



(RESEARCH ARTICLE)



# Integration of Importance Performance Analysis (IPA) and Kano Model to Improve the Manggarai Station Service Quality

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## Abstract

Manggarai Station is one of the transit stations with the highest number of passengers and will become the first central station in Indonesia. However, the process of station construction and changes in transit patterns resulted in a significant increase in the number of passengers, which had an impact on the quality of services provided. There are many complaints made by passengers due to the buildup which results in the discomfort they feel when traveling at Manggarai Station. This research aims to determine the order of priority and strategies required for each service attribute using the integration of Importance Performance Analysis (IPA) and Kano, determine the causes of dissatisfaction and low performance received by passengers, and provide recommendations for improvements to the service quality of Manggarai Station. The methods used in this research are Importance Performance Analysis (IPA) and the Kano Model, then the results of both are integrated. Based on the processing results, the categorization results obtained using the IPA method were divided into four quadrants based on performance and importance, the Kano category results were based on satisfaction and dissatisfaction, and the IPA and Kano results were integrated. The results of the IPA and Kano integration show that 4 of the 14 service attributes are included in the Fatal category, which means that performance needs to be improved in order of top priority.

**Keywords:** Service quality; IPA method; Kano model; Public transportation

## 1. Introduction

Global population growth reached 832.87 million people in the last 10 years (The World Bank, 2021) causing overcrowding in several countries, including Indonesia with a density of 142 people/km<sup>2</sup> in 2021 (Central Bureau of Statistics, 2021). Increased community mobility has triggered an increase in numbers private vehicles, but lack of expansion of facilities Roads cause congestion and pollution. The solution is to increase the provision of public transportation in accordance with Law Number 22 of 2009 concerning Road Traffic and Transportation. DKI Jakarta, as the capital of Indonesia, shows a high level of population density, with a congestion ranking ranking 29th in the world according to the Tomtom Traffic Index 2022. This city is an attraction for the surrounding area with a population density reaching 275,773,800 people in 2022, dominated by 69% of the productive age (Central Bureau of Statistics, 2022). The number of workers in Jakarta will increase to 4.875 million people in 2022 (Central Bureau of Statistics, 2022), has an impact on mobility The population is high, so it requires an efficient transportation system.

Minister of Transportation Regulation No. 54 of 2013 emphasizes the development of the transportation system in Jabodetabek with a focus on large capacity mass transportation networks. The DKI Jakarta government provides public transportation to overcome congestion, switching from private vehicles to public transportation provides significant benefits such as reducing congestion, travel time, noise and air pollution (Tuan, Truong, Tetsuo, & An, 2022). Efforts to

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improve the transportation system involve arranging KRL Commuter Line stations that are integrated with Transjakarta, MRT and LRT, as well as improving public transportation integration through the JakLingko program.

The public transportation with the most users is the KRL Commuter Line. The number of users always increases from year to year. There are more than 90 KRL stations. Manggarai Station is the center vital as the busiest station connecting many routes. In an effort to make it the first central station in Indonesia to serve KRL, KAJJ and Airport Trains, the construction of Manggarai Station involved changes to platform lines, known as switch overs, which have been carried out seven times. After the fifth switch over which affected the operation of the Bogor and Bekasi KRL routes, Manggarai Station experienced a significant increase in the volume of train users.

From the preliminary survey, 93% of respondents felt that there had been an increase in passenger density at Manggarai Station after Switch Over 5 was carried out, and 82% of respondents felt that there had been a decrease in the level of time efficiency due to changes in KRL routes which required transit at Manggarai Station. In addition, the lowest satisfaction was recorded in the reliability dimension (2.61), indicating dissatisfaction with the capacity and punctuality of trains. The second lowest value, namely on the direct evidence dimension (2.95), indicating dissatisfaction with facilities such as manual stairs, escalators and lifts. However, responsiveness (3.27), assurance (3.87), and empathy (3.04) recorded a sufficient level of satisfaction with services at Manggarai Station but still needs improvement to get the highest score, namely 5.

The quality of the Jabodetabek Commuter Line service can be evaluated using a questionnaire survey based on the SERVQUAL service quality dimensions which are focused on measuring the factors of direct evidence (tangible), reliability, responsiveness, assurance and empathy (Dianawati, Hanif, & Maiciptaani, 2019). Improving service quality at Manggarai Station can be done with Importance Performance Analysis (IPA) to identify and prioritize improvements to service attributes based on importance and performance. However, IPA has the weakness of not considering the two-dimensional characteristics of service attributes and cannot reflect customer dissatisfaction. Therefore, the Kano model is used to describe customer satisfaction and dissatisfaction by categorizing service attributes into Attractive (A), One Dimensional (O), Must Be (M), Indifferent (I), and Reverse (R) (Tseng, 2020). So it is necessary to integrate the results of the IPA and Kano methods to reduce resource investment in unnecessary attributes in order to increase passenger satisfaction.

The results of the Kano IPA integration model will later be divided into two types, namely maintained and improved according to the needs of each service attribute. So every problem at Manggarai Station has a different strategy. From the explanation above it can be concluded that this research uses the IPA and Kano integration model to determine the priority strategy for each service attribute and determine whether performance is sufficient to be maintained or must be improved according to the company's condition and existing resources at Manggarai Station and provide recommendations for improvement.

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## 2. Literature Review

### 2.1. Service Quality

Service quality is a measure of the effectiveness and goodness of service in satisfying consumers (Algifari, 2016). The focus is on meeting customer expectations and delivering goods/services accurately (Arianto, 2018). Service quality includes efforts to meet customer requirements and preferences, as well as thoroughness in tasks to meet consumer expectations. Service quality is influenced by customer expectations and acceptance (Parasuraman, Zeithaml, & Berry, 1988). If the service meets expectations, it is considered good; conversely, if it does not meet expectations, it is considered bad. Evaluation of service quality can be done through the service provider's ability to continue to meet customer expectations.

### 2.2. Dimensions of Service Quality

Service quality is more difficult to define than product quality. Because in service quality, customer involvement is high, resulting in a more diverse variety of attributes (Foster, 2017). Service quality is determined by the service quality method (SERVQUAL) which is divided into five dimensions as follows (Parasuraman, Zeithaml, & Berry, 1988).

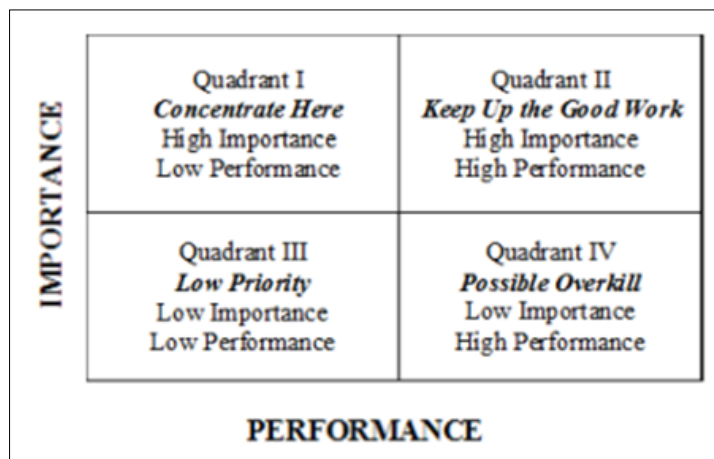
- Tangibles, which includes how physical assets, personnel, technology and communication tools look and function during service provision.
- Reliability, which includes the accuracy of service providers in delivering their products or services to build client trust and dependence.

- Responsiveness, which consists of the service provider's readiness or desire to immediately offer the support the customer needs while being responsive.
- Assurance, namely employee politeness and understanding of the service provider's capacity to provide the best service to persuade customers is included in this dimension.
- Empathy, which includes sincere and personal attention given by service providers as well as customer needs that are understood by employees.

### 2.3. Importance Performance Analysis (IPA)

Importance Performance Analysis (IPA) is a method for prioritizing attribute improvements based on evaluating customer interests and performance. The IPA model divides the matrix into four parts based on the importance and performance of quality attributes (Martilla & James, 1977). The level of importance reflects customer expectations of the product/service, while performance reflects the reality perceived by the customer. The horizontal axis shows the level of performance and the vertical axis shows the degree of importance (Kuo, Chen, & Deng, 2012), IPA helps identify attributes that need to be improved to match customer expectations.

The following is a matrix from Importance Performance Analysis (Keong, 2017).



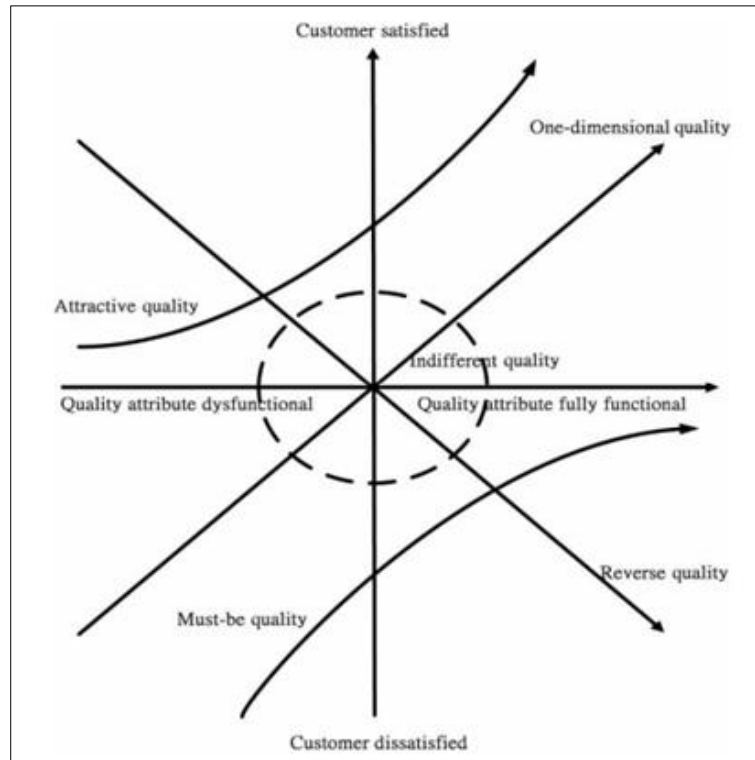
**Figure 1** IPA Matrix

From the picture above there are four different quadrants with the following explanation (Keong, 2017).

- Concentrate Here (Quadrant I), this attribute is very important for respondents, but its performance is still unsatisfactory. Therefore, improvements are necessary and must be the main focus.
- Keep Up the Good Work (Quadrant II), maintaining good performance is very necessary because this attribute has high performance and is very important.
- Low Priority (Quadrant III), this attribute performs poorly and is not very important. Despite poor performance, businesses are not too worried because customers do not value the attributes in this quadrant.
- Possible Overkill (Quadrant IV), this attribute has a low level of importance, but its performance is high. Even if customers are satisfied, it is important to consider that this attribute is not overused.

### 2.4. Kano Model

The Kano Model, introduced in 1984 by Professor Noriaki Kano, is a theory for product development and customer satisfaction (Coleman, 2015). This is a twodimensional model that considers an asymmetric and nonlinear relationship between product or service performance and customer satisfaction (Tseng, 2020). Evaluation is carried out through a questionnaire with functional and dysfunctional questions classified into quality categories. Functional questions evaluate customer reactions when attributes are met, while dysfunctional questions evaluate reactions when attributes are not met (Chen, Yeh, Pai, & Chen, 2018). The Kano model recognizes that a good product or service does not always result in higher customer satisfaction. The Kano model divides product or service quality attributes into six quality categories, each of which influences customer satisfaction differently (Kuo, Chen, & Deng, 2012).



**Figure 2** Kano Model

- Attractive quality (A), customers will feel very satisfied if this attribute is present and has good performance, but if the level of performance decreases customers will not be disappointed. Attributes in this category can differentiate products/services from competitors.
- One-dimensional quality (O), customers will feel satisfied if the performance given to good attributes increases, but will be dissatisfied if the attributes cannot be met. So that attributes are positively and linearly related to customer satisfaction.
- Must-be quality (M), customers are very dissatisfied if the attribute performance is low, but if the performance is met it does not increase customer satisfaction because it is considered a basis that should exist.
- Indifferent quality (I), customers will not feel a difference in satisfaction with the presence or absence of an attribute.
- Reverse quality (R), customers feel dissatisfaction with the presence of the attribute, and vice versa.
- Questionable (Q), attributes that respondents assess as inconsistent.

### 2.5. Integration of IPA and Kano

The IPA-Kano integration model by Kuo et al. (2012) provide a new method for classify service quality characteristics, offering strategy recommendations for each attribute. Developed to overcome the limitations of IPA and the Kano model, this model helps managers accurately understand customer perceptions and provide appropriate strategies. The 'Indifferent' and 'Reverse' categories of the Kano model can be eliminated as they do not need to be provided to customers.

The IPA-Kano integration model consists of three series, namely the hygiene series, war series, and treasure series. The following is an image of the IPA and Kano integration model (Kuo, Chen, & Deng, 2012).

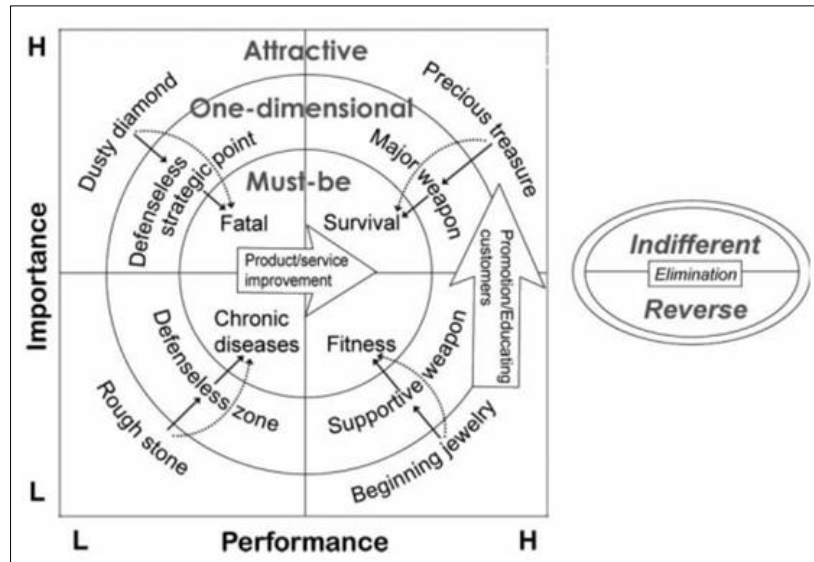


Figure 3 Integration IPA Kano

The following are the series, categories and strategic priorities in the IPA-Kano integration model.

Table 1 Strategic Priority Integration IPA Kano

Series (Kano Categories)	Categories		Importance	Performance	IPA Quadrant	Strategic Priorities	
						Improvement	Keep Up the Good Work
Hygiene (Must-be)	1	Survival	High	High	II	-	1
	2	Fatal	High	Low	I	1	-
	3	Chronic Disease	Low	Low	III	2	-
	4	Fitness	Low	High	IV	-	2
War (One Dimensional)	5	Major Weapon	High	High	II	-	3
	6	Defenseless strategy point	High	Low	I	3	-
	7	Defenseless zone	Low	Low	III	4	-
	8	Supportive weapon	Low	High	IV	-	4
Treasure (Attractive)	9	Precious treasure	High	High	II	-	5
	10	Dusty diamond	High	Low	I	5	-
	11	Rough stone	Low	Low	III	6	-
	12	Beginning Jewelry	Low	High	IV	-	6

### 3. Research Methods

#### 3.1. Research Stages

This research began with problem identification through literature study and field study. By involving a direct communication approach with train passengers at Manggarai Station through a preliminary questionnaire, which is then processed into research problems and problem formulation. Next, determine the research objective, namely to find out the cause of the problem. Then determine the population and sample as well as research variables. The variables in this study use the SERVQUAL method which is an instrument for measuring the service quality of Manggarai Station.

There are five dimensions in measuring service quality in this research, namely tangible, reliability, responsiveness, empathy, and assurance, each of which consists of several attributes.

The next stage is data collection by distributing questionnaires via Google Form to train passengers at Manggarai Station. Then the data is tested for validity and reliability to ensure the data is valid and consistent. After passing the test, the data is processed using the IPA and Kano methods which are then integrated to obtain a priority order and improvement strategy for each service attribute.

### 3.2. Data Collection Technique

The variables in this study use the SERVQUAL method which is an instrument for measuring the service quality of Manggarai Station. The following is a table of research variables used.

**Table 2** Research Variable

<b>No</b>	<b>Dimension</b>	<b>Attribute</b>	<b>Attribute Code</b>	<b>Source</b>
1	<i>Tangible</i> This dimension includes how physical assets, personnel, technology, and communication tools look and function during service provision.	Availability of seats in the station waiting room	TB1	(Miranda et al., 2018)
		Good air circulation and comfort in station	TB2	(Dianawati et al., 2019)
		The official parking area is spacious and not crowded	TB3	(Miranda et al., 2018)
		Special facilities and convenience for priority passengers	TB4	(Eboli et al., 2016)
		Free cellphone charger facility	TB5	(Tseng, 2020)
2	<i>Reliability</i> This dimension includes the accuracy of service providers in delivering their products or services to build client trust and dependability.	Availability of stairs, lifts and escalators	RT1	(Ojha, 2020)
		Timely train departure	RT2	(Shi et al., 2022)
		Ease of access to station location	RT3	(Miranda et al., 2018)
		Suitability of station capacity to number of passengers during rush hour	RT4	(Dianawati et al., 2019)
3	<i>Responsiveness</i> This dimension consists of the service provider's readiness or desire to immediately offer the customer the support they need while being responsive.	Station staff are always willing to help with responsiveness	RS1	(Miranda et al., 2018)
		Clarity of service information visually and clearly audibly	RS2	(Miranda et al., 2018)
4	<i>Empathy</i> This dimension includes genuine and individualized attention provided by service providers and consumer needs that can be understood by employees.	Officers responded to passenger protests at the station	EM1	(Miranda et al., 2018)
5	<i>Assurance</i> This dimension includes employee understanding and politeness related to the service provider's ability to provide the best service in order to convince consumers.	The friendliness and politeness of officers in serving passengers at the station	AS1	(Eboli et al., 2016)
		Safety and security from criminal acts at the station	AS2	(Farazi et al., 2022)

The questionnaire in this research is closed. This questionnaire contains SERVQUAL quality dimensions which consist of assessment indicators. The first section contains the demographic characteristics of respondents, namely gender, age, occupation, domicile, frequency of train use at Manggarai Station. The second part contains questions related to the level of importance and level of performance of Manggarai Station attributes in the form of a Likert scale using the IPA method. The third part contains functional and dysfunctional questions. Functional questions ask the respondent's attitude if the attribute is fulfilled properly. Dysfunctional questions ask the customer's perception if the attribute is not met. The answer choices in the Kano model consist of like, it should be, neutral, tolerance, and dislike.

Then a validity test is carried out. To find out whether a questionnaire is valid or not, a validity test is carried out (Ghozali, 2018). To carry out validity tests through parametric statistics, especially the Pearson correlation test (product moment correlation), this research uses a Likert scale which produces interval data. The Pearson Product Moment formula is as follows (Hidayat, 2021).

$$r_{xy} = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{\sqrt{\{n \sum x_i^2 - (\sum x_i)^2\} \{n \sum y_i^2 - (\sum y_i)^2\}}}$$

*Keterangan:*

- $r_{xy}$  = koefisien korelasi
- $n$  = jumlah responden
- $x_i$  = skor setiap item pada instrumen
- $y_i$  = skor setiap item pada kriteria

After getting the  $r_{xy}$  value (calculated  $r$ ), then compare it with the table  $r$  value. If the calculated  $r$  is greater than the table  $r$ , then the instrument can be declared valid.

Next, a reliability test is carried out using Statistical Product and Service Solution or SPSS for reliability testing. The Cronbach Alpha value was calculated to carry out a reliability test on the research data. If the Cronbach Alpha value of a variable is greater than 0.70, it is considered reliable (Ghozali, 2018).

### 3.3. Data Calculation

Data calculations in this research consist of calculations using the Importance Performance Analysis (IPA), Kano method, and integration of the results of both.

#### 3.3.1. Calculation of Importance Performance Analysis (IPA)

In the IPA diagram the vertical axis (X) is the level of performance and the horizontal axis (Y) is the level of customer importance. Data processing using the IPA method begins by calculating the average level of importance and satisfaction as follows:

$$\bar{X}_i = \frac{\sum X_i}{n}$$

$$\bar{Y}_i = \frac{\sum Y_i}{n}$$

*Information*

- $X_i$  = Average value of attribute performance
- $Y_i$  = Average value of attribute importance
- $N$  = Number of attributes

Then calculate the level of conformity as follows:

$$Tki = \frac{\sum X_i}{\sum Y_i} \times 100\%$$

*Information:*

- $T_{ki}$  = Respondent's suitability level
- $\sum X_i$  = Performance assessment score
- $\sum Y_i$  = Respondent's hope assessment score

The final step in the IPA method is to create a Cartesian diagram using SPSS (Statistical Product and Service Solution) to determine priority levels

*3.3.2. Kano Calculation*

The Kano model produces service attribute categories into five categories, namely Attractive (A), One Dimensional (O), Must Be (M), Indifferent (I), Reverse (R). Data processing using the Kano method begins by determining each attribute into a Kano category. Next, calculate the average value of the level of satisfaction and level of disappointment and then use the value for the diagram. The satisfaction coefficient is from 0 to 1. The greater the value, the more it influences consumer satisfaction. The disappointment coefficient is from 0 to -1. The closer to -1, the greater the influence on consumer disappointment. The following is the formula used (Berger et al., 1993):

$$\text{Satisfaction Index (SI)} = \frac{(A + O)}{(A + O + M + I)}$$

$$\text{Dissatisfaction Index (DI)} = -\frac{(M + O)}{(A + O + M + I)}$$

*Information:*

- A = Frequency of the Attractive category
- O = Frequency of the One Dimensional category
- M = Frequency of the Must Be category
- I = Indifferent category frequency

*3.3.3. Integration of IPA dan Kano*

The IPA Kano integration model considers three categories of service attributes, namely Kano (Must Be, One Dimensional, and Attractive), two levels of attribute importance (high and low), and two levels of attribute performance (high and low) which are then classified into three series and twelve categories. The three series are hygiene, war, and treasure, each of which consists of several categories. Data processing is carried out by determining categories using the respective IPA and Kano methods. Then it is integrated using the Kano Science Integration model strategy priority sequence table for now the final results in the order of priorities that must be carried out.

**4. Results and Discussion**

Data collection in this research is primary data from questionnaires. Questionnaires were distributed online to train users traveling at Manggarai Station. This research questionnaire contains an assessment of the service quality of Manggarai Station which consists of assessing the importance and performance of attributes to be processed using the Importance Performance Analysis (IPA) method as well as assessing functional and dysfunctional attributes to be processed using the Kano model. Questionnaire answer data collected was 410 respondents. Distribution of questionnaires will be carried out from 22 October 2023 to 30 October 2023.

The demographic characteristics of the respondents in this study were the majority of women (75.6%), generation Z with birth years 1996 to 2010 (94.6%), SMA/D1 education (60.5%), student/college student (72.4%), domicile in Jakarta (36.8%), often use Manggarai Station services (47.3%), travel during peak hours (66.6%), and the purpose of the trip is to make transit (52%). The validity test produces a calculated r value that is greater than the r table, so it can be concluded that the research instrument is valid. And the Cronbach Alpha value is > 0.70, so the data is reliable and consistent. After passing the data testing, data processing was carried out using the IPA and Kano methods which were then integrated.



#### 4.1. Results of IPA Method

In this research, data from 410 train passenger respondents at Manggarai Station were collected through questionnaires and processed using the Importance Performance Analysis (IPA) method. Evaluation was carried out on 14 service attributes by calculating the average importance value. Based on the calculation results, the average value of the importance of service attributes exceeds 4, so that for passengers all service attributes are considered important. The highest average value of importance is found in the attributes of safety and security from criminal acts at the station (AS2), clarity of service information visually and audibly (RS2), station officers are always willing to help responsively (RS1), and the friendliness and politeness of officers in serving passengers at the station (AS1). Meanwhile, the average value of the performance level of service attributes provided by Manggarai Station is 2.37 to 3.97, which is still bad to quite good because it does not reach a value of 4. Attributes with an average value of performance level The lowest is the suitability of the station's capacity to the number of passengers during peak hours (RT4), availability number of stairs, lifts and escalator facilities (RT1), and availability of chairs in the station waiting room (TB1).

The level of suitability is used to evaluate the extent to which Manggarai Station service performance meets the interests of passengers. A high level of conformity indicates good performance and can increase passenger satisfaction. Based on the analysis, the attributes with the highest level of suitability are the friendliness of the officers (AS1) 85%, ease of access to station locations (RT3) 84%, and clarity of service information (RS2) 83%. These attributes perform well and need to be maintained. On the other hand, the lowest level of suitability is found in the attributes of station capacity during peak hours (RT4) 51%, availability of stairs, lifts and escalator facilities (RT1) 58%, and availability of chairs in the station waiting room (TB1) 64%. These attributes indicate poor performance and need improvement to improve service and passenger satisfaction. The following is the Importance Performance Matrix obtained from the results of data processing.

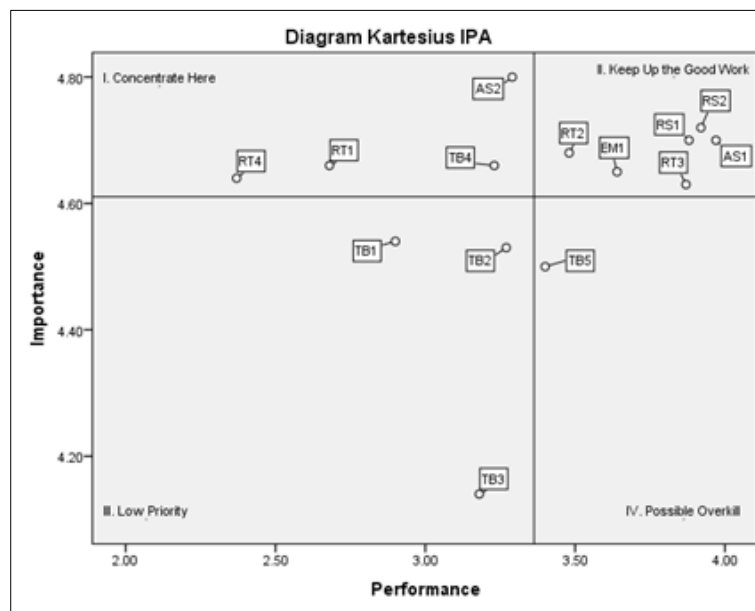


Figure 4 Importance Performance Matrix (IPM)

Attributes included in quadrant I, such as special facilities for priority passengers (TB4), availability of stairs, lifts and escalator facilities (RT1), station capacity during peak hours (RT4), and safety and security (AS2), have a level of importance high for passengers. However, Manggarai Station's service performance on these attributes is still low, causing disappointment. Passengers perceived a lack of station environmental support for special facilities, frequent lift breakdowns and escalators, crowding during peak hours, and the risk of theft at stations. Therefore, improvements to quadrant I attributes are the main focus that needs to be carried out by Manggarai Station so that passengers can travel safely and smoothly.

Attributes in quadrant II, such as on-time departures (RT2), easy access to station locations (RT3), responsiveness and friendliness of officers (RS1 and AS1), clarity of information (RS2), and handling of protests passengers (EM1), has a high level of importance and good performance by Manggarai Station. Passengers were satisfied because the departure schedule was met, the station location was well integrated, the officers were responsive and friendly, service information was clear, and protests were handled well. Therefore, even though the performance of this attribute is good,

it needs to be improved and maintained to ensure passengers remain satisfied with the services provided by Manggarai Station.

Attributes in quadrant III, such as the availability of seats in the waiting room (TB1), air circulation at the station (TB2), and large parking areas (TB3), have a low level of importance and performance according to the Manggarai Station assessment. Passengers who transit at stations tend not to attach importance to the availability of seats, comfortable air circulation, and the size of the parking space because they only stop for a while and continue their journey on the next train.

The attribute in quadrant IV, namely the free cellphone charger facility (TB5), has a low level of importance for passengers, but its performance is very good. According to passengers, a cellphone charger free is not that important because the majority of passengers only take transit and don't spend long at the station. Therefore, to avoid excessive use of resources, Manggarai Station needs to reconsider the sustainability of the attributes in this quadrant.

#### 4.2. Kano Model Results

The Kano model classifies service attributes into four categories: Attractive, One Dimensional, Must Be, and Indifferent. From the results of the data processing analysis, it shows 1 Attractive attribute, 2 One Dimensional attributes, and 11 Must Be attributes. Attractive attributes, namely free cellphone chargers (TB5), although not a basic necessity, have great potential to increase passenger satisfaction because they provide significant added value. These facilities, if fulfilled properly, can provide a high level of satisfaction, but if not, the level of satisfaction will only reach neutral limits without disappointment. Therefore, improving the performance of the Attractive attribute can contribute positively to improving the overall service of Manggarai Station.

The One Dimensional category at Manggarai Station involves attributes such as ease of access (RT3) and friendliness of officers (AS1), which greatly influence passenger satisfaction. If access is easy and the officers provide friendly service, passengers will feel satisfied. Conversely, deficiencies in these attributes can lead to dissatisfaction. Therefore, meeting the needs of passengers in this category is directly correlated with the level of satisfaction, and increasing the fulfillment of needs can increase passenger satisfaction at Manggarai Station.

Attributes in the Must Be category at Manggarai Station, including seat availability (TB1), comfortable air circulation (TB2), priority passenger facilities (TB4), stairs, escalators and lifts (RT1), on-time departure (RT2), suitability of capacity (RT4), response officers (RS1), clarity of information (RS2), officers responding to protests (EM1), safety and security (AS2), and large official parking spaces (TB3), if met, do not provide satisfaction beyond neutral limits because they are considered standards. However, not fulfilling this attribute can cause passenger disappointment and dissatisfaction because it is a facility that is considered basic and should be there. Therefore, the majority of attributes at Manggarai Station have an important role, and incomplete service attributes can hinder travel and cause

Based on the calculation of the Satisfaction Index (SI) and Dissatisfaction Index (DI), the three attributes with the highest SI scores at Manggarai Station are the friendliness of the officers (AS1), free cellphone charger facilities (TB5), and ease of location access (RT3). Improving friendly service, providing cellphone chargers, and integrating access can significantly increase passenger satisfaction. Meanwhile, the three lowest DI values are related to official parking spaces (TB3), cellphone chargers (TB5), and seat availability (TB1). Although deficiencies in these areas do not significantly increase dissatisfaction, incomplete attributes can still cause a decrease in passenger satisfaction levels. The following is a graph of the SI and DI calculation results.

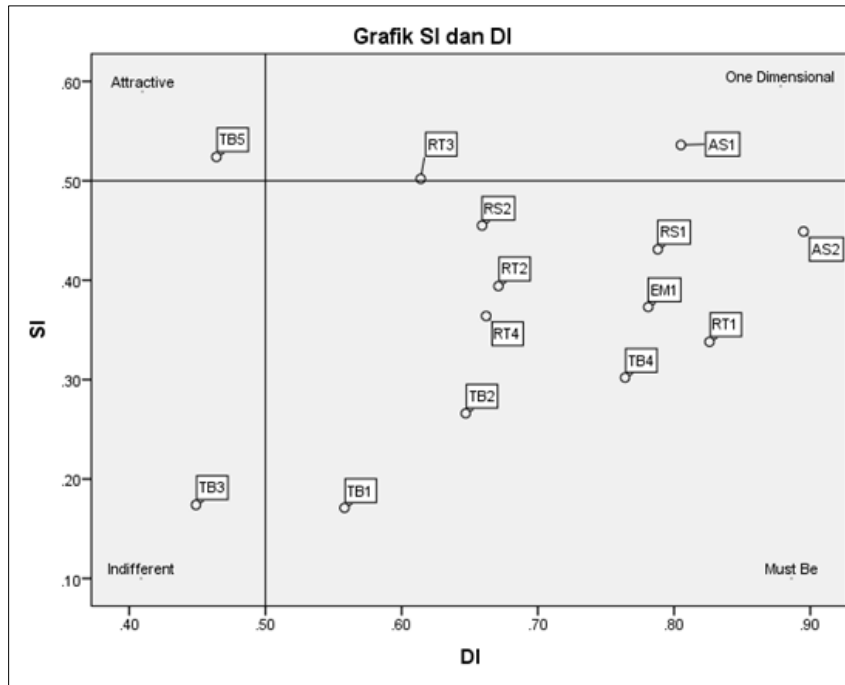


Figure 5 SI and DI Graphs

4.3. Results of Integration IPA and Kano

The following is a table of category integration results IPA and Kano for 14 service attributes Manggarai Station

Table 3 Results of Integration IPA and Kano

Dimensions	Attribute Code	IPA Category	Kano Category	IPA Kano Category	Strategic Priority
Tangible	TB1	III	M	Chronic Disease	Improvement, 2
	TB2	III	M	Chronic Disease	Improvement, 2
	TB3	III	M	Chronic Disease	Improvement, 2
	TB4	I	M	Fatal	Improvement, 1
	TB5	IV	A	Beginning Jewelry	Keep Up the Good Work, 6
Reliability	RT1	I	M	Fatal	Improvement, 1
	RT2	II	M	Survival	Keep Up the Good Work, 1
	RT3	II	O	Major Weapon	Keep Up the Good Work, 3
	RT4	I	M	Fatal	Improvement, 1
Responsiveness	RS1	II	M	Survival	Keep Up the Good Work, 1
	RS2	II	M	Survival	Keep Up the Good Work, 1
Empathy	EM1	II	M	Survival	Keep Up the Good Work, 1
Assurance	AS1	II	O	Major Weapon	Keep Up the Good Work, 3
	AS2	I	M	Fatal	Improvement, 1

Based on the table above, it shows that the attributes of special facilities and convenience for priority passengers (TB4), the availability of stairs, lifts and escalators (RT1), suitability of station capacity with passengers (RT4), and safety and

security from criminal acts (AS2) are included in the category Fatal whose performance must be improved with main priority.

#### 4.3.1. TB4 Attributes

TB4 attribute, related to the availability of special facilities for priority passengers at Manggarai Station, is considered very important (importance value 4.66) but has low performance (performance value 3.23) according to the IPA method. The level of conformity between performance and interests only reached 69%, indicating that performance has not met passengers' interests. This attribute is the main focus (quadrant I) in the IPA method because low performance is caused by a lack of facilities, such as breastfeeding rooms and difficulties for passengers with disabilities. The ongoing construction of Manggarai Station also creates obstacles, such as areas without guiding blocks and difficult access to the old building which contains a minimarket and ATM Gallery, causing difficulties for priority passengers.

The TB4 attribute, related to special priority passenger facilities at Manggarai Station, is included in the Must Be category in the Kano model. This means that passengers will feel high dissatisfaction if these facilities are not provided properly. Even though fulfilling this attribute does not provide excessive satisfaction, Manggarai Station is expected to provide good facilities, because the high Dissatisfaction Index (DI) value (0.764) indicates that this attribute is not fulfilled. will cause significant passenger dissatisfaction.

Based on the results of the integration of IPA and Kano, the special facility attributes for priority passengers are in the Fatal category, indicating the need for performance improvement and becoming a top priority. Manggarai Station can improve performance by providing special additional services, such as wheelchair and attendant assistance, with passengers able to inform their travel schedule in advance for more effective assistance.

#### 4.3.2. Attributes RT1

The RT1 attribute discusses the stairs, lifts and escalator facilities at Manggarai Station, with a high level of importance (4.66). However, the low performance (2.68) and the conformity rate of only 58%, indicate the problem of frequent breakdowns in elevators and escalators. This causes difficulties for passengers, especially those with disabilities, because the lift does not function. Repairs that take a long time, up to several weeks, result in backlogs and hamper the efficiency of passenger travel, especially during peak hours. This attribute is the main focus of improvement based on the IPA method.

The RT1 attribute on the Kano model is in the Must Be category, indicating that customers will experience high levels of dissatisfaction if the stairs, lifts and escalator facilities do not operate properly. If Manggarai Station provides these facilities well, passengers will only reach a neutral point because it is considered an obligation. The Satisfaction Index (SI) of this attribute is 0.338, indicating an insignificant increase in satisfaction if met. However, the Dissatisfaction Index (DI) value is high (0.826), indicates a high level of dissatisfaction if the facility is not functioning properly.

The attribute of availability of the number of stairs, lifts and escalators after the integration of IPA and Kano is considered in the Fatal category, indicating the need for performance improvement and is a top priority. Recommendations for repairs involve regular inspections, setting passenger patterns, and keeping stock of spare parts by PT KCI to speed up the repair process and prevent long non-operational times for lifts and escalators.

#### 4.3.3. Attributes RT4

The RT4 attribute, which includes the suitability of Manggarai Station's capacity during peak hours, is considered very important but has low performance, with a suitability percentage of only 51%. The accumulation of passengers occurs due to the large number of transit passengers from various areas, causing confusion and a mismatch between the number of passengers and station capacity during peak hours. Special attention and performance improvement on this attribute is needed to overcome this problem.

The RT4 attribute, which concerns the suitability of Manggarai Station's capacity during peak hours, is included in the Must Be category. This means that passengers will feel high dissatisfaction if there is a buildup due to a mismatch with station capacity. Fulfillment of this attribute only reaches a neutral level, because Manggarai Station is expected to ensure passengers can travel without being crowded. In the Kano model, a Satisfaction Index (SI) value of 0.364 indicates an insignificant increase in satisfaction if the attribute is met, while a Dissatisfaction Index (DI) value of 0.662 indicates quite high dissatisfaction if the attribute is not met.

The results of the IPA and Kano integration show that the attribute of suitability of the station's capacity for rush hour passengers is in the Fatal category, requiring performance improvements and top priorities. Manggarai Station must immediately improve transit flow so that passengers do not pile up, regulate train arrivals, and consider adding additional trains during peak hours.

#### 4.3.4. Attributes AS2

The AS2 attribute regarding safety and security from crime at Manggarai Station is considered very important in the IPA method, with the highest importance value (4.80), but its performance is low (3.29). The level of compliance of safety services against criminal acts at stations only reached 68%, indicating that performance is still far below the interests of passengers. This attribute is the main focus in the IPA method and is included in the Concentrate I quadrant Here. Low performance is caused by criminal acts such as theft and sexual harassment, especially during peak hours, with perpetrators moving quickly, making victims realize it too late.

In the Kano model, the AS2 attribute is included in the Must Be category, indicating that security from criminal acts at Manggarai Station is very important. Although fulfilling this attribute does not provide a significant increase in passenger satisfaction (Satisfaction Index 0.449), a high Dissatisfaction Index value (0.895) indicates high dissatisfaction if the station does not meet security from crime, which can make passengers reluctant to use Manggarai Station services.

Based on the integration of IPA and Kano, safety and security from criminal acts at Manggarai Station is in the Fatal category which requires performance improvement and is a top priority. Therefore, Manggarai Station needs to increase outreach on preventing and handling theft and sexual harassment, tighten the security system with x-rays, and urge passengers to pay more attention to their luggage.

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## 5. Recommendations for Improving Service Quality

### 5.1. Attributes of Special Facilities and Conveniences for Priority Passengers (TB4)

PT KCI can improve services with a priority passenger registration application at Manggarai Station, ensuring fast and efficient service upon arrival. Recommendations include providing identification to all priority passengers, not just pregnant women, to avoid use of special facilities by regular passengers. A special system is needed so that only priority passengers can use facilities such as toilets and lifts. This will ensure that special facilities remain optimal for passengers with disabilities, pregnant women and the elderly. Additional officers are needed to supervise the use of lifts and escalators according to user priorities. The recommendations also emphasize the importance of outreach so that ordinary passengers understand and give priority to passengers with special needs

### 5.2. Stairs, Lifts and Escalators Availability Attribute (RT1)

Based on an interview with PT KCI, the lifts and escalators at Manggarai Station operate almost 24 hours, only being turned off when the station is not operating at 24.00-3.59. Recommendations involve stopping operation of lifts and escalators outside peak hours to avoid damage and distribute usage evenly. PT KCI is advised to shorten repair time by restocking spare parts and installing officers in the lift to monitor capacity and prioritizing priority passengers. Other suggestions involve a total audit of vendors for lifts and escalators as well as consideration of replacing vendors if they do not comply with Minimum Service Standards (SPM) or there is repeated damage.

### 5.3. Attributes of Suitability of Station Capacity to Passengers (RT4)

Manggarai Station can improve services by arranging the flow of passenger movements to avoid crowding at certain points. PT KCI is advised to create different travel routes for each destination and increase the number of trains during peak hours to prevent trains from being full. To avoid KRL queues with long-distance trains, an additional line is needed at Manggarai Station. Features in service applications that show passenger density also need to be developed. Recommendations from the Train Kids community involve reducing the headway between trains from 10-30 minutes to 3-5 minutes to reduce passenger waiting times and prevent pile-ups.

### 5.4. Safety and Security Attributes from Criminal Acts (AS2)

Based on interviews with PT KCI, it was found that many passengers were reluctant to report sexual harassment directly. Therefore, PT KCI needs to increase outreach through social media with posters or videos containing handling steps and providing responsive hotline numbers. PT KCI has also provided a loss reporting form with detailed information for processing by officers. Recommendations from the Train Children community include socializing SOPs

for handling cases to passengers, regular publication of case handling results on social media, and collaborating with the train user community to speed up case handling. This action is expected to increase passenger confidence in security at Manggarai Station

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## 6. Conclusion

The conclusion obtained from this research is that the main priorities that need to improve performance are attributes in the Fatal category such as special facilities for priority passengers (TB4), availability of stairs, lifts and escalators (RT1), suitability of station capacity (RT4), and safety of actions. crime (AS2). Causes of low performance and passenger satisfaction namely, there is no room for breastfeeding mothers and there is a long wait for staff to take disabled passengers, lifts and escalators are often damaged, resulting in overcrowding on manual stairs, there is a buildup of passengers, especially during peak hours, and criminal acts such as theft and sexual harassment occur. Recommendations for improvements that can be made namely by providing special priority passenger services through an application to record travel information so officers can immediately help, not operating all lifts and escalators during non-peak hours and restocking spare parts, regulating the flow of passenger movements, increasing the number of trains during peak hours, and differentiating routes. Long-distance trains and KRLs, provide outreach regarding handling criminal acts by providing hotline numbers so that security officers respond immediately, monitoring with CCTV cameras and checking goods using x-ray.

Suggestions that can be given based on the results of this research are that it can use broader research attributes and can represent all the problems that exist in service quality at Manggarai Station, this research can be used as a basis for future research on the topic of service quality in other industries, and can identify correspondence between the Kano model category classification results and the category results using the Satisfaction Index (SI) and Dissatisfaction Index (DI) graphs.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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