Analysis of Servqual Repair Using the IPA Method in CN235 Aircraft Maintenance Services by PT Dirgantara Indonesia Maintenance, Repair, and Overhaul

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Abstract

The increasing competition in the business world, particularly in the manufacturing and service industries, has prompted business owners to measure their operations from the perspective of their customers through customer quality analysis. The maintenance service performed at PT Dirgantara Indonesia for the CN235 Aircraft of the Indonesian Air Force's 27th Squadron was analyzed using service quality methods such as GAP analysis and IPA analysis. According to the research results of this analysis, PT Dirgantara Indonesia must improve its CN235 aircraft maintenance services' timeliness, flexibility, information and communication disclosure, and payment methods.

Keywords: *Service Quality; GAP Analysis; IPA Analysis; CN235 Aircraft; PT DI*

1. Introduction

The business competition extends beyond the manufacturing industry and has infiltrated the service industry. The manufacturing sector competes on the quality of products produced, whereas the service sector competes on the quality of service that companies provide to customers (Wisnu, 2021), (Lubis, 2019), (Wicaksono, 2022). Furthermore, business actors expect to deliver the best service possible (Ichsan, 2022). Understanding the qualities of the customer is one thing that service providers can do to increase customer trust. Understanding customer demand, knowing customer desires, and knowing customers can help with it (Alfatiyah, 2018), (Anastasya, 2022). Continuing costs for services or products, including administrative issues, impacts customer satisfaction (Restiani, 2016). The concept of satisfaction refers to a desire felt by customers as a result of service or product expectations (Habibah, 2019).

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The research was out at PT Dirgantara Indonesia, which is reported at Jalan Pajajaran Number 154, Husen Sastranegara, Cicendo District, Bandung City, West Java 40174. PT Dirgantara Indonesia is a company that manufactures light and medium-class turboprop aircraft for military operations and special missions, as well as civil and commercial aviation (Amperiawan, 2022). PT Dirgantara Indonesia's business has been divided into four categories: Aircraft, aerostructure, aircraft, and engine services, as well as technology development related to Aircraft and several other types of industries. Furthermore, PT Dirgantara Indonesia offers Maintenance, Repair, and Overhaul services guided by a Quality Management System that adheres to compliance with the guidelines of the Indonesian Directorate General of Civil Aviation, CASR 145 (*Aircraft Maintenance Organization*), CASR 57 (*Aeronautical Component Distributor*), DOA (*Design Organization Approval*), ISO 9001 (*AS/EN 9110 aircraft workshop/Requirements for Aviation Maintenance Organization*).

This study focused on maintenance services for CN235 Aircraft belonging to the Indonesian Air Force's 27th Squadron that was currently being serviced at MRO PT Dirgantara Indonesia, where the CN235 Aircraft was also produced.

The Service Quality method was developed in 1985 by A. Parasuraman, Valarie A. Zeithaml, and Leonard L. Berry to measure the satisfaction of customers. Service quality was measured by distributing questionnaires to customers, with the customer acting as the respondent (Ariani, 2018). This service quality method evaluates customer satisfaction based on the respondents' perceptions and expectations. Each questionnaire statement is divided into several dimensions, each containing several attributes (Satria, 2019). This method of service quality is also known as gap analysis (Eko, 2017). According to Parasuraman, Zeithaml, and Berry, there are five commonly used dimensions to measure service quality, which include the following (Parasuraman, 1985).

a. Tangible

Physical evidence includes physical facilities, existing tools, company appearance, physical facilities and infrastructure, and tangible evidence of service from the intended service provider.

b. Reliability

The ability of a company to provide services to customers under the initial agreement, trustworthy, accurate, and in line with customer expectations is what is meant by reliability.

c. Responsiveness

Employee responsiveness refers to their desire to provide customers with quick and precise services. One of the examples is the responsiveness of employees in handling customer complaints.

d. Assurance

Assurance refers to an employee's ability to foster consumer confidence in the services provided, such as giving customers a sense of security so that future customers can feel at ease.

e. Empathy

Empathy is when employees and businesses pay special and in-depth attention to customers to understand what these customers expect.

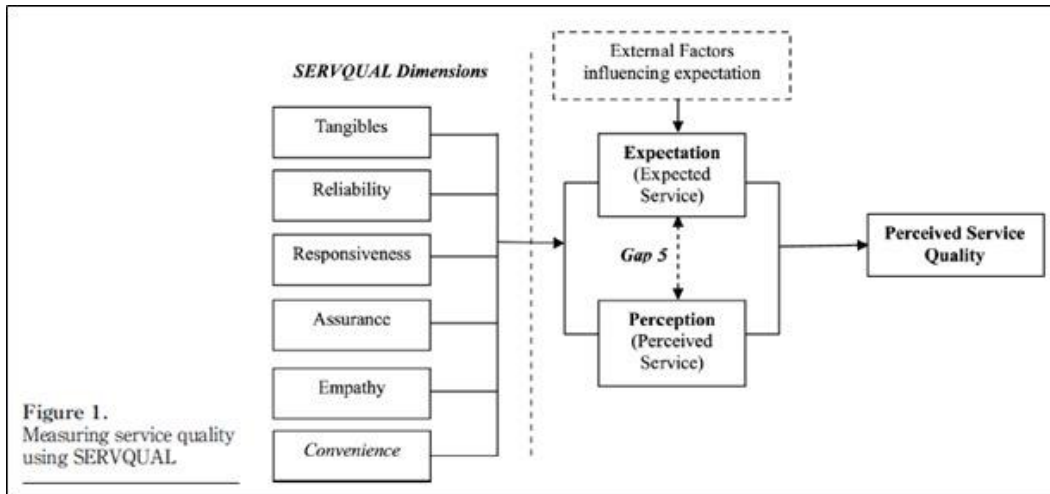This method's framework is illustrated in the image below.

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Figure 1. Measuring Service Quality using Servqual (Source: Parasuraman et al., 1985)

2. Research Method

The combination method used for the research combined quantitative and qualitative data. The qualitative research method involves utilizing the researcher as an instrument (human instrument). The quantitative research method, on the other hand, is a research method that focuses on data in the form of numbers using research instruments. Furthermore, the model used in this study is sequential, meaning that it begins with qualitative data and then moves on to quantitative data (Sugiyono, 2012).

Data gathered by researchers through:

1. Questionnaire. Data collection was completed through the dissemination of questionnaires in the form of written forms containing statements addressed to respondents to the company.

2. Observation. The data that gathered through observation by going directly to the field.

3. Review of the literature. Data that gathered through a literature review to conduct a further review of references from the theory used.

Researchers manage data such as service quality research, GAP analysis, and IPA analysis.

Table 1. IPA quadrant

Quadrant I (Main priority)	Quadrant II (Keep up the good work)
Quadrant III (Low priority)	Quadrant IV (Exaggerate)

Source: Reference (Attamimi, 2019)

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Each quadrant's interpretation is as follows (Alfarisyi, 2022):

1. Quadrant 1 is a prioritized attribute because performance is inadequate and must be improved.
2. Quadrant 2 is concerned with the performance's suitability in terms of the expectations that must achieve.
3. Quadrant 3 is a non-critical attribute whose performance is still insufficient.
4. Quadrant 4 is a less important attribute, but its performance is adequate.

3. Result and Discussion

The table below shows the statements in the questionnaire that the researcher then distributes to the respondents.

Table 2. Dimensional Statements in Questionnaires

Dimensions	Attribute number	Questionnaires Statements
Tangible	P1	Maintenance equipment and supplies for the CN235 Aircraft
	P2	Public spaces provided by the company
	P3	Availability of materials to support CN235 aircraft maintenance
Reliability	P4	The competence of workers in carrying out the scope of work assigned to CN235 aircraft maintenance
	P5	On-time completion of CN235 aircraft maintenance work
	P6	CN235 aircraft maintenance troubleshooting
Responsiveness	P7	Company responsiveness in the context of CN235 aircraft maintenance
	P8	Company guarantees for CN235 aircraft maintenance
	P9	The company's adaptability in CN235 aircraft maintenance
Assurance	P10	The company provides system quality and quality assurance in the maintenance of CN235 Aircraft.
	P11	The company ensures safety compliance in the maintenance of CN235 Aircraft.
	P12	After the CN235 Aircraft is maintained, the company issues a certificate of flight worthiness.
Empathy	P13	Communication and disclosure of information concerning the maintenance of CN235 Aircraft
	P14	Method of payment for CN235 aircraft maintenance
	P15	Product and service conformity in CN235 aircraft maintenance

Source: processed data

a. *Service Quality* Analaysis

The table below shows the service quality analysis results of the surveys sent out and contains several statements.

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Table 3. Service Quality Analysis Findings

Attribute number	Perception		Expectancy		GAP
	Value	*Average*	Value	*Average*	
Tangible					
P1	111	3,70	134	4,47	-0,77
P2	109	3,63	128	4,27	-0,64
P3	98	3,27	126	4,20	-0,93
Total	318	10,60	388	12,93	-2,33
Reliability					
P4	115	3,83	131	4,37	-0,54
P5	85	2,83	133	4,43	-1,60
P6	89	2,97	125	4,17	-1,20
Total	289	9,63	389	12,96	-3,33
Responsiveness					
P7	95	3,17	124	4,13	-0,96
P8	92	3,07	126	4,20	-1,13
P9	77	2,57	130	4,33	-1,76
Total	264	8,8	380	12,66	-3,86
Assurance					
P10	98	3,27	128	4,27	-1,00
P11	105	3,50	127	4,23	-0,73
P12	116	3,87	133	4,43	-0,56
Total	319	10,63	388	12,93	-2,30
Empathy					
P13	86	2,87	136	4,53	-1,66
P14	85	2,83	132	4,40	-1,57
P15	108	3,60	129	4,30	-0,70
Total	279	9,3	397	13,23	-3,93

Source: processed data

The analysis results using the service quality method are shown in the table above. P1 to P15 represent attribute numbers, where P is a statement. These statements are presented more clearly in the questionnaire attached to table 2. The perception column is split into two sections: values and averages. This value is the sum of the total points earned by 30 respondents for each attribute.

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On the other hand, the average that calculated by dividing the values by the number of respondents. The expectation column is divided into two equal parts: value and *standard.* Then, on the right column is the GAP, which results from the average perception minus the moderate expectation, resulting in these values. The GAP results are negative, with the lowest value of -1.76 at P9. The higher minus value in a GAP indicates that the client/user is dissatisfied with the company's performance.

b. GAP Analysis

The results of the gap analysis, or the differences between the perceptions and expectations listed in the previous table, are then rated in the table below.

Table 4. Ranking Table

Parameter	Attribute number	GAP	Ranking
Tangible	P1	-0,77	10
	P2	-0,64	13
	P3	-0,93	9
Reliability	P4	-0,54	15
	P5	-1,60	3
	P6	-1,20	5
Responsiveness	P7	-0,96	8
	P8	-1,13	6
	P9	-1,76	1
Assurance	P10	-1,00	7
	P11	-0,73	11
	P12	-0,56	14
Empathy	P13	-1,66	2
	P14	-1,57	4
	P15	-0,70	12

Source: Processed data

After obtaining the GAP values in table 3, a ranking of all attributes, namely P1 to P15 in table 4, is performed for the GAP analysis. This ranking seeks to determine which attribute has the greatest GAP and should be improved by the company because a large GAP indicates that the user/client is dissatisfied with the company's performance.

c. IPA Analysis

This ranking seeks to determine which attribute has the most significant GAP and should be improved by the company because a large GAP indicates that the user/client is dissatisfied with the company's performance.

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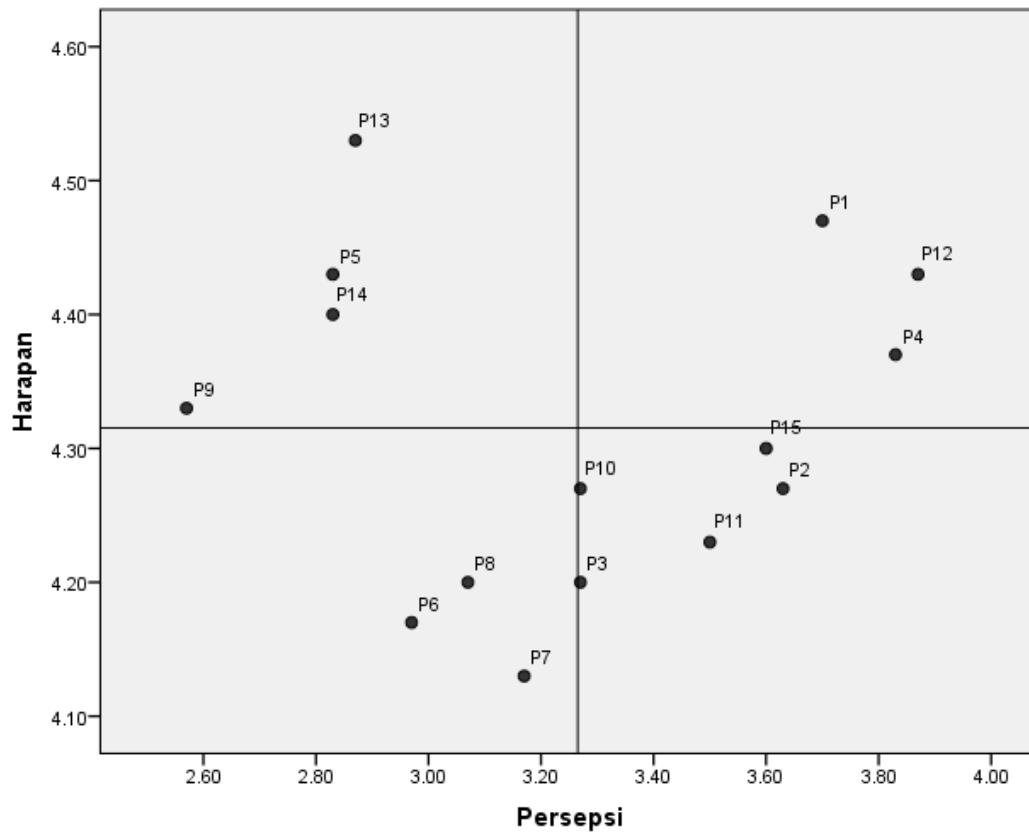
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Figure 2. the results of IPA Analysis

Figure 2 shows that those included in Quadrant 1 are P5, P9, P13, and P14. Where the four GAP analysis attributes appear in the top four rankings. In addition, Quadrant 2 includes the attributes P1, P4, and P12. P6, P7, and P8 are the following attributes for Quadrant 3. Finally, Quadrant 4 consists of P2, P3, P10, P11, and P15.

Conclusion

The attributes that PT Dirgantara Indonesia must repair in terms of maintenance services for the CN235 Aircraft belonging to the 27th Squadron of the Indonesian Air Force are as follows, based on the results of service quality analysis, GAP analysis, and IPA analysis.

1. In the CN235 aircraft maintenance work, the P5 attribute is timely performance.

Timely performance in the CN235 aircraft maintenance work includes timely work on the scope of work in aircraft maintenance. Because if that experience delays one scope of work, it will hinder other scopes of work. Moreover, if the work forms a continuous chain, the obstacles will spread throughout the maintenance work so that the project does not comply with the allotted time.

2. The company's flexibility in handling CN235 aircraft maintenance is the P9 attribute.

The company's flexibility in handling the CN235 aircraft maintenance is the same as not forcing maintenance work. In other words, it is flexible regarding tools, human resources, quality, and others. The maintenance work for this aircraft will usually find unexpected findings not included in the maintenance

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plan discussed in the early stages. This flexibility can also be applied in the division of human resources work so that the last attribute, namely P5, can be fulfilled.

3. P13 is the openness of information and communication regarding the CN235 Aircraft's maintenance.

Disclosure of information and communication regarding aircraft maintenance is vital to be able to build trust from customers. This attribute is also related to attribute P9, where any flexibility made by the company must be immediately communicated to customers. That means any problems during aircraft maintenance must be immediately communicated to the customer to avoid misunderstandings between the company and the customer. In addition, if there are problems beyond the company's control, the customer can be used as an option for assistance in smoothing aircraft maintenance activities.

4. The payment method for CN235 aircraft maintenance is Attribute P14.

This aircraft maintenance payment method must be clear and transparent. It is clear here that the deadline given is how extended, or there is an initial fee that must be paid by the customer immediately. This payment method is also related to attribute P13, namely information and communication disclosure. Because of payment, there must be clarity of information and intense communication between the company and the customer.

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