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Integration of Service Quality, Importance Performance Analysis, and Quality Function Deployment for Service Quality Analysis

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Abstract:

Companies that provide service offerings must prioritize service and customer comfort. Customers do not only assess the services provided; they also evaluate the comfort and performance of the employees serving them. Customer satisfaction is crucial since customers are the source of income and an excellent promotion medium. They share their experiences with others based on what they feel. Information technology services are currently in high demand, and with many competitors emerging, it is essential to build customer trust by fulfilling their needs to achieve customer satisfaction. This study aims to analyze the service quality at Dinotech Solution to determine how satisfied customers are with the services provided and to measure the quality of the services performed. Customers at the managerial level will be the subjects for data collection in this study. The data will be processed using Service Quality (Servqual) and Importance Performance Analysis (IPA), further clarified with the Quality Function Deployment (QFD) method in the house of quality. It is expected that this study will provide solutions to enhance customer satisfaction. The research results can also serve as actionable solutions for the company to attract more customers and retain existing ones.

Keywords: *service quality, importance peformance analysis, quality function deploymentt, house of quality*

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1. Introduction

In the marketing process in the service sector, comfort and ease are highly prioritized because there are no physical products as parameters to hold. In its growth, every marketing strategy in the service sector highlights repeat orders in addition to acquiring new customers. For repeat orders, the comfort of the customer is very prominent (Low, 2021)in this case, good service will make customers reluctant to switch places or services. Many companies believe that the services they have provided are already the best and feel there is no need to improve processes that have been in place for years. However, consumers also have expectations in areas that are crucial and need improvement. When these expectations are not met, consumers may

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seek services from competitors and make comparisons. The problem arises when the quality of service is similar to that of competitors, but the competitor offers better customer service—consumers will not hesitate to switch. Therefore, it is essential for companies to gather feedback from consumers and identify which aspects of the service are most important to them.

Businesses in the IT sector (software development) do not have a physical product, in other words, this is part of the service. The companies in this field are very diverse (Modiba & Kekwaletswe, 2020) However, they all share the common objective of creating application systems that meet customer desires and are easy to use, or can even be said to be hassle-free. All sectors are competing to have a strong digital system so that everything is well-structured, which is why third-party companies in the field of software development play their role (Vakeel et al., 2021). With the creation of suitable applications and the increasing number of competitors, consumers do not just look at technical excellence but also take service quality into account. Thus, what is most observed, besides good results, is good service. It is certain that those with the best service will receive repeat orders most frequently (Maryani & Chaniago, 2019). In response to these issues, the researcher will conduct a study at Dinotech Solution to determine the current service quality and how to improve it. One method for enhancing service quality is to integrate the SERVQUAL method followed by Importance Performance Analysis (IPA), after which the data will be analyzed using Quality Function Deployment (QFD) (Wu et al., 2020).

In general, this research will be conducted with the object of Dinotech Solution, with the need to understand and assess how the services that have been implemented so far are performing, as there has yet to be a process in place to measure service quality in that company. It is hoped that if the service at Dinotech Solution can be measured and areas that still need improvement are identified, then the stakeholders can enhance those services to help the company achieve its desired targets. This research combines the importance and satisfaction of customers with the perspectives of employees working at Dinotech Solution, creating a reciprocal relationship when the company implements technical responses to attributes with low satisfaction scores.

2. Theoretical Background

In existing journals such as “Winning customer satisfaction toward omnichannel logistics service quality based on an integrated importance-performance analysis and three-factor theory: Insight from Thailand”(Sumrit & Sowijit, 2023) Demonstrate how customer satisfaction benchmarks can help the company understand the competitive landscape and formulate the right omnichannel strategy for logistics to enhance satisfaction and maintain customer competitiveness, “Designing Products and Services to Meet and Exceed Customer Expectations using Quality Function Deployment (QFD) and House of Quality (HOQ): Applications in Six Sigma and Design for Six Sigma (DFSS)”(Sahay, 2023) It is said that the success of a company

depends on the design, development, and launch of new products of superior quality, quick time to market (reduced cycle time), introducing innovation in products, and understanding customer needs and requirements. "influence of service quality and customer satisfaction of the BRImo application on customer loyalty"(Saputra et al., 2022) It is also said that customer loyalty has a strong impact on profitability, especially the loyalty that results from a very good relationship between the company and its customers. "Analysis Of Service Quality On Customer Satisfaction With Servqual And QFD Methods"(Wahyu Satria Perkasa, 2022) Consumers will perceive the quality of service performance as low when the perceived quality in the field is generally said to be good but does not meet consumer expectations

3. Methodology

The research stages have both quantitative and qualitative models. In the SERVQUAL and IPA stages, data collection is required, so the method used is definitely quantitative. Next, in the House of Quality for QFD (Chaudhary & Dey, 2021) the data processing tends to be qualitative. By combining these two methods, it is hoped that data can be obtained from two perspectives. For the purpose of detailing the flow, it can be depicted according to the flowchart below. This way, we can see a clearer picture of the research.

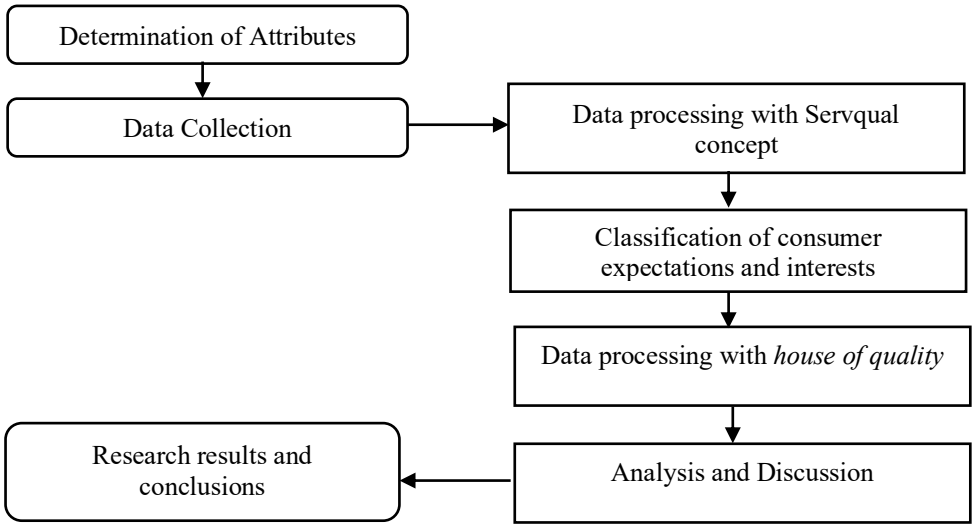


Figure 1. Research framework

The determination of attributes is carried out by elaborating on the dimensions of service quality. Next, questionnaires will be targeted to customers at the managerial level and data will also be taken from competitors' customers. In the processing of Servqual, several attributes with the most negative gaps will be selected and compared

with the IPA graph to determine importance and satisfaction. From these two processes, we can determine which attributes need to be managed further. These attributes will then be processed in the house of quality dimension. The analysis in this study is conducted to determine the most feasible technical responses based on the house of quality. The final stage is the conclusion and recommendations from the research conducted. The researcher uses primary data obtained from the results of questionnaires collected from customers who have used the services of Dinotech Solution and competitor companies in the same field. The researcher classifies the respondents filling out the questionnaires as those in managerial positions, PIC, or those responsible for the tasks assigned to the company. The researcher will involve customers who have used the services of Dinotech Solution as well as competitors. Data will be collected from 10 companies/institutions, with 5 respondents from each company/institution. Additionally, there will be 5 competitors, with data collected from 5 companies/institutions, with a total of 2 respondents from each company/institution. The target value, which is the company's target for customer satisfaction, will be taken from 10 questionnaires filled out by company employees. This research also uses a Likert scale of 1-7. Data will be taken from the questionnaire forms at Dinotech Solution's customer companies, specifically at the managerial level. In general, the questionnaire consists of 3 types of responses to the same question

1. Importance Level: to measure how important a service attribute (Quan et al., 2022)
2. Satisfaction Level: to measure the satisfaction felt by consumers for each attribute (Jurnal et al., 2023)
3. Expectation Level: to measure the expectations desired by consumers
4. Target Value/Satisfaction: to determine the target satisfaction that the company aims to achieve

Service Quality

The service quality method (Servqual) is used. This is a commonly used method in service quality studies (Ikhsan Syukri Amri, 2023).Parasuraman mentioned the following, according to (Stighfarrinata & Ashari, 2022). In Servqual, several dimensions are known :

1. Tangibles: Regarding the attractiveness of physical facilities, complete equipment, and materials used by the company. In this case, what will be measured are the appearance of employees and promotional designs conducted by the company.
2. Reliability: Related to the company's ability to provide accurate service from the first time without making any mistakes and delivering its services as agreed upon.
3. Responsiveness: Related to the willingness and ability of employees to help customers and respond to their requests, as well as informing them when the service will be provided and then delivering the service quickly.

4. Assurance: Employee behavior that can foster consumer trust in the company and the company's ability to create a sense of security for its customers. Assurance also means that employees are always polite and possess the knowledge and skills needed to handle every question or problem from consumers.
5. Empathy: States that the company understands its customers' problems and acts in the best interest of the customers, providing personal attention to customers and having convenient operating hours (Artikel et al., 2022)

Importance Peformance Analysis

IPA primary task is to convey information about the service factors that significantly impact customer satisfaction and loyalty, as well as those that customers believe need improvement. The IPA method takes an analytical approach to identify the grouping of attributes within an organization that fulfills customer satisfaction. IPA is divided into four dimensions or quadrants. The first step in quadrant analysis within the Cartesian diagram is to calculate the average ratings of importance/expectation and performance for each attribute.

1. **Quadrant I (Top Priority)** This quadrant contains features that are considered important by visitors but do not meet customer expectations; their performance is lower than customer expectations. Features in this quadrant need to be improved further to satisfy customers.

2. **Quadrant II (Maintain Performance)** All attributes in this quadrant have high levels of expectation and performance, indicating that these attributes or statements are important and successful. They should be maintained for a long time as they are considered important and expected, providing satisfactory results.

3. **Quadrant III (Low Priority)** Attributes in this quadrant have low levels of importance or expectation and are rated poorly by customers. Improvements to attributes or statements in this quadrant should be reconsidered based on how much or how little they affect the benefits perceived by customers. Additionally, attributes or statements in this quadrant should not be transferred to Quadrant I.

4. **Quadrant IV (Excessive)** In this quadrant, attributes/statements have low levels of expectation according to customers but perform well, making them considered excessive by customers. This indicates that the attributes/statements influencing customer satisfaction are seen as over-executed because customers believe that these attributes/statements are not very important or expected but are implemented well so that customers can enjoy their experience without compromising anything they have.

Quality Function Deployment

QFD is a structured methodology used in the product planning and development process to define the specifications of consumer needs and desires. It systematically evaluates the strengths and weaknesses of a product or service's capabilities in meeting consumer needs and desires. QFD was developed to ensure that the products entering the production stage will truly satisfy consumer or customer needs by establishing the necessary quality and achieving maximum alignment at every stage of product development. The structure of QFD is often likened to a matrix in the shape of a house, commonly referred to as the House of Quality.

In general, this research approach involves quantitative data analysis, taking into account customer satisfaction, expectations, and importance. Service quality serves as the foundational variable to be measured, while Importance Performance Analysis (IPA) is used as a method to map consumer needs by evaluating importance and filtering which attributes need to be implemented or revised. The function of QFD, as previously explained, is to determine the most suitable and efficient technical response by considering the relationships between attributes and incorporating feedback from employee questionnaires.

4. Empirical Findings/Result and Discussion

With accountable data, the researcher obtained data as shown in Table 1. This data maps each attribute to be grouped into 4 quadrants. This is useful to identify which attributes are very important and need immediate improvement, thus becoming a priority for solutions. From determining the gap and classification of importance, the company will decide which attributes to address first to improve service quality (Wicaksono et al., 2021)

Table 1. Quisioner results each attribute

Service Attributes			Importance	Satisfaction	Expectation	Gap
Reability	1	Accuracy of Business Processes Analyzed	5,59804	5,48039	5,16667	0,31373
	2	Ease of Product Use	5,71569	5,63725	5,41667	0,22059
	3	Precision in Analyzing Needs	5,72549	5,47059	5,58333	-0,11275
	4	Speed of Work by Programmers	5,69608	5,52941	5,58333	-0,05392
	5	Good Frontend Design	5,66667	5,56863	5,83333	-0,26471
	6	Programmer Skills	6,00980	5,63725	5,75000	-0,11275
	7	Application Speed When Used	6,03922	5,38235	5,33333	0,04902

	8	Error Rate of the Application After Development	5,69608	5,17647	5,41667	-0,24020
	9	Application Features Functioning Well	5,99020	5,40196	5,33333	0,06863
Responsiveness	10	Ease of Coordination Regarding the Application	5,90196	5,62745	5,41667	0,21078
	11	Price for Appropriate Service	5,48039	5,31373	5,16667	0,14706
	12	Explanation of Workflow and Advantages/Disadvantages of Features to Be Developed	5,67647	5,42157	5,75000	-0,32843
	13	Contribution to Application Implementation	5,81373	5,59804	5,25000	0,34804
	14	Ease of Complaints	5,75490	5,50000	5,41667	0,08333
Assurance	15	Warranty Provided	5,94118	5,44118	6,16667	-0,72549
	16	Quality of the Application/System Provided	5,96078	5,42157	5,33333	0,08824
	17	Feature Adjustments During the Warranty Period	5,74510	5,40196	5,41667	-0,01471
	18	Assistance in Running the Application	5,83333	5,52941	5,41667	0,11275
Emphaty	19	Polite and Friendly Service from the Company	5,83333	5,64706	5,41667	0,23039
	20	Ease of Coordination When Ordering a New Applicationaplikasi baru	5,84314	5,48039	5,33333	0,14706
	21	Politeness of Company Admin	5,79412	5,50980	5,75000	-0,24020
Tangible	22	Promotional Design (Product Proposals, Company Profile)	5,74510	5,48039	5,00000	0,48039
	23	Digital Media Design (Website)	5,70588	5,48039	5,00000	0,48039
	24	Appearance of Employees When Meeting Customers	5,75490	5,50980	5,58333	-0,07353

The gap in Table 1 is the result of subtracting current satisfaction from expectations. If the value is negative, it indicates that customer satisfaction is still below expectations, whereas a positive value means customers are already satisfied. Based on this information, the attributes in the assurance dimension show the most negative values. However, many attributes in the reliability dimension are also negative. To determine which attributes will be managed using the QFD method, they will be detailed through the IPA quadrant

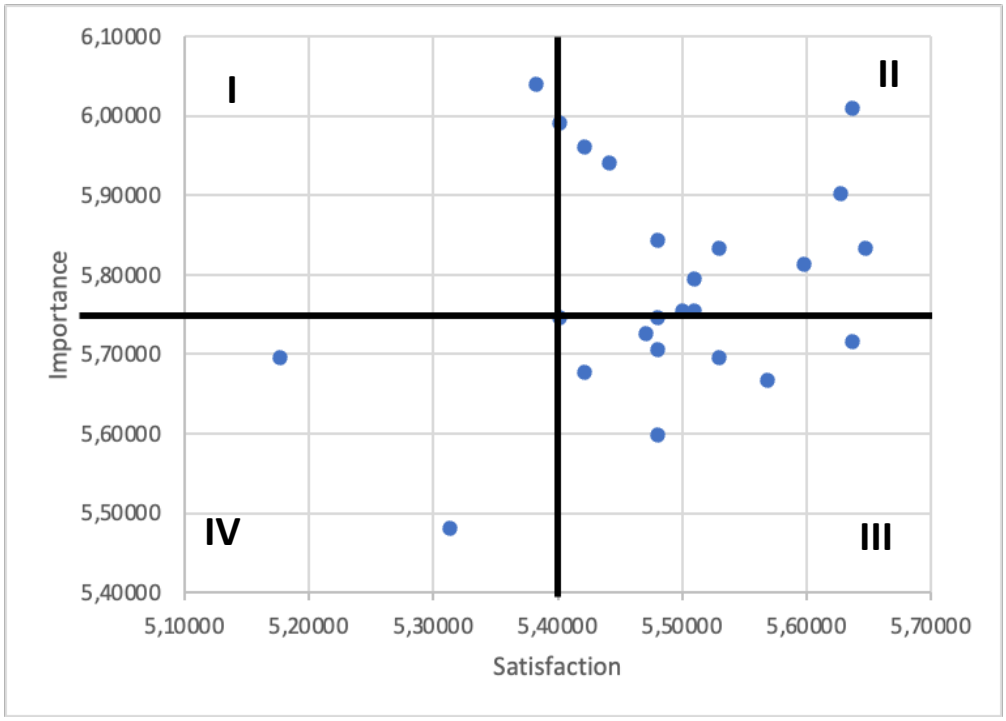


Figure 2. Importance classification

From Figure 2, we classify the data with the x-axis representing satisfaction and the y-axis representing importance. This data is taken from the questionnaire detailed in Table 1 and displayed on the classification graph in Figure 2.

The attributes to be managed further are identified after being mapped through the two images above. The result is the What matrix, or the matrix of consumer needs. Therefore, we need to determine the company's responses required to address those consumer needs. The company's responses are then referred to as the How matrix, or the company's technical responses. Before creating the What & How matrix, the company will gather information using qualitative methods to conceptualize or characterize the technical responses to be implemented. In this case, the filtered desires will be followed by identifying several solutions that the company can implement. In this study, it has been determined that the references are the assurance attributes and the attributes in Quadrant I and Quadrant II. With the condition that if the gap is positive and greater than 0.1, it will not be included and will be replaced with attributes in the assurance group with a gap smaller than -0.1, even if it is not an attribute with high importance.

Developing Customer Priorities for Needs

From the questionnaire on importance and the selection of indicators to be followed up, the next step is to assess the level of importance. From the data obtained, we can

determine the Improvement Ratio/Scale-up Factor based on the target value, which is derived from the customer satisfaction target questionnaire taken from the company's employees.

$$Improvement\ Ratio = \frac{Target\ Value}{Customer\ Satisfaction}$$

The next stage is to weigh the Sales Point to identify whether fulfilling customer needs impacts the company's profit. The most commonly used Sales Point values are:

1 : No sales point
1.2 : Moderate sales point
1.5 : Strong sales point

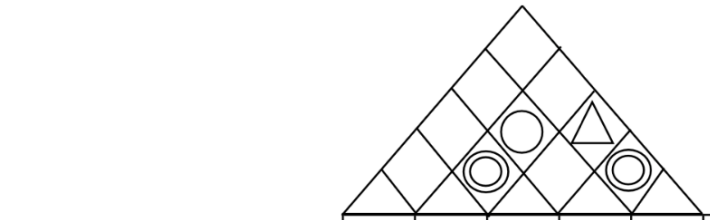
Next, we need to determine the absolute weight of consumer desires, which involves Consumer Importance, Improvement Ratio, and Sales Point.

$$Absolute\ Weight = Importance\ x\ Improvement\ Ratio\ x\ Sales\ Point$$

Table 2. Results of Developing Consumer Desires

Service Attributes	Satisfaction	Target Value	Improvement Ratio	Sales Point	Absolute Weight
Application Speed When Used	5,38235	6	1,11475	1,5	10,09836
Programmer Skills	5,63725	6	1,06435	1,2	7,67583
Application Features Functioning Well	5,40196	5,4	0,99964	1,2	7,18563
Quality of the Provided Application/System	5,42157	5,2	0,95913	1,5	8,57577
Warranty Provided	5,44118	5,6	1,02919	1,2	7,33751
Ease of Coordination When Ordering a New Application	5,48039	5,2	0,94884	1,5	8,31628
Assistance in Running the Application	5,52941	5,8	1,04894	1,2	7,34255
Politeness of Company Admin	5,50980	5,4	0,98007	1,2	6,81438
Ease of Complaints	5,50000	5,6	1,01818	1,5	8,78930
Appearance of Employees When Meeting Customers	5,50980	5,4	0,98007	1,2	6,76826
Adjustment of Features During the Warranty Period	5,40196	5,6	1,03666	1,5	8,93358

House Of Quality Explanation



Strong = 9
Moderate = 3
Weak = 1

	Implementation of Uniforms During Visits	Hiring Additional Customer Care Staff	Training for Employee Personality Development	Periodic Technical Skills Training	Hiring New Programmers	Satisfaction	Expectation	Importance
Application Speed When Used				◎	○	5,64	5,75	6,01
Programmer Skills				△	△	5,38	5,33	6,04
Application Features Functioning Well				◎	◎	5,40	5,33	5,99
Quality of the Provided Application/System		◎	○		○	5,50	5,42	5,75
Warranty Provided			○		○	5,44	6,17	5,94
Ease of Coordination When Ordering a New Application				◎	○	5,42	5,33	5,96
Assistance in Running the Application			◎			5,53	5,42	5,83
Politeness of Company Admin			○	◎	○	5,40	5,42	5,75
Ease of Complaints			○			5,48	5,33	5,84
Appearance of Employees When Meeting Customers		○	◎			5,51	5,75	5,79
Adjustment of Features During the Warranty Period	◎		◎			5,51	5,58	5,75
Absolute Weight Percent	51,79	138,91	156,56	219,39	148,19			
Relative Weight Percent	60,91	192,43	195,57	301,44	198,70			

Figure 3. House Of Quality

In this matrix, we can identify customer needs based on the quality gap and the expectations desired by consumers. The questionnaires distributed revealed that some attributes have a very small gap, particularly in the assurance attribute. In other words,

consumers are least satisfied with that attribute. With the IPA mapping the importance, points 10 and 13 are excluded from priority customer needs as their gaps are already satisfactory.

In the initial planning stage, the attribute data to be processed will be ranked according to importance, as shown in Table 2. The highest importance is the speed when using the application, with a score of 6.03922, and the skill of the programmer, with a score of 6.00980. This data will be compared with the target value obtained from company employees' questionnaires, representing the desired consumer satisfaction targets. From the current customer satisfaction data, we get the improvement ratio variable, which is the comparison between the target value and current customer satisfaction. It can be described that the larger the improvement ratio, the greater the effort required by the company to improve that attribute. In this study, the attribute "Speed of application when used" has the highest improvement ratio. The characteristics can be seen in Figure 3.

It is explained that the company has determined technical steps to improve attributes with small gaps and high importance. From the technical steps designed according to Figure 3, a correlation matrix called the What and How relationship matrix is formed. The assessment is based on the information in the figure.

From Figure 3, it can be concluded that when new employees are added, training is highly relevant because training is essential for new employees (programmers or customer care). Therefore, extra attention is needed when adding employees. If the new employee is a programmer, technical training is very important, and personality training is less important as they do not directly interact with consumers. In contrast, for new customer care employees, personality training is very important, and technical training for product knowledge is also necessary.

Based on the mapped customer needs and their improvement ratios, the company needs to add the sales point parameter as shown in Table 2. The determination is done objectively by the company. This is necessary to refine the absolute weight of each attribute according to the given formula. The absolute weight will be used to determine the technical weight, which is the final result of this study

1. Absolut Weight and Percent
   With the explanations provided earlier, "Periodic Technical Skills Training" becomes the attribute with the highest absolute weight, and "Implementation of uniforms during visits" is the lowest, as seen in figure 3
2. Relative Weight and Percent
   For relative weight, "Periodic Technical Skills Training" is the attribute with the highest absolute weight, and "Implementation of uniforms during visits" is the lowest

The study data tends to be consistent, indicating that "Periodic Technical Skills Training" should be prioritized for implementation, corresponding to attribute points 6, 7, 9, 16, 17. The second option could be "Technical Response Training for Employee Personality," which will be implemented to address non-technical needs. From the obtained results, it is evident which priorities need to be addressed. By considering the interrelationship between technical responses, we can also determine which attributes need to be implemented first and how they are related to other attributes

The results of this study align with previous research, such as “Exploring service quality combining Kano model and importance-performance analysis - customer satisfaction of luxury housing service management” (Wu et al., 2020), where not all attributes were addressed by the company because they did not require immediate improvement. However, the difference lies in the dimensions prioritized; in this study, the focus is more on reliability and assurance. Another difference in this study is the application of QFD for further processing of needs, which necessitates gathering information from employees themselves, making the data two-way. In another study, “Designing Products and Services to Meet and Exceed Customer Expectations using Quality Function Deployment (QFD) and House of Quality (HOQ)” (Sahay, 2023), a similar final approach is taken, although it does not use importance as a parameter because the subject is a new innovation. Thus, this study could potentially be developed further to test new breakthroughs from the company with existing customers.

5. Conclusions

This study aims to address issues at Dinotech Solution Company. Surprisingly, there are aspects of the company's service that consumers find unsatisfactory, evidenced by the negative score in the assurance dimension. The researcher also found that at least 11 attributes require solutions. By implementing Importance Performance Analysis (IPA) and Quality Function Deployment (QFD), the solutions proposed include designing technical response strategies for Dinotech Solution. Three feasible solutions are identified: periodic technical skills training, hiring additional programmers, and training for employee personality development. The recommended suggestion is to prioritize periodic technical skills training, which is more cost-effective than hiring additional programmers. Subsequently, employee personality training can be conducted to improve interactions and service to customers. Additional programmers and customer care staff should be added only if customer orders exceed capacity.

The study has limitations, such as data collection only involving consumers at the managerial level; a separate questionnaire should be provided for staff-level consumers. Competitors should also be assessed separately to allow for comparisons related to market needs. Future research could analyze service quality similarly while considering the technical responses undertaken by the company and the costs incurred,

as well as segmenting consumers according to company type or business line. The conclusion of this study emphasizes that regular service quality analysis is crucial to understanding consumer satisfaction and enhancing the competitiveness of the company

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