**Engineering and Technology Journal e-ISSN: 2456-3358**

**Volume 09 Issue 04 April-2024, Page No.- 3706-3716**

**DOI: 10.47191/etj/v9i04.06, I.F. – 8.227**



# Analysis of Service Level of Trans Metro Pasundan Bandung Raya Corridor 2 Based on Importance Performance Analysis and Customer Satisfaction Index

**Muhammad Gibbran Madani[1], Muhammad Isradi[2], Acep Hidayat[3], Kukuh Mahi Sudrajat[4], Hendy Yusman Firdaus[5], Joewono Prasetijo[6]**

[1,2,3,4,5] Department of Civil Engineering, Universitas Mercu Buana, Jakarta, Indonesia

[6]Faculty of Engineering Technology, Universiti Tun Hussein Onn Malaysia, Malaysia

**ABSTRACT:** Trans Metro Pasundan is an integrated highway bus system serving the Greater Bandung metropolitan area, West Java. This service is a program from the Ministry of Transportation of the Republic of Indonesia through the Directorate General of Land Transportation, and Bandung is the eighth service after Makassar and Banyumas in the Bus Friends Buy the Service (BTS) service purchasing program. The purpose of this study is to assess the operational performance and user satisfaction of the Trans Metro Pasundan Corridor 2 Greater Bandung transportation system, as well as to identify service conditions based on World Bank standards and Ministerial Regulation No. 29 of 2015. A sample of 105 respondents was selected from a population of 369,320 Trans Metro Pasundan Corridor 2 passengers using the Slovin's formula. The research findings indicate that the load factor and travel time meet the standards, although some load factors do not meet the criteria. Priorities for improving passenger satisfaction include providing facilities at shelters/stops, availability of polls, among others. The Customer Satisfaction Index of 73.078 suggests that passengers are "Satisfied" with the service performance.

**KEYWORDS:** Trans Metro Pasundan, Indeks Performance Analysis, Customer Satisfaction Index, Satisfaction, Performance.

## I. INTRODUCTION

Transportation is interconnected with economic growth and is an essential aspect of distributing goods and facilitating the movement of people to keep things running smoothly (Bakar et al., 2022). With increasing economic growth, individual mobility rises, and the demand for movement surpasses the capacity of available transportation infrastructure (Firdaus et al., 2021).

Bandung City is the capital of West Java Province, where the population's activities steadily increase each year, reaching 2,469,589 inhabitants (BPS-West Java, 2020), leading to various issues such as traffic congestion in and around the city. Additionally, Bandung City is adjacent to other areas, namely Cimahi City and West Bandung Regency, which serve as transportation hubs.

The Ministry of Transportation through the Directorate General of Land Transportation provides public transportation for Bandung City and its surroundings, namely the Trans Metro Pasundan Bandung Raya (Ariostar et al., 2022). This public transportation system is a collaborative effort of the areas neighboring Bandung City, particularly those along the route of the Trans Metro Pasundan Bandung Raya, such as Cimahi City and West Bandung Regency. Therefore, the presence of Trans Metro Pasundan Bandung Raya, which commenced operations on December 27, is expected to reduce the number of private vehicles, according to data from the Bandung City Transportation Agency, which indicates that the number of vehicles in Bandung City is almost equivalent to its population of 2.2 million units (Ariostar et al., 2022)

On the other hand, the persistently high number of private vehicles in Bandung City and its surroundings is an indication of the level of satisfaction and comfort with the services provided by Trans Metro Pasundan Bandung Raya. The operational managers of Trans Metro Pasundan are expected to enhance services such as organized schedules, comfort at shelters and on buses, readiness of staff to assist users, and addressing user complaints. Public evaluation of these services can serve as a benchmark for satisfaction; hence efforts are needed to improve services to address these issues (Chikkabagewadi et al., 2022; Esmailpour et al., 2020).

Therefore, research is needed to assess the service quality of Trans Metro Pasundan Bandung Raya Corridor 2 in relation to public satisfaction, with the aim of evaluating and improving the service to encourage more people to use Trans Metro Pasundan Bandung Raya Corridor 2, thereby reducing the number of private vehicles and alleviating traffic congestion (Dwiatmoko et al., 2022; Isradi et al., 2022; Rachmadina et al., 2023).

The objectives of this research are to evaluate the performance of Trans Metro Pasundan Bandung Raya Corridor 2 based on indicators such as load factor, travel time, and Headway according to World Bank standards, as well as to analyze users' perceptions of their satisfaction levels and expectations based on Ministerial Regulation No. 29 of 2015. Furthermore, this research aims to identify the service conditions implemented on Trans Metro Pasundan Bandung Raya Corridor 2 in accordance with the provisions stated in Ministerial Regulation No. 29 of 2015. Based on these aspects, this paper takes on the topic of "Analysis of Service Level of Trans Metro Pasundan Bandung Raya Corridor 2 Based on Importance Performance Analysis (IPA) and Customer Satisfaction Index (CSI)".

## II. RESEARCH METHOD

Generally, every research is conducted with a "research method" so that all processes that must be completed can be fulfilled as planned and the research can be concluded at the decision-making point (Sum et al., 2019). Direct observation, interviews, and questionnaires are used as primary data collection methods (Esmailpour et al., 2020; Suria et al., 2019). Research preparation involves several stages of work or methodology presented in the form of a flowcha(Dermawan et al., 2021), which can be seen in Figure 1. below.

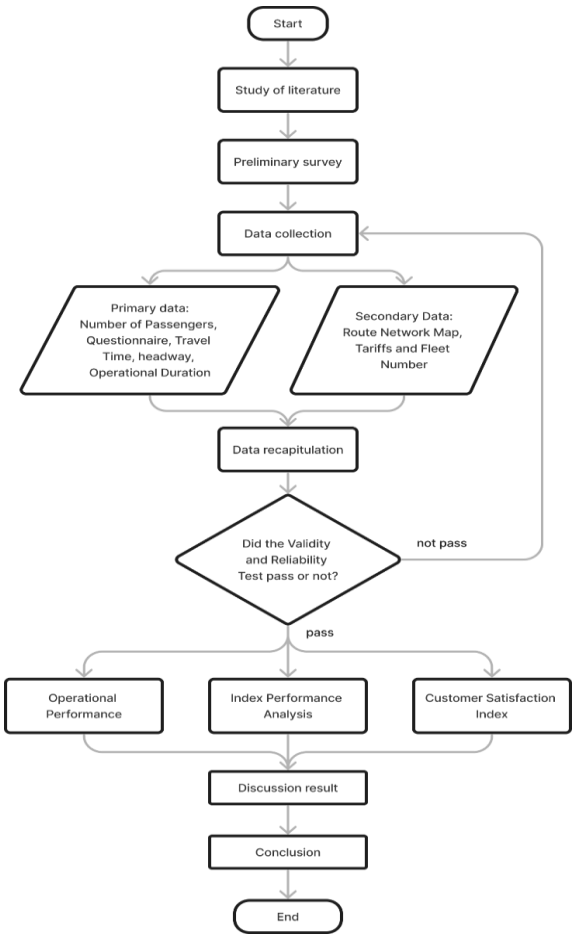


**Figure 1. Flowchart**

The research took place along the route of Corridor 2 of Trans Metro Pasundan in Bandung. Below is the route of Corridor 2 of Trans Metro Pasundan Bandung Raya (Kota Baru Parahyangan – Alun-alun Kota Bandung):

Kota Baru Parahyangan – STEI LPPM A – RS. Karisma Cimareme A – RS. IMC A – Masjid Ar-Ridwan A – Padasuka Indah A – Ranca Belut A – PLN Cisangkan A – BRI – RSUD Cibabat A – Dinas Sosial – Jalan Budi – SMAN 13 A – Paledang – Rajawali Barat – Plaza Telkom Rajawali – Rajawali 1 – Dungus Cariang – SMA Trinitas – RS. Kebon Jati – SMA Pasundan – Perintis Kemerdekaan – Lembong – Alun-alun Kota Bandung – KEB Hana Bank – GKI Anugerah – Mayapada Tower – Toko Ambon – Kemenag Kanwil Jabar – Optik Krida – Sudirman 3 – Kebon Kopi – SMAN 13 B – Cilember – RS. Mitra Kasih – RSUD Cibabat B – SMPN 6 – Gedung 4 – Pasar Antri – Stasiun Cimahi – Lapangan Rajawali – Gedung 4 – Buana – PLN Cisangkan B – Ranca Belut B – Padasuka Indah B – Masjid Ar-Ridwan B – RS. IMC B – RS. Karisma Cimareme B – STEI LPPM B – Bale Pare – Kota Baru Parahyangan. The map of the route of Corridor 2 of Trans Metro Pasundan can be seen in Figure 2.

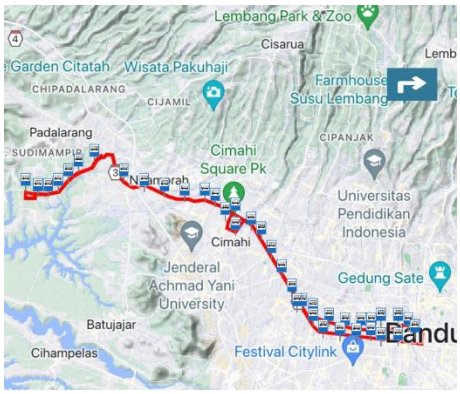


**Figure 2. Research Location**

The research will be conducted in the morning (06:30 – 08:00), afternoon (11:30-13:00), and evening (15:30-17:00) based on the results of the preliminary survey conducted over 3 days to determine the time for the research survey, as well as based on considerations and suggestions from the operational team of Trans Metro Pasundan Corridor 2, namely PT. Surveyor Indonesia.

The data used in the calculation in this research includes primary and secondary data (Firdaus et al., 2022; Rifai et al., 2021). Primary data is obtained by conducting surveys directly at the research location, including:

1. Number of Passengers
2. Results of Questionnaire Completion
3. Travel Time
4. Headway
5. Operational Duration

Then, for secondary data obtained from relevant institutions as part of the research, the secondary data required in this

study includes (Andriyani et al., 2021; Isradi, Farhan, et al., 2021; Isradi, Molina, et al., 2021):

1. Route Network Map
2. Number of Fleet

## III. RESULT AND DISCUSSION

### A. Load Factor

The load factor was obtained at 06:30, 11:30, and 15:30 on three days, namely May 23-25, 2023. A recapitulation is conducted to facilitate standardization with the World Bank to determine whether it is in accordance with the standards or not based on the field data obtained. Below is the recapitulation table of the load factor:

**Table 1. Recapitulation of Average Load Factor**

| Poll | Time | Capacity | Number of Stops | Total Passengers | Avg of Load factor (%) | Standar World Bank | Compliant/Not |
|---|---|---|---|---|---|---|---|
| A | 06.30 (23 May 2023) | 20 | 29 | 36 | 86.03 | 70% | Not Compliant |
| | 06.30 (24 May 2023) | 20 | 29 | 22 | 53.44 | 70% | Compliant |
| | 06.30 (25 May 2023) | 20 | 29 | 33 | 80.51 | 70% | Compliant |
| | 11.30 (8 June 2023) | 20 | 29 | 17 | 35.34 | 70% | Compliant |
| | 15.30 (23 May 2023) | 20 | 29 | 39 | 63.10 | 70% | Compliant |
| | 15.30 (24 May 2023) | 20 | 29 | 11 | 23.79 | 70% | Compliant |
| | 15.30 (25 May 2023) | 20 | 29 | 27 | 35.86 | 70% | Compliant |
| B | 06.30 (23 May 2023) | 20 | 28 | 32 | 87.03 | 70% | Not Compliant |
| | 06.30 (24 May 2023) | 20 | 28 | 17 | 28.51 | 70% | Compliant |
| | 06.30 (25 May 2023) | 20 | 28 | 33 | 38.14 | 70% | Compliant |
| | 11.30 (7 June 2023) | 20 | 28 | 18 | 62.22 | 70% | Compliant |
| | 15.30 (23 May 2023) | 20 | 28 | 38 | 60.92 | 70% | Compliant |
| | 15.30 (24 May 2023) | 20 | 28 | 26 | 72.59 | 70% | Not Compliant |
| | 15.30 (25 May 2023) | 20 | 28 | 37 | 94.07 | 70% | Not Compliant |
| Average | | | | | 58 | 70% | Compliant |

Based on Table 1, the highest average load factor (94.07%) is found at Poll B during the evening rush hour, while the lowest (23.79%) occurred at Poll A during the evening rush hour. The table indicates load factors outside the World Bank standards at certain times, for example, at Poll A at 06:30 on March 23, 2023, Poll B at 06:30 on March 23, 2024, and at 15:30 on March 24 and 25, 2024. Here is an example calculation of the load factor that occurred on May 23, 2023, from 06:30 to 08:00, from Rancabelut stop to PLN Cisangkan stop:

$$\text{Lf} = \frac{\text{Psg}}{\text{C}} * 100\%$$

$$\text{Lf} = \frac{19}{20} * 100\%$$

$$\text{Lf} = 95\%$$

### B. Travel Time

The average travel time of Trans Metro Pasundan Corridor 2 is calculated from a 5-day survey by recording travel times during the morning commute (06:30), midday (11:30), and evening rush hour (15:30) from Poll A at the Ikea stop to Poll B at the Alun-Alun Bandung stop.

**Table 2. Travel Time of Trans Metro Pasundan 2**

| Poll | Waktu | Berangkat | Datang | Travel time | Jarak Tempuh | Standar World Bank | Compliant/Not |
|---|---|---|---|---|---|---|---|
| A | 06.30 (23 May 2023) | 06:30 | 07:52 | 81.68 Minute | 23 Km | 10-12 km/hour | Compliant |
| | 06.30 (24 May 2023) | 06:30 | 07:46 | 76.32 Minute | 23 Km | 10-12 km/hour | Compliant |
| | 06.30 (25 May 2023) | 06:30 | 08:00 | 89. 11 Minute | 23 Km | 10-12 km/hour | Compliant |
| | 11.30 (8 June 2023) | 11:30 | 12:41 | 69.13 Minute | 23 Km | 10-12 km/hour | Compliant |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 15.30 (24 May 2023) | 15:30 | 16:32 | 62.05 Minute | 23 Km | 10-12 km/hour | Compliant |
| | 15.30 (25 May 2023) | 15:30 | 16:38 | 67.56 Minute | 23 Km | 10-12 km/hour | Compliant |
| B | 06.30 (23 May 2023) | 06:30 | 07:34 | 60.4 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 06.30 (24 May 2023) | 06:30 | 07:30 | 59.43 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 06.30 (25 May 2023) | 06:30 | 07:40 | 70.22 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 11.30 (7 June 2023) | 11:30 | 12:35 | 65.12 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 15.30 (23 May 2023) | 15:30 | 17:02 | 91.55 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 15.30 (24 May 2023) | 15:30 | 16:58 | 88 Minute | 21 Km | 10-12 km/hour | Compliant |
| | 15.30 (25 May 2023) | 15:30 | 17:00 | 90.01 Minute | 21 Km | 10-12 km/hour | Compliant |
| Rata-Rata | | | | | 18 Km/hour | 10-12 km/hour | Compliant |

Based on Table 2, the longest travel time occurred on Trans Metro Pasundan Poll B during the evening rush hour on May 23, 2023 (91.55 minutes). This was due to heavy traffic from Alun-Alun Bandung to IKEA Kota Baru Parahyangan. The fastest travel time was recorded on Trans Metro Pasundan Poll B during the morning commute on May 24, 2023 (59.43 minutes). All travel times comply with the World Bank standards for the distance covered by Trans Metro Pasundan corridor. The calculation of travel time is provided below:

TTAB = (T AB)/(J AB)

TTAB = 23/1.22

TTAB = 18 Km/Hour

**C. Headway**

The Headway value was obtained from the research results statically, the data were collected by recording the departure time of buses with the departure time of the next bus at the starting point at each Poll. Here is the Headway data obtained in the field on July 2-3.

**Table 3. Recapitulation of Headway**

| Poll | Date | Headway Avg (Mnt) | Standar World Bank | Compliant/Not |
|---|---|---|---|---|
| A | 2 Juli 2023 | 0:09 | 10-20 Minute | Compliant |
| | 3 Juli 2023 | 0:09 | 10-20 Minute | Compliant |
| B | 2 Juli 2023 | 0:08 | 10-20 Minute | Compliant |
| | 3 Juli 2023 | 0:09 | 10-20 Minute | Compliant |

Based on Table 3, the average Headway obtained in the field at Poll A and Poll B on July 2-3, 2023 is in the range of 8-9 minutes. Therefore, the Headway values observed are still within the World Bank standard, with a maximum standard of 10-20 minutes.

**D. Level of Satisfaction and Expectation Alignment**

Assessment of passenger satisfaction level with the service of Trans Metro Pasundan Corridor 2 is used as an indicator for future improvements to enhance service quality. The assessment of satisfaction level of Trans Metro Pasundan Corridor 2 consists of 45 attribute questions. Below is an example calculation of the average satisfaction level/Mean Satisfaction Score (MSS) for variable 1:

$$MSS = \frac{\sum_i^n Xi}{n}$$

$$MSS = \frac{418}{105}$$

$$MSS = 3.981$$

For variable 1, the total score obtained from 105 questionnaire respondents is 418. Based on the calculation

above, the average satisfaction score (MSS) for passengers of Trans Metro Pasundan services is 3.981.

Assessment of the expectation level of Trans Metro Pasundan Corridor 2 services serves as a measure for service improvement efforts aimed at enhancing passenger satisfaction with Trans Metro Pasundan Corridor 2 services. Below is an example calculation of the average expectation level/Mean Importance Score (MIS) for variable 1:

$$\text{MIS} = \frac{\sum_{i}^{n} \text{Yi}}{\text{n}}$$

$$\text{MIS} = \frac{474}{105}$$

$$\text{MIS} = 4.514$$

For variable 1, the total score obtained from 105 questionnaire respondents is 474. Based on the calculation above, the average expectation score (MIS) for passengers of Trans Metro Pasundan services is 4.514.

Here is an example calculation of the Conformity Rate between satisfaction (MSS) and expectation (MIS) of passengers of Trans Metro Pasundan Corridor 2 services for variable 1:

$$\text{Conformity Rate} = \frac{\text{MSS of avg}}{\text{MIS of avg}} \text{ x } 100\%$$

$$\text{Conformity Rate} = \frac{3.981}{4.514} \text{ x } 100\%$$

$$\text{Conformity Rate} = 88.186\%$$

**Table 4. Conformity Rate of Trans Metro Pasundan Corridor 2 Services**

| No. | Variable | Question | Average Satisfaction (MSS) | Expected Average (MIS) | Conformity Rate (%) |
|---|---|---|---|---|---|
| 1 | Awak Kendaraan | How long does the bus stop at the shelter/bus stop? | 3.981 | 4.514 | 88.186 |
| 2 | | What is the waiting time between buses? | 3.500 | 4.400 | 79.545 |
| 3 | | Are employees ready on site when needed? | 4.048 | 4.314 | 93.819 |
| 4 | | How is information on emergency handling procedures on the bus? | 3.886 | 4.295 | 90.466 |
| 5 | | Are employees responsive to passenger needs? | 3.981 | 4.305 | 92.478 |
| 6 | | What is the employee's ability to respond to passenger complaints? | 3.924 | 4.362 | 89.956 |
| 7 | | What is the employee's ability to respond to suggestions from passengers? | 3.848 | 4.295 | 89.579 |
| 8 | | How is the company's ability to respond quickly to passenger complaints? | 3.676 | 4.229 | 86.937 |
| 9 | | How friendly is provided by the employees on the bus? | 4.067 | 4.438 | 91.631 |
| 10 | | How polite are the employees on the bus? | 4.219 | 4.467 | 94.456 |
| 11 | | What are the employee's skills in communicating with passengers? | 3.810 | 4.343 | 87.719 |
| 12 | | How do employees provide information on bus arrivals clearly and communicatively? | 3.838 | 4.410 | 87.041 |
| 13 | | What is the employee's ability to drive? | 4.019 | 4.495 | 89.407 |
| 14 | Sarana | How are seat facilities provided on Trans Metro Pasundan buses? | 4.048 | 4.514 | 89.662 |
| 15 | | How are hand grip facilities provided on Trans Metro Pasundan buses? | 4.210 | 4.390 | 95.879 |
| 16 | | How are lighting facilities provided on the bus? | 4.086 | 4.400 | 92.857 |

| | | | | | |
|---|---|---|---|---|---|
| 17 | | How is first aid equipment provided on Trans Metro Pasundan buses? | 3.438 | 4.221 | 81.449 |
| 18 | Sarana | How to provide fire extinguishers on Trans Metro Pasundan buses | 4.114 | 4.324 | 95.154 |
| 19 | | How are safety belts provided on Trans Metro Pasundan buses? | 3.629 | 4.219 | 86.005 |
| 20 | | How clean is the Trans Metro Pasundan Bus? | 4.308 | 4.600 | 93.645 |
| 21 | | How are facilities available for submitting complaints and suggestions? | 3.798 | 4.257 | 89.217 |
| 22 | | How is the availability of special seats for passengers with special needs and pregnant women? | 3.981 | 4.410 | 90.281 |
| 23 | | How are the facilities provided at Trans Metro Pasundan shelters/stops? Example: lights? | 2.581 | 4.419 | 58.405 |
| 24 | | How are waiting chairs provided at Trans Metro Pasundan shelters/stops? | 2.962 | 4.442 | 66.675 |
| 25 | | How is the Greater Bandung city map provided at Trans Metro Pasundan shelters/stops? | 2.990 | 4.467 | 66.951 |
| 26 | | How is the Trans Metro Pasundan route map provided at TMP shelters/stops? | 3.114 | 4.429 | 70.323 |
| 27 | | How are ticket machines provided at Trans Metro Pasundan shelters/stops? | 2.962 | 4.524 | 65.474 |
| 28 | | How are information boards provided at Trans Metro Pasundan shelters/stops? | 2.810 | 4.495 | 62.500 |
| 29 | Prasarana | What is the availability of Shelters/Stops? | 3.143 | 4.448 | 70.664 |
| 30 | | How is Poll availability? | 2.724 | 4.471 | 60.920 |
| 31 | | How many Trans Metro Pasundan shelters are there? | 3.229 | 4.505 | 71.670 |
| 32 | Kenyamanan | Providing AC facilities on Trans Metro Pasundan buses? | 4.352 | 4.467 | 97.441 |
| 33 | | How are trash bins provided on Trans Metro Pasundan buses? | 3.705 | 4.276 | 86.637 |
| 34 | | How comfortable is the Trans Metro Pasundan Bus? | 4.200 | 4.429 | 94.839 |
| 35 | | How clean is the Trans Metro Pasundan Bus? | 4.400 | 4.590 | 95.851 |
| 36 | | How many bus fleets operate? | 3.810 | 4.429 | 86.022 |
| 37 | | How many routes does the Trans Metro Pasundan bus offer? | 3.692 | 4.457 | 82.840 |
| 38 | | How easy is the Bus Friends application? | 3.267 | 4.448 | 73.448 |
| 39 | | How is the cleanliness at the Trans Metro Pasundan shelter/stop? | 2.743 | 4.286 | 64.000 |
| 40 | | How comfortable is the Trans Metro Pasundan shelter/stop? | 2.838 | 4.505 | 63.002 |
| 41 | | How are trash bins provided in TMP shelters/stops? | 2.933 | 4.476 | 65.532 |

| | | | | | |
|---|---|---|---|---|---|
| 42 | | What are the prices for Pasundan Trans Metro Bus Tickets? | 4.314 | 4.429 | 97.419 |
| 43 | | How far is the shelter from public places? | 3.905 | 4.476 | 87.234 |
| 44 | | What are the smoking ban regulations? | 3.800 | 4.457 | 85.256 |
| 45 | | How easy is it to get information about bus arrivals and bus delays? | 3.562 | 4.467 | 79.744 |
| Jumlah | | | 164.441 | 198.592 | 3728.215 |
| Rata-Rata | | | 3.654 | 4.413 | 82.849 |

Presentation >100% can be said to indicate that the satisfaction with that attribute has exceeded passengers' expectations. Based on Table 4. it shows that the average Conformity Rate of Trans Metro Pasundan Corridor 2 services is 82.849%, with a range of values between 58.405% for the attribute of providing facilities at Trans Metro Pasundan shelters/stops to 97.441% for the attribute of providing air conditioning facilities inside Trans Metro Pasundan buses.

### E. Quadrant Analysis Using the Index Performance Analysis (IPA) Method on Trans Metro Pasundan Corridor 2 Services

Below are the results of the analysis of Trans Metro Pasundan Corridor 2 services using the Index Performance Analysis method, which can be seen in the following figure:

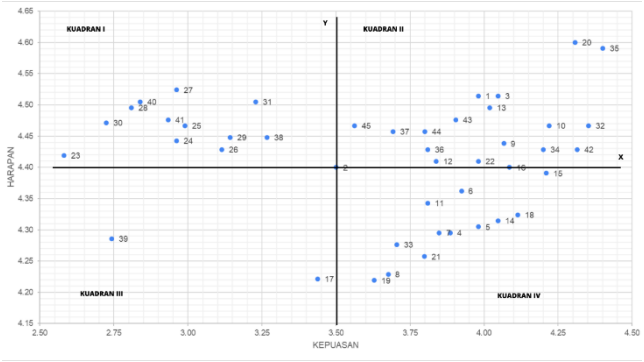


**Figure 2. IPA Cartesian Diagram**

Based on the Cartesian diagram of the Index Performance Analysis method on Trans Metro Pasundan Corridor 2 services, four quadrants are obtained, consisting of quadrant I, which is the improvement category, quadrant II, which is the satisfaction category, quadrant III, which is the dissatisfaction category, and quadrant IV, which is the no need for improvement category. Below are the attributes for each quadrant explained as follows:

1. **Quadrant I, Improvement (Concentrate)**
   The condition of quadrant I indicates that attributes have low performance but are highly expected by passengers regarding the services of Trans Metro Pasundan Corridor 2. Attributes included in quadrant I are: 23, 24, 25, 26, 27, 28, 29, 30, 31, 38, 40, and 41.
2. **Quadrant II, Satisfactory (Keep up with the good work)**
   The condition of quadrant II depicts attributes with high performance and high expectations from passengers regarding the services of Trans Metro Pasundan Corridor 2. Attributes included in quadrant II are those that should be maintained. Attributes included in quadrant II are: 1, 3, 9, 10, 12, 13, 16, 20, 22, 32, 34, 35, 36, 37, 42, 43, 44, and 45.
3. **Quadrant III, Dissatisfactory (Low priority)**
   The condition of quadrant III depicts attributes with low performance and low expectations from passengers regarding the services of Trans Metro Pasundan Corridor 2. Attributes included in quadrant III are those that do not require high prioritization. Attributes included in quadrant III are: 17 and 39.
4. **Quadrant IV, No Need for Improvement (Possible overkill)**
   The condition of quadrant IV depicts attributes with high performance but low expectations from passengers regarding the services of Trans Metro Pasundan Corridor 2. Attributes included in quadrant IV are those that are excessive in their provision. Attributes included in quadrant IV are: 4, 6, 7, 8, 11, 14, 15, 18, 19, 21, and 33.

### F. Analysis of Customer Satisfaction Index for Trans Metro Pasundan Corridor 2 Services

To obtain the Customer Satisfaction Index for Trans Metro Pasundan Corridor 2 services, it is obtained through the following steps:

The median score of Satisfaction level for each attribute is obtained from the average attribute Satisfaction or mean (MSS). Here is an example calculation of the average satisfaction level/Mean Satisfaction Score (MSS) for variable 1:

$$SS = \frac{\sum_i^n Xi}{n}$$

$$MSS = \frac{418}{105}$$

$$MSS = 3.981$$

The median score of the expectation level for each attribute is obtained from the average attribute expectation or mean

(MIS). Here is an example calculation of the average expectation level/Mean Importance Score (MIS) for variable 1:

$$MIS = \frac{\sum_i^n Yi}{n}$$

$$MIS = \frac{474}{105}$$

$$MIS = 4.514$$

The Importance Weighting Factor (WF) for each attribute is obtained by dividing the median score of the expectation level by the average attribute performance level. Here is an example calculation to find the WF value for variable 1:

$$WF = \frac{MISi\ (var\ 1)}{\sum_i^p MISi} * 100\%$$

$$WF = \frac{4.514}{198.592}$$

$$WF = 0.023$$

The Weighted Score (WS) for each attribute is obtained by multiplying the Importance Weighting Factor by the median score of the Satisfaction level. Here is an example calculation to find the WS value for variable 1:

$WS = MSSi \text{ x } WF$

$WS = 3.981 \text{ x } 0.023$

$WS = 0.090$

The Customer Satisfaction Index is obtained by dividing the total Weighted Score by the highest possible score, which is 5. Here is the calculation to find the Customer Satisfaction Index value:

$$CSI = \frac{\sum_i^p WSi}{HS} * 100\%$$

$$CSI = \frac{3.654}{5} * 100\%$$

$$CSI = 73.078\%$$

Here is the recapitulation of the calculation results for the Customer Satisfaction Index (CSI), as shown in the table below.

**Table 5. Calculation of Customer Satisfaction Index for Trans Metro Pasundan Corridor 2 Services**

| No. | Mean Satisfaction Score (MSS) | Mean Importance Score (MIS) | Importance Weighting Factor (WF) | Weighted Score (WS) |
|---|---|---|---|---|
| 1 | 3.981 | 4.514 | 0.023 | 0.090 |
| 2 | 3.500 | 4.400 | 0.022 | 0.078 |
| 3 | 4.048 | 4.314 | 0.022 | 0.088 |
| 4 | 3.886 | 4.295 | 0.022 | 0.084 |
| 5 | 3.981 | 4.305 | 0.022 | 0.086 |
| 6 | 3.924 | 4.362 | 0.022 | 0.086 |
| 7 | 3.848 | 4.295 | 0.022 | 0.083 |
| 8 | 3.676 | 4.229 | 0.021 | 0.078 |
| 9 | 4.067 | 4.438 | 0.022 | 0.091 |
| 10 | 4.219 | 4.467 | 0.022 | 0.095 |
| 11 | 3.810 | 4.343 | 0.022 | 0.083 |
| 12 | 3.838 | 4.410 | 0.022 | 0.085 |
| 13 | 4.019 | 4.495 | 0.023 | 0.091 |
| 14 | 4.048 | 4.514 | 0.023 | 0.092 |
| 15 | 4.210 | 4.390 | 0.022 | 0.093 |
| 16 | 4.086 | 4.400 | 0.022 | 0.091 |
| 17 | 3.438 | 4.221 | 0.021 | 0.073 |
| 18 | 4.114 | 4.324 | 0.022 | 0.090 |
| 19 | 3.629 | 4.219 | 0.021 | 0.077 |
| 20 | 4.308 | 4.600 | 0.023 | 0.100 |
| 21 | 3.798 | 4.257 | 0.021 | 0.081 |
| 22 | 3.981 | 4.410 | 0.022 | 0.088 |
| 23 | 2.581 | 4.419 | 0.022 | 0.057 |
| 24 | 2.962 | 4.442 | 0.022 | 0.066 |
| 25 | 2.990 | 4.467 | 0.022 | 0.067 |
| 26 | 3.114 | 4.429 | 0.022 | 0.069 |

| | | | | |
|---|---|---|---|---|
| 27 | 2.962 | 4.524 | 0.023 | 0.067 |
| 28 | 2.810 | 4.495 | 0.023 | 0.064 |
| 29 | 3.143 | 4.448 | 0.022 | 0.070 |
| 30 | 2.724 | 4.471 | 0.023 | 0.061 |
| 31 | 3.229 | 4.505 | 0.023 | 0.073 |
| 32 | 4.352 | 4.467 | 0.022 | 0.098 |
| 33 | 3.705 | 4.276 | 0.022 | 0.080 |
| 34 | 4.200 | 4.429 | 0.022 | 0.094 |
| 35 | 4.400 | 4.590 | 0.023 | 0.102 |
| 36 | 3.810 | 4.429 | 0.022 | 0.085 |
| 37 | 3.692 | 4.457 | 0.022 | 0.083 |
| 38 | 3.267 | 4.448 | 0.022 | 0.073 |
| 39 | 2.743 | 4.286 | 0.022 | 0.059 |
| 40 | 2.838 | 4.505 | 0.023 | 0.064 |
| 41 | 2.933 | 4.476 | 0.023 | 0.066 |
| 42 | 4.314 | 4.429 | 0.022 | 0.096 |
| 43 | 3.905 | 4.476 | 0.023 | 0.088 |
| 44 | 3.800 | 4.457 | 0.022 | 0.085 |
| 45 | 3.562 | 4.467 | 0.022 | 0.080 |
| Total | 164.441 | 198.592 | 1.000 | 3.654 |
| Customer Satisfaction Indeks (CSI) | | | | 73.078 |

Based on Table 5, the Customer Satisfaction Index for Trans Metro Pasundan Corridor 2 services is 73.078, which falls within the interval of 66.00-80.99 in Table 2.5. This indicates that passengers are "Satisfied" with the performance of Trans Metro Pasundan Corridor 2 services. Below are the results of the analysis of Trans Metro Pasundan Corridor 2 services using the Performance Index method.

### G. Summary of Calculation Result

Based on the calculation results measuring the performance of Trans Metro Pasundan, where the average load factor performance is 58%, travel time is 18.85 km/hour, and Headway is 9 minutes, these values are in accordance with the standards set by the World Bank, as shown in Table 4.28. Furthermore, the IPA and CSI values obtained are 82% and 73%, respectively, which can be considered compliant with the standards set by Ministerial Regulation No. 29 of 2015, as shown in the table below.

**Table 6. Recapitulation of Performance, IPA, and CSI of Trans Metro Pasundan Corridor 2**

| No. | Variable | Average Actual Value | Standard Value | Standard | Compliant/Not |
|---|---|---|---|---|---|
| 1. | Load factor | 58% | Max 70% | World Bank | Compliant |
| 2. | Travel time | 18.85 Km/hour | Min 10-12 Km/hour | World Bank | Compliant |
| 3. | Headway | 9 Minute | Max 10-20 Minute | World Bank | Compliant |
| 4. | Index Performance Analysis | 82% | Min 80% | Peraturan Menteri No. 29 Tahun 2015 | Compliant |
| 5. | Customer Satisfaction Index | 73% | 66-80.99% | Peraturan Menteri No. 29 Tahun 2015 | Compliant |

## IV. CONCLUSIONS

Based on the analysis and discussion in this study, the following conclusions can be drawn:

1. Operational performance of Trans Metro Pasundan Corridor 2: The highest load factor was recorded at Poll B at 15:30 (94.07%), while the lowest was at Poll A at 15:30 (23.79%). The longest travel time occurred at Poll B at 15:30 on May 23, 2023 (91.55 minutes) due to heavy traffic. Some load factors do not meet the World Bank standards, for example, at

Poll A at 06:30 on March 23, 2023. However, travel time complies with the standards for distances of 21 km and 23 km (10-12 km per hour). Headway between 5-13 minutes meets the standard (10-20 minutes).

2. Perceptions of passenger satisfaction and expectations for Trans Metro Pasundan Corridor 2 based on attributes with scores below 80% include: provision of facilities at shelters/stops, availability of Polls, provision of information boards, comfort, cleanliness, ticket machine availability, garbage bins, waiting seats, city maps, route maps, shelter availability, number of shelters, ease of use of the Bus Friend application, and waiting time between buses. Attributes in quadrant I are the top priority for improvement, including facility provision, waiting seats, city maps, route maps, ticket machines, information boards, shelter availability, Poll availability, number of shelters, ease of use of the Bus Friend application, comfort, and garbage bins. These 12 attributes have a significant impact on passenger satisfaction and must be improved.
3. Evaluation of service conditions based on the Customer Satisfaction Index value for Trans Metro Pasundan Corridor 2 services is 73.078, which falls within the interval of 66.00-80.99, indicating that passengers are "Satisfied" with the performance of Trans Metro Pasundan Corridor 2 services.

**REFERENCES**


1. Andriyani, A., Dermawan, W. B., Isradi, M., & Rifai, A. I. (2021). Operational Performance Analysis of Rapid Transit Bus (BRT) Corridor 11 in Pulogebang Bus Station. World Journal of Civil Engineering, 2(2), 71–80. http://world.journal.or.id/index.php/wjce%0AAttribution
2. Ariostar, A., Muttaqin, A. W., Adriadi, A., Andiyan, A., & Irawan, S. (2022). Implementasi Standar Pelayanan Minimal Bus Trans Metro Bandung Koridor 1. Jurnal Komposit: Jurnal Ilmu-Ilmu Teknik Sipil, 6(1), 9–16.
3. Bakar, M. F. A., Norhisham, S., Katman, H. Y., Fai, C. M., Azlan, N. N. I. M., & Samsudin, N. S. S. (2022). Service Quality of Bus Performance in Asia: a Systematic Literature Review and Conceptual Framework. Sustainability, 14(13), 7998.
4. BPS-West Java. (2020). Transportation Statistics of West Java Province 2020. Central Bureau of Statistics of West Java Province.
5. Chikkabagewadi, S., Devappa, V. M., & Karjinni, V. V. (2022). Evaluation of the Bus Service Quality and a Strategy for Improvement Service: Based on Importance Performance Analysis and Customer Satisfaction Index Level. Journal of Pharmaceutical Negative Results, 5441–5453.
6. Dermawan, W. B., Bimantara, F., & Isradi, M. (2021). Passenger Satisfaction Analysis on Bekasi Station Service Performance. IJTI International Journal of Transportation and Infrastructure, 5(1), 36–43.
7. Dwiatmoko, H., Isradi, M., Prasetijo, J., & Hamid, A. (2022). Comparative Study of the Passenger's Satisfaction with Regional Rail Transport in Indonesia and Malaysia. European Journal of Science, Innovation and Technology, 2(2), 32–40. http://www.ejsit-journal.com/index.php/ejsit/article/view/94/81
8. Esmailpour, J., Aghabayk, K., Vajari, M. A., & De Gruyter, C. (2020). Importance–Performance Analysis (IPA) of Bus Service Attributes: A Case Study in a Developing Country. Transportation Research Part a: Policy and Practice, 142, 129–150.
9. Firdaus, H. Y., Isradi, M., Prasetijo, J., & Rifqi, M. (2021). Performance Analysis and Passenger Satisfaction on Trans Jakarta Bus Services ( Cibubur Route – BKN ). Journal of Science, Technology, and Engineering (JSTE), 1(2), 73–81.
10. Firdaus, H. Y., Isradi, M., Prasetijo, J., Rifqi, M., & Halim, H. (2022). Analysis of Transjakarta Service Performance on the Cibubur-BKN by Servqual Method. European Journal of Science, Innovation and Technology, 2(1), 113–123.
11. Isradi, M., Arifin, Z., Setiawan, M. I., Nasihien, R. D., & Prasetijo, J. (2022). Traffic Performance Analysis of Unsignalized Intersection Using the Traffic Conflict Parameter Technique. Sinergi, 26(3), 397. https://doi.org/10.22441/sinergi.2022.3.015
12. Isradi, M., Farhan, M. N., Rifai, A. I., & Mufhidin, A. (2021). Analysis of Passenger Satisfaction with LRT Jakarta Services Route Velodrome - Boulevard Utara. IJTI (International Journal of Transportation and Infrastructure), 5(1), 26–35.
13. Isradi, M., Molina, P., Rifai, A. I., Mufhidin, A., & Prasetijo, J. (2021). Evaluation of Performance and Services of Integrated Transportation System (Case Study: Connecting Line between MRT Dukuh Atas Station and KRL Sudirman Station). Proceedings of the International Conference on Industrial Engineering and Operations Management, 496–507.
14. Rachmadina, Y., Isradi, M., Prasetijo, J., Negara Dalimunte, A. K., & Mufhidin, A. (2023). Analysis of the Choice of Commuter Line Electric Rail Train (Krl) Modes and Transjakarta Buses for the Bekasi City - East Jakarta Route. Engineering and

Technology Journal, 8(08), 2655–2664. https://doi.org/10.47191/etj/v8i8.23

15. Rifai, A. I., Lista, Isradi, M., & Mufhidin, A. (2021). How did the COVID-19 Pandemic Impact Passenger Choice toward Public Transport? The Case of Jakarta, Indonesia. Design Engineering, 2(8), 6816–6824.
16. Sum, S., Champahom, T., Jomnonkwao, S., & Ratanavaraha, V. R. (2019). An Application of Importance-Performance Analysis (IPA) for Evaluating City Bus Service Quality in Cambodia. International Journal of Building, Urban, Interior and Landscape Technology (BUILT), 13, 55–66.
17. Suria, H., Ahmad, F. M., & Siti, N. S. (2019). Bus Service Indicator: The Different Sight of Performance Index Development. Journal of Physics: Conference Series, 1349(1), 12049