

IMPROVING PASSENGERS' EXPERIENCE ON TYPE-B TERMINAL IN BATU, EAST JAVA, USING IMPORTANCE PERFORMANCE ANALYSIS

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ABSTRACT

Measuring passenger satisfaction at bus terminals is important to ensure the services provided are in line with user expectations and to improve service quality. Many factors contribute to passenger satisfaction at the bus terminal, for example, safety and comfort, accessibility, and other supporting facilities. This research is trying to figure out the variables that need to be prioritised for improving passenger experience and satisfaction on type-B terminal in Batu. The conformity level shows a percentage of 84%, included in the upper low classification, which means that on average, the variables assessed in the service level of the Batu City Type B Terminal are still at a low satisfactory level so that a lot of evaluation and improvement is still needed in service to passengers. Finally, based on the IPA analysis that has been carried out, there are 7 variables included in quadrant I, where these 7 variables must receive primary attention in efforts to improve terminal services. These seven variables have a high importance value, but existing services are still considered inadequate by passengers, so they must receive priority in efforts to improve services.

Keywords: IPA; passenger satisfaction; type-B terminal

INTRODUCTION

Transportation is one of the keys to developing a region or city (Prus&Sikora, 2021 ; Rosik&Wojeik, 2023 ; Shi et al, 2024). Transportation is defined as the transfer of goods and people from the place of origin to the destination, the transportation process is a movement from the place of origin, from where the transportation activity begins, to the destination, where the transportation activity ends (Tapolsek et al, 2018 ; Nasution, 2004). Type B passenger terminal refers to the classification of bus terminals based on the regulations in force in Indonesia. Determination of terminal type and class is carried out based on service functions, service facilities and authority regulated by UU 23/2014 concerning the Division of Government Affairs, which determines management authority based on type: type A by the Central Government, type B by the Provincial Government, and type C by the Regency/City Government. This terminal, which is type-B passenger terminal, is under the authority of the provincial government and generally serves inter-city buses within the province (AKDP) and city buses. Measuring passenger satisfaction at bus terminals is important to ensure the services provided are in line with user expectations and to improve service quality. Many factors contribute to passenger satisfaction at the bus terminal, for example, safety and comfort, accessibility, and other supporting facilities. Weng, et al (2018) find that overall passenger satisfaction is strongly linked to how well the bus service (and by implication terminal/service facilities) meets those needs, while Ibrahim, et al (2020) emphasize how public-transport services support urban mobility and the economy, while identifying service quality attributes as crucial to passenger satisfaction.

In the next sentence, we will explain the factors influencing terminal user satisfaction according to Hagen's Theory. Hagen and Oort (2019) emphasised the importance of comprehending the specific types of quality that passengers seek and are prepared to embrace as a means to attain

the desired level of quality. Furthermore, they elucidated that assessing client needs' quality across many tiers of quality proves advantageous, as depicted in Figure 1.

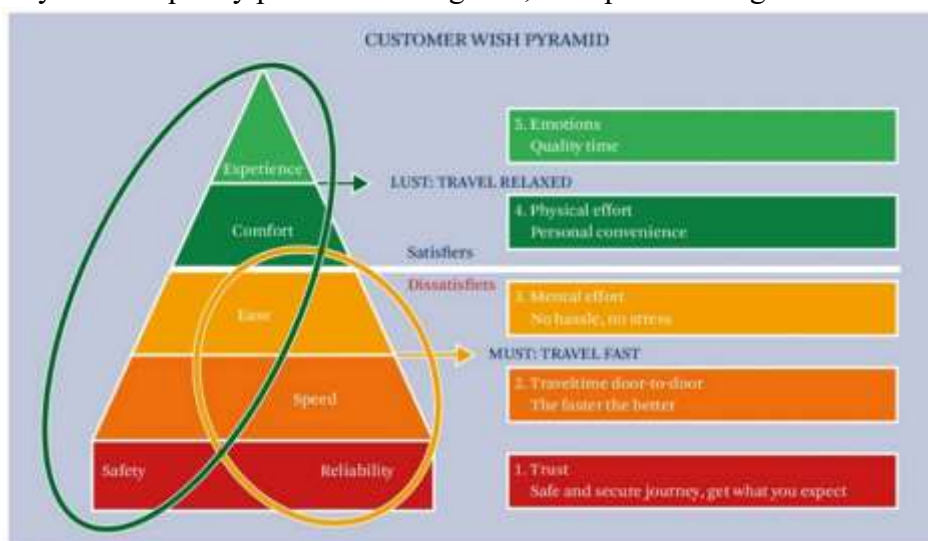


Figure 1. Improving Passengers Experience: Two Perspectives. (Hagen and Oort, 2019)

The hierarchical structure of the several quality dimensions is illustrated in Figure 1, Hagen and Oort (2019) explained that at a station or terminal as a node, passengers can either moving or remain staying. When passengers moving, the factors of speed and convenience assume paramount importance, however, when the passengers staying, such as waiting in public transport or being seated on a moving vehicles, the essential considerations shift towards comfort and experiential aspects (Hagen and Oort, 2019). In summary, the lower tier of the pyramid pertains to the efficient utilisation of time or Hagen and Oort (2019) addressed it as 'time well saved', referred to as dissatisfiers, while the upper tier, known as satisfiers, focuses on the effective allocation of time or Hagen and Oort (2019) addressed it as 'time well spent'.

According to Hagen (2011), fulfilling the need for a pleasant experience is contingent upon various factors, including visual elements such as architecture, design, and material colours, as well as intangible variables like light, smell, and sound (including noise and music). These factors undoubtedly impact the overall quality of the experience (Hagen, 2011) as also can be seen in Figure 1 that comfort and experience are included in the satisfied category. In this thesis, research was conducted using Importance Performance Analysis as one of the tools to identify the factors under the passenger satisfaction pyramid initiated by Hagen (2011). The objectives of this research are to identify the level of service performance obtained by passenger terminal type B users in Batu and to identify the factors to improve terminal service performance based on passenger perceptions using IPA analysis.

Problem Statement

Batu City Type B Terminal is the only terminal in Batu that serves city-scale passengers and inter-city buses within the province. As a tourism city, the number of tourists in Batu can reach approximately 700,000 tourists during peak season. This should be in line with the development of the passenger terminal in Batu, but the use of public transport by tourists is very small, traffic jams occur everywhere because tourists tend to use private vehicles. By evaluating the Batu terminal using IPA analysis, it is hoped that concrete steps can be found according to the desires and needs of tourists and local residents regarding the development of the type B passenger terminal in Batu and increasing the number of public transport users in Batu.

Literature Review

1. Emerging Expansion in Mobility Design

The conventional transportation model, according to Urry (2016), shows excessive emphasis on transportation alone, and ignores the complex interactions between transportation and society, even though society is the main aspect in transportation itself. Designing mobility for the future requires accounting for changing user needs, uncertainties (technology, demographics, climate), and helps planners create more inclusive and robust mobility systems (Gall et al, 2023). A research from Park, et al (2023) shows how buildings and urban spaces are adapting to future mobility, revealing that mobility design influences not only transport modes but also urban form, architecture, and land-use. In a study conducted by Wind (2014), a research project was carried out on a group of 11 families living in Copenhagen. This research aimed to explore the concept of routine mobility and its implications beyond just fulfilling a busy schedule, as well as highlighting its potential impact on social and emotional aspects. In addition to daily movements, there are many additional circumstances and activities that can be engaged in, including but not limited to relaxation, socialization, and learning (Wind, 2014).

A pleasant encounter could serve as a motivating factor for individuals to utilize public transportation on a more regular basis (Forward, 2019). In short, although additional factors in transport hub, e.g. passenger terminal, may not directly influence transportation demand, it is an integral component of the wider cultural and social framework that shapes individuals' behaviours and decisions about transportation. When formulating transportation strategies to address the transportation needs in certain regions and timeframes, transportation planners and authorities may consider the cultural importance of public services in accordance with user wishes.

2. Importance Performance Analysis

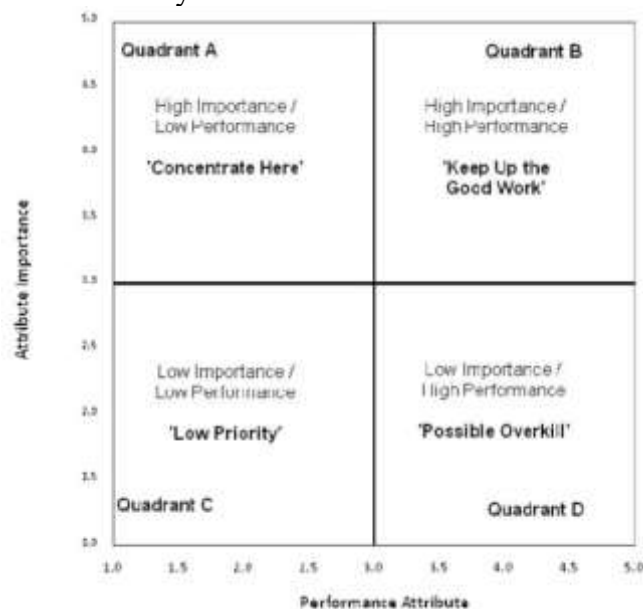


Figure 2. The Original IPA Quadrant (Martilla and James, 1977)

In the late 1970s, Martilla and James (1977) introduced a concept known as Importance-Performance Analysis (IPA), which has since gained significant popularity as a managerial tool for enhancing organizational performance. This strategy enhances passenger satisfaction by facilitating their demand needs. It is a graphical technique that represents the average values of importance and performance for various parts of services or products. These values are calculated concerning each other and are typically displayed on a two-

dimensional coordinate system. The coordinate system is divided into four quadrants. Users directly evaluate and calculate the average importance and performance values of various service attributes in a specified coordinate system. The horizontal axis represents performance, while the vertical axis represents importance as shown on Figure 2 (Martilla & James, 1977).

Importance-Performance Analysis (IPA) is a strategic management tool used to prioritize actions by identifying how well various attributes perform and how important they are to stakeholders. It helps organizations focus their resources on areas that will have the most significant impact on passenger satisfaction and business success. Improving passenger satisfaction at a bus terminal is crucial for maintaining and increasing passenger loyalty and overall service quality. Using Importance-Performance Analysis (IPA) to evaluate and enhance various aspects of the bus terminal can be very effective. The key to the success of any system, including transportation, lies in understanding the factors that contribute to passenger and passenger satisfaction. There is no doubt that a higher level of service/product quality leads to increased user satisfaction. While the concept may appear straightforward, the actual task of achieving passenger satisfaction has proven to be challenging due to the rapid advancement of technology and intense competition experienced over the past forty years.

3. Importance, Performance, and Satisfaction.

As mentioned in the previous line, the IPA framework was developed to match customers' views of attribute importance and performance in order to better understand customer satisfaction. Four quadrants—"keep up the good work," "potential overkill," "low priority," and "concentrate here"—are used to express importance and performance ratings on a two-dimensional grid (Figure 2). An additional categorization method was built by Deng and Pirskala (2018) to identify management priorities by inserting an upward 45° diagonal line, often known as an iso-rating or iso-priority line for defining the satisfaction and dissatisfaction level as shown on the Figure 3.

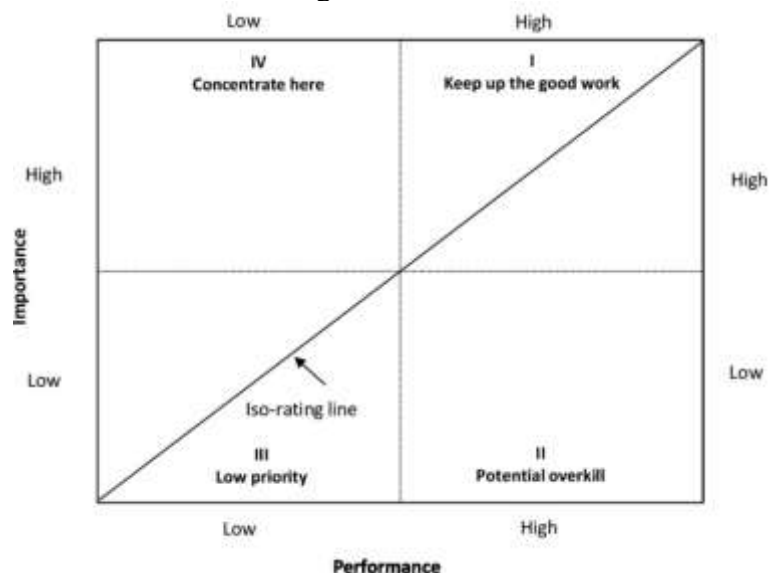


Figure 3. Iso rating line on IPA grid (Deng and Pirskala, 2018)

The word "satisfaction" comes from the Latin "satis" (meaning good enough, adequate) and "facio" (doing or making), so that simple can be interpreted as an effort to fulfill something. According to Kotler (2017) satisfaction is a person's feelings of joy or

disappointment that arise after comparing the performance (results) of the product or service in question against the performance (or outcome) expected. If performance falls below expectations, the passenger not satisfied. If performance meets expectations, passengers are satisfied. If performance exceeds expectations, passengers are very satisfied or happy, satisfaction will encourage consumers to buy and consume repeat the product, or in transportation case, they will continue using the public transportation.

Passenger satisfaction influenced by the quality of service consisting of physical facilities (Tangibles), Reliability, Responsiveness, Guarantee (Assurance), and Empathy. If the quality of service is below expectations, then passengers are not satisfied, if the quality of service exceeds expectations, then the passengers will feel satisfied or happy (Mowen and Minor, 2021)

METHOD

In this study, a quantitative method is utilized. The outcomes will be shown as numerical data. A survey method was used in the study to demonstrate the correlation or connection. Expectations of service quality or importance categorized as the dependent variable (Y) and users' perceptions of performance as an independent variable (X) were referred to the research design. In order to categorize service qualities and determine which ones should be emphasized or maintained at their existing level of performance, the current study combines a proposed IPA with a Likert scale. The method's simplicity is another feature; sophisticated statistical understanding is not really involved. The study was carried out by sending questionnaire and conducted for several months by the end of 2024, both online and face to face interview, to 113 passengers in Type-B Terminal. The number of respondents was calculated by Slovin Methods, using 10% margin of error and it is computed as:

$$n = \frac{N}{1 + Ne^2}$$

Where

n : sample size

N : population size

e : margin of error

To ensure that the data collected is suitable for use, then it is necessary to carry out validity and reliability test. Data can be said to be valid if the *r* value is greater than *r* table. By using Cronbach's formula Alpha, data can be declared reliable if the results of Cronbach's Alpha are greater than 0.6 as can be shown in the figure below that the result is 0.722 and 0.939 for performance and importance as counted as reliable.

Table 1.
Reliability Statistics

Reliability Statistics		Reliability Statistics	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
.939	25	.722	25

After the data is declared valid and reliable, the next step sending the questionnaire to all respondents. The following are the 25 variables used in the questionnaire.

Table 2.
 Variables List

Variables	Service Attributes
X1	Waiting Room Cleanliness
X2	Clean and Neat Staff Appearance
X3	Toilets Availability
X4	Toilet Cleanliness
X5	Adequate private vehicle parking available
X6	Accessibility (road conditions) to the terminal
X7	Officers' willingness to serve and prioritize passenger needs
X8	Friendliness of Officers in Serving Passengers
X9	Ease of Finding Officers
X10	Officers always show a ready attitude to serve passengers
X11	Terminal Security
X12	Terminal Comfortability
X13	Ensure that public transport enters the terminal
X14	Accuracy of public transport arrival and departure schedules
X15	The Terminal location is accessible (easy to reach)
X16	Terminal location is close to the main road
X17	Signages for passengers
X18	Understandable signages
X19	Terminal Layout Availability
X20	The existence of supporting shops
X21	Terminal website to monitor schedules, routes and availability of public transportation
X22	Background music played by the terminal operator (not illegal buskers' music)
X23	Attractive chair design in the waiting room
X24	Ergonomic waiting room chairs
X25	The terminal wall design is artsy and unique

The Likert scale uses five levels of statements range score scale of 1-5 shown on the Table 3 below.

Table 3.
 Variables List

Performance / Importance	Score
Very Dissatisfied / Very Unimportant	1
Dissatisfied / Unimportant	2
Satisfied-enough / Important-enough	3
Satisfied / Important	4
Very Satisfied / Very Important	5

The following criteria are the level of conformity customer assessment:

1. Conformity level >100%
 The quality of the provided services has been beyond what is customer considered important. It means the service are getting high satisfaction.
2. Conformity level = 100%,
 The quality of provided services fulfil or dominantly fulfil what is customer considered important. It means the service are getting satisfaction.
3. Conformity level <100%,
 The quality of provided services does not meet what is customer considered important. It means the service are getting low satisfaction.

Conformity level calculations use the following formula:

$$TKi = \frac{Xi}{Yi} \times 100\%$$

Where

TKi : Passenger Conformity Level

Xi : Performance Score

Yi : Importance Score

Furthermore, Importance Performance Analysis (IPA) is used to analyse the relationship between passenger expectation and perception. Using Cartesian Diagram which is divided into four parts and bounded by two intersecting perpendicular straight line the average score of the level of perception of expectations using the following formula:

$$X' = \frac{\sum Xi}{n}, Y' = \frac{\sum Yi}{n}$$

Where

X' : average score of performance level

Y' : average score of level of importance/expectation

n : number of respondents

RESULT AND DISCUSSION

This section will discuss respondent distribution profile, passenger conformity level, and identification of importance-performance variables using IPA analysis.

Respondent Distribution Profile

The descriptive data analysis was interpreted by age, occupation, marital status, private vehicle occupancy, and whether it were their first time visiting Terminal Batu. Based on the occupation as shown in the Figure 4 below, majority of the respondents were the university students, followed by traders. This might be because the location of the terminal itself was in the same zone with the biggest traditional market in Kota Batu.

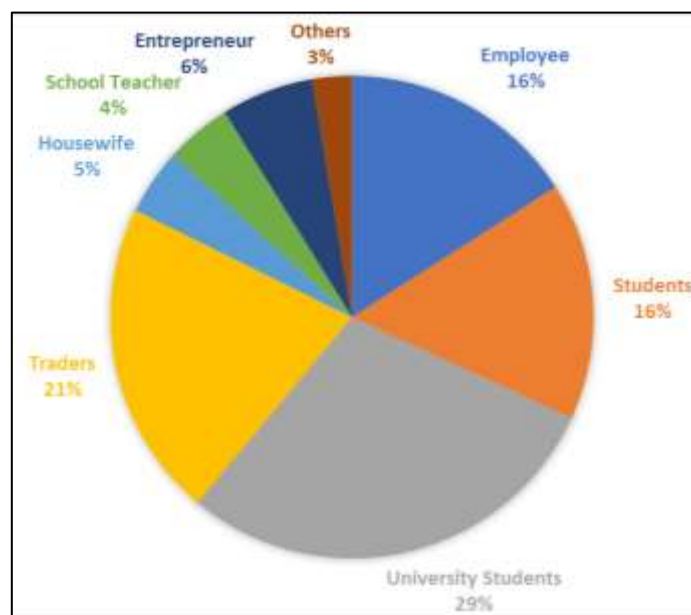


Figure 4. Respondents' Occupation.

Moreover, more than 90% respondents are in the range of productive age (15-64 years old) as can be seen in Figure 5. In Figure 6, we can see that 53% of respondents are not married and the other 47% classified as married, even though not all of the married respondents were having family trip at the survey time. Figure 7 explained that 19% of respondents claimed that it was their first time coming to Terminal Batu, while other 81% said that they come to the Terminal multiple times, and it also potentially becomes regular trips with many repetitions.

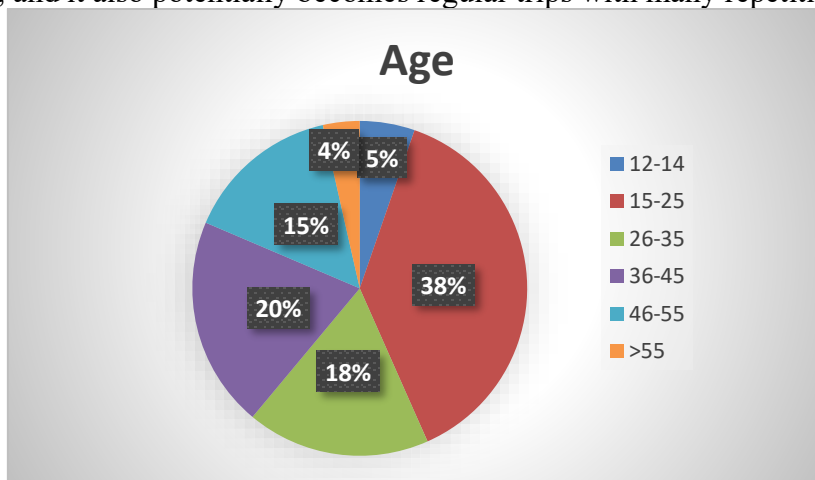


Figure 5. Respondents' Age

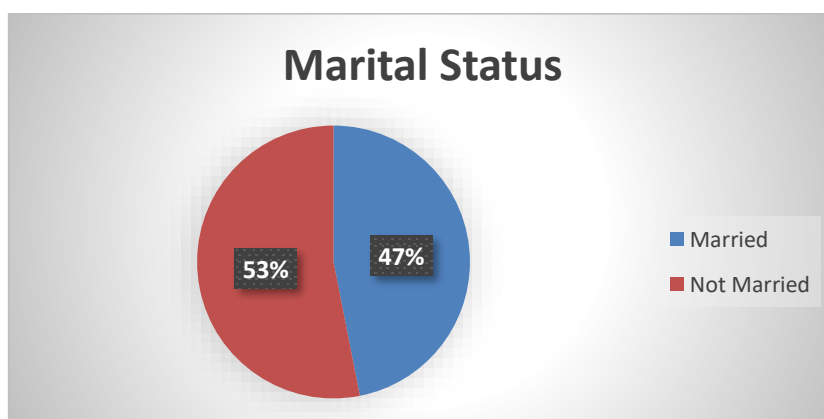


Figure 6. Respondents' Marital Status

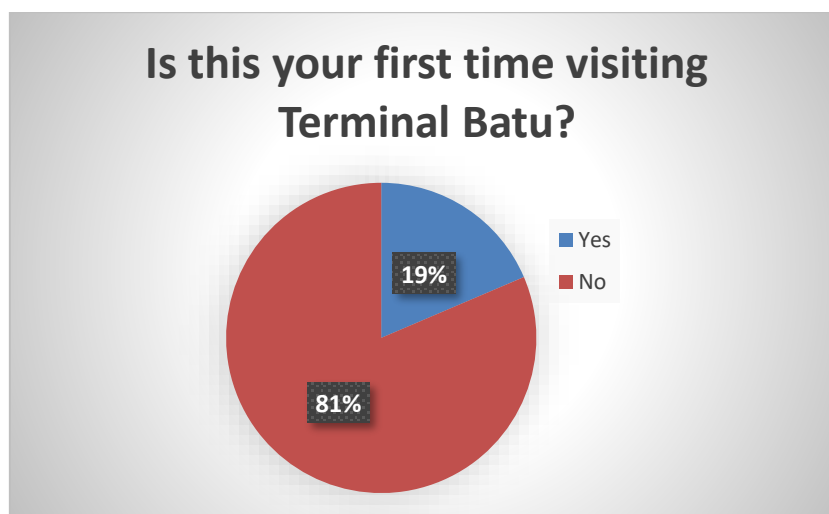


Figure 7. Respondents' Visiting Status

Respondent Conformity Level

Conformity Level is determined by multiplying the user's expectation scale multiplied by 100% and comparing it to the company's rating scale. Every step of the research is explained in terms of each attribute for each performance item and its intended significance. Each level of conformance of each attribute for each performance and importance item is described in Table 4 below. The average of passenger conformity level is 86.84%, categorised as low satisfaction. Since the conformity level of passenger should reach 100% to be categorised as “satisfying” and the range are quite wide, we can re-classified the low level into some sub level, e.g. 3 sub level (0-33% as super low, 34-66% as middle low, and >66% as upper low). Based on the sub level category, the conformity level is around the upper low, it was below the standard conformity level, yet almost reach the line.

Table 4. Passengers’ Conformity Level

Variabel	Performance	Importance	Conformity Level (%)
X1	3.30	4.44	74.30
X2	3.14	3.75	83.73
X3	3.17	4.59	68.98
X4	2.82	4.50	62.80
X5	3.86	3.11	124.22
X6	4.10	4.50	91.14
X7	2.71	3.86	70.18
X8	4.27	4.24	100.84
X9	3.21	3.65	87.89
X10	2.81	4.41	63.65
X11	4.21	4.41	95.58
X12	3.87	4.09	94.59
X13	4.42	4.42	100.20
X14	4.33	4.35	99.59
X15	3.30	3.97	83.07
X16	4.36	4.50	97.05
X17	3.90	4.07	95.87
X18	4.00	4.03	99.34
X19	3.31	4.01	82.56
X20	4.48	4.48	100.00
X21	1.80	3.45	52.05
X22	2.46	2.20	111.65
X23	2.52	2.48	101.79
X24	2.88	4.14	69.44
X25	1.88	3.11	60.40
		Average	86.84

Importance Performance Analysis

Before making a Cartesian diagram, first calculate the average value of the level of importance and level of performance. The average value is used to determine the position of the attribute in the Cartesian diagram. The result can be seen in the Figure 8 below.

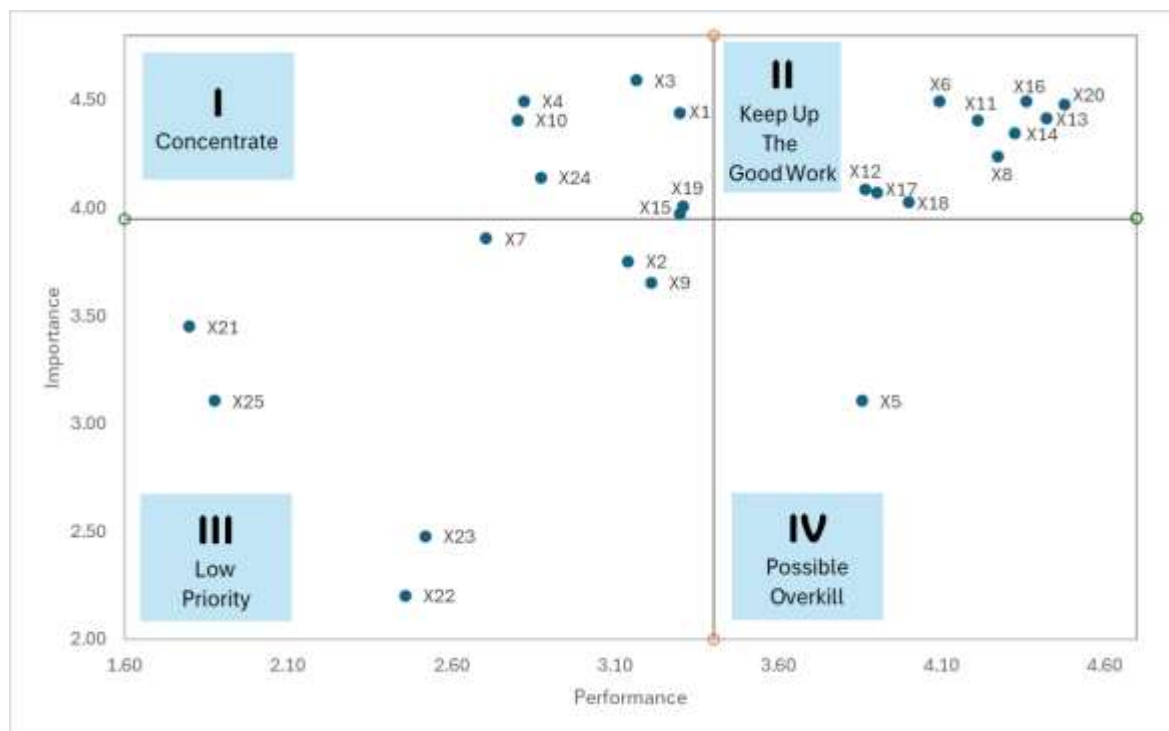


Figure 8. IPA Cartesian Diagram

Based on the figure above, there are four categories on four quadrants. The variables that became the main focus is located in Quadrant I, where the level of importance is in the high category but the existing performance is not satisfactory. The variables are X3 (Toilets availability), X4 (Toilet Cleanliness), X1 (Waiting Room Cleanliness), X10 (Officers always show a ready attitude to serve passengers), X24 (Ergonomic waiting room chairs), X15 (Terminal accessibility – the location is easy to reach), and X19 Terminal Layout Availability.

Variables that fall into the Quadrant II category are variables with a high level of importance and existing services that are also in the good category, so they are worth maintaining, which are X12 (Terminal Comfortability), X17 (Signages for passengers), X18 (Understandable Signages), X6 (Accessibility – Road Conditions to the terminal), X11 (Terminal Security), X8 (Friendliness of Officers while serving passengers), X13 (ensure the public transport enters the terminal), X14 (Accuracy of public transport arrival and departure schedule), X16 (Terminal location close to the main road), and X20 (The existence of supporting shops). The other variables categorized in Quadrant III and IV were having low priority to maintain, and X5 (Adequate private vehicle) is possible to kill.

Furthermore, Deng and Pirskala (2018) also develop the conventional IPA method to be more advance analysis. They divided the total variable by adding iso-rating line, to describe and classified which variable are counted as satisfying and dissatisfying variables, as can be seen in Figure 9 below. By the figure, X22, X23, X5, X18, and X8 are classified as dissatisfying variable.

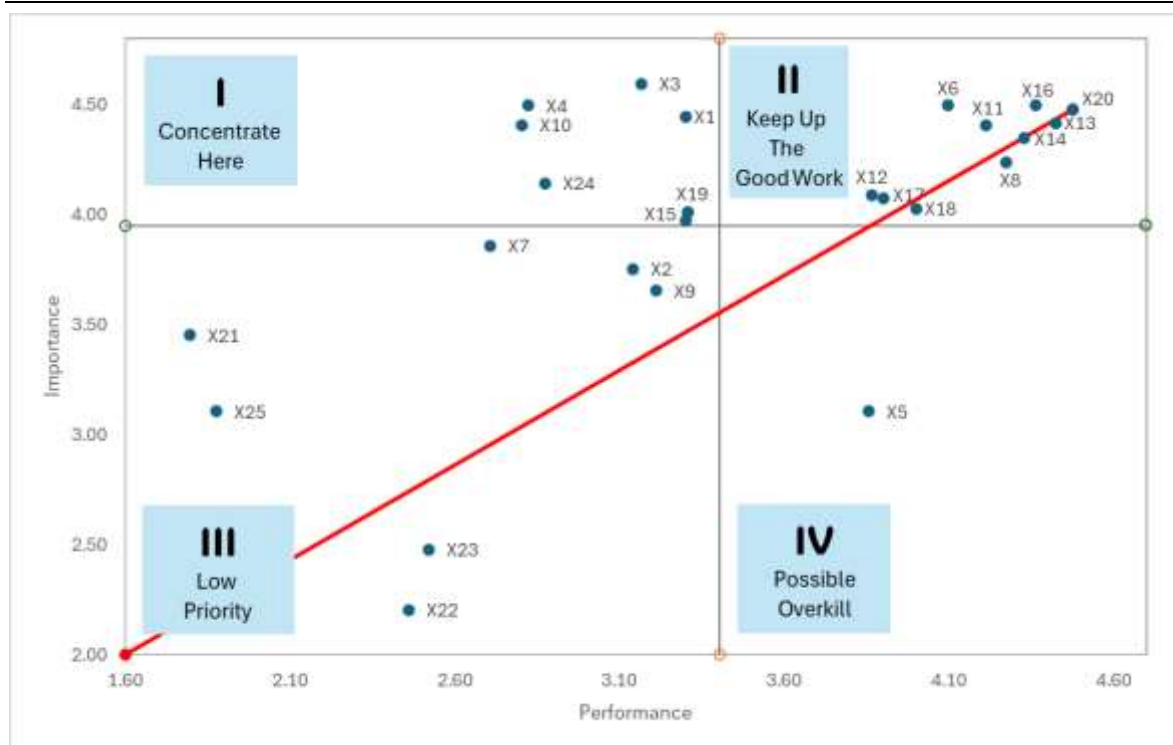


Figure 9. IPA Quadrant with iso-rating line.

CONCLUSION

Before the IPA analysis was carried out, a validity and reliability test was carried out with valid and reliable results, so that the questionnaire was then distributed for data collection, both through face-to-face and online surveys. The conformity level shows a percentage of 86.84%, included in the upper low classification, which means that on average, the variables assessed in the service level of the Batu City Type B Terminal are still at a low satisfactory level so that a lot of evaluation and improvement is still needed in service to passengers. Finally, based on the IPA analysis that has been carried out, there are 7 variables included in quadrant I, where these 7 variables must receive primary attention in efforts to improve terminal services. These seven variables have a high importance value, but existing services are still considered inadequate by passengers, so they must receive priority in efforts to improve services.

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