, providing the composition of the main raw materials so that the taste remains consistent (Assurance), serving techniques with serving sizes, cleanliness physical facilities (Tangible), service to Customers and socialization of how to standardize customer service (Emphaty), and ordering techniques (reliability). So in order to maintain and maintain the quality of SMEs products and services in the culinary field, it is necessary to carry out a performance evaluation especially related to the four aspects of service quality Assurance, Tangible, Emphaty and Reliability as a design in service quality assessment.

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