

PASSENGER SATISFACTION AND SERVICE IMPROVEMENT PRIORITIES AT PASIR HAYAM TERMINAL USING CSI AND IPA

Muhammad Thosya Nugraha^{1*}, Herman¹ and Hadyan Arifin Bustam²

¹Department of Civil Engineering, Faculty of Civil Engineering and Planning, National
Institute of Technology Bandung, Bandung, Indonesia

²Department of Civil Engineering, Faculty of Engineering and Computer Science, Universitas
Teknokrat Indonesia, Bandar Lampung, Indonesia

*E-mail: mthosyan@mhs.itenas.ac.id

Received: 30 July 2026

Accepted: 10 August 2026

Published: 31 August 2026

Abstract

Passenger terminals serve as essential nodes in road-based public transportation systems, where service quality significantly influences user satisfaction. However, the availability of terminal facilities alone does not guarantee positive passenger perceptions. This study evaluated passenger satisfaction and identified service improvement priorities at Pasir Hayam Type B Terminal, Cianjur Regency, Indonesia, based on the service standards specified in the Indonesian Minister of Transportation Regulation PM 40/2015. A descriptive quantitative approach was employed using field observations and a five-point Likert scale questionnaire. Based on 158 questionnaires collected, 101 valid responses were analyzed across 39 service attributes. Passenger satisfaction was measured using the Customer Satisfaction Index (CSI), while service improvement priorities were determined through Importance Performance Analysis (IPA). The overall CSI reached 79.20%, indicating that passengers were generally satisfied with the terminal services. Among the service dimensions, reliability achieved the highest CSI (81.08%), whereas equity recorded the lowest (75.41%). The average importance score (4.254) exceeded the average satisfaction score (3.964), resulting in an overall service gap of -0.290. IPA identified two high-priority attributes requiring immediate attention: (1) the effectiveness of security facilities, including security posts, closed-circuit television (CCTV), and designated security areas; and (2) the provision and maintenance of green open spaces, terminal cleanliness, and segregated waste bins. Although the terminal achieved an overall satisfactory performance, the results reveal critical operational and environmental deficiencies that warrant improvement. These findings provide an evidence-based framework for prioritizing resource allocation and enhancing service quality to better meet passenger expectation.

Keywords: Passenger satisfaction; road passenger terminal; Customer Satisfaction Index; Importance-Performance Analysis; service standards

Mohammad Thosya Nugraha, et al. (2026). Evaluation of Passenger Satisfaction and Service Improvement Priorities at Pasir Hayam Terminal, Cianjur, Indonesia, Banten. *Jurnal of Infrastructural in Civil Engineering*, Vol.07, N0.02, pp: 134-142.

INTRODUCTION

Passenger terminals are not merely transfer points for vehicles and travelers; they are public-service environments in which operational order, safety, information provision, comfort, accessibility, and perceived security jointly shape the travel experience. At terminal level, deficiencies in apparently secondary facilities can influence users' willingness to continue using public transport, particularly when those deficiencies increase uncertainty, inconvenience, or perceived risk. A comprehensive evaluation should therefore examine not only whether facilities exist, but also whether users consider them important and experience them as satisfactory.

In Indonesia, minimum service requirements for road passenger terminals are established through Minister of Transportation Regulation PM 40/2015. The regulation organizes service provision into six dimensions: safety, security, reliability/regularity, comfort, convenience/affordability, and equity. The broader operation of road passenger terminals is further governed by Minister of Transportation Regulation PM 24/2021. Together, these instruments position terminals as regulated public-service facilities whose performance should satisfy both operational requirements and passenger needs [Ministry of Transportation of the Republic of Indonesia [1-2].

Regulatory compliance and perceived service quality, however, are not equivalent. A facility may be physically available but poorly maintained, difficult to locate, inconsistently operated, or unsuitable for particular user groups. Previous transport-facility studies have consequently combined minimum-service assessments with passenger perceptions to reveal attributes that require managerial attention even when overall satisfaction remains favorable [3-5]. Similar evidence from terminal and ferry-port settings indicates that aggregate satisfaction can obscure localized performance gaps, making attribute-level prioritization essential for effective resource allocation [6-7].

The Customer Satisfaction Index (CSI) summarizes overall perceived performance while weighting each attribute by its importance. Importance-Performance Analysis (IPA), in turn, locates attributes within a two-dimensional matrix defined by perceived importance and performance [8]. Used together, CSI and IPA distinguish the general level of satisfaction from the specific attributes that require immediate improvement, continued maintenance, gradual intervention, or resource rationalization.

Pasir Hayam Terminal is a Type B passenger terminal in Cianjur Regency serving local and intercity movements. Preliminary observation indicated that several facilities were present, although their completeness, visibility, operation, and conformity with regulatory indicators varied. An inventory-only assessment would therefore be insufficient for selecting improvement measures. This study addresses that need by integrating field observations with users' evaluations of 39 attributes derived from PM 40/2015. Specifically, the study aims to: (1) quantify the perceived importance and satisfaction of terminal services; (2) determine overall and dimension-level CSI values; and (3) identify service improvement priorities through IPA. The principal contribution is an operationally oriented prioritization of regulatory service attributes at a Type B terminal, including explicit consideration of attributes whose social importance may not be fully represented by the dominant respondent profile.

MATERIALS AND METHODS

Study Site, Design and Respondents

The study was conducted at Pasir Hayam Terminal, located on Jalan Raya Cibeber, Sirnagalih, Cilaku District, Cianjur Regency, West Java, Indonesia. A descriptive quantitative

design was employed. Primary data were obtained through field observation, brief on-site interviews, and a passenger questionnaire. Observation was used to compare existing terminal conditions with the service indicators specified in PM 40/2015, whereas the questionnaire measured users' perceived importance and satisfaction for each service attribute.

The operational population was based on the average daily boarding and alighting volume of minibuses and medium-sized buses, estimated at 376 passengers. Using the Slovin expression with a 10% error tolerance produced a minimum sample requirement of 79 respondents. On-site convenience (intercept) sampling was applied to terminal users who were at least 17 years old, had used the terminal more than once during the preceding three months, and consented to complete the questionnaire. A total of 158 responses were collected; 57 were excluded because they did not satisfy the instrument's attention-screening criterion. The final analytical sample comprised 101 respondents, exceeding the calculated minimum.

Instrument and Measurement Quality

The questionnaire consisted of respondent-characteristic items and 39 service attributes representing the six regulatory dimensions. Each attribute was rated twice on a five-point Likert scale: once for importance and once for satisfaction/performance. A score of 1 represented very unimportant or very dissatisfied, while a score of 5 represented very important or very satisfied. The allocation of attributes across dimensions is summarized in Table 1.

Table 1. Service dimensions and attributes derived from PM 40/2015

Code	Service dimension	Number of attributes	Main coverage
A	Safety	10	Pedestrian routes; signs and markings; evacuation; fire protection; health services; vehicle inspection; safety information
B	Security	3	Security posts; CCTV; complaint channels; security personnel
C	Reliability/regularity	5	Schedules; fares; ticket counters; control office; operational personnel
D	Comfort	10	Waiting area; toilets; prayer room; green open space; food outlets; cleanliness; smoking area; drainage; lighting
E	Convenience/affordability	9	Arrival and departure circulation; service information; onward transport; luggage storage; charging points; platforms; parking
F	Equity	2	Accessibility for persons with disabilities and lactation room

Item-total validity was assessed using a critical correlation coefficient of 0.196 at the 5% significance level ($n = 101$), and internal consistency was assessed using Cronbach's alpha with a minimum criterion of 0.60 (Ghozali, 2018). All satisfaction items exceeded the item-total threshold. Seven items on the importance scale did not exceed the threshold, although the

aggregate importance scale remained internally consistent ($\alpha = 0.840$); the satisfaction scale produced an α of 0.962. Because the attributes operationalized mandatory regulatory indicators, all were retained for the CSI and IPA calculations. Consequently, results involving importance ratings are treated as exploratory and interpreted together with field observations and the regulatory context.

Customer Satisfaction Index and Importance-Performance Analyses

For each attribute i , the Mean Importance Score (MIS) and Mean Satisfaction Score (MSS) were first calculated across n respondents. The Weight Factor (WF) was obtained by dividing an attribute's MIS by the sum of MIS values across all attributes. The corresponding Weight Score (WS) was calculated as WF multiplied by MSS. The CSI was then computed as follows:

$$CSI = [\sum(WF_i \times MSS_i) / 5] \times 100\% \quad (1)$$

CSI values were classified as not satisfied (0-34%), less satisfied (35-50%), moderately satisfied (51-65%), satisfied (66-80%), and highly satisfied (81-100%), following the classification used in the source study. Service gaps were expressed as MSS minus MIS; negative values indicate that perceived performance remained below perceived importance.

IPA used MSS as the horizontal axis and MIS as the vertical axis. The intersection lines were defined by the grand means across all attributes: $MSS = 3.964$ and $MIS = 4.254$. Quadrant I contains high-importance/low-performance attributes and represents the principal improvement priority. Quadrant II contains high-importance/high-performance attributes that should be maintained. Quadrant III contains low-importance/low-performance attributes that may be improved gradually, while Quadrant IV contains low-importance/high-performance attributes for which additional resource allocation is generally less urgent. A single overall matrix was used to ensure that priorities reflected terminal-wide performance rather than dimension-specific averages.

RESULTS AND DISCUSSION

Respondent Profile and Observed Service Conditions

The respondent sample was predominantly male (82.9%) and concentrated in the 25-34-year age group (77.8%). Most respondents were laborers or casual workers (61.4%), and 71.5% reported household incomes of IDR 3-6 million per month. In terms of travel behavior, 82.9% used the terminal one to five times per year, 53.8% were at the terminal to depart, and 84.2% were undertaking intercity trips. Only 1.9% were persons with disabilities or companions of persons with disabilities. The results therefore primarily represent working-age intercity users and should not be assumed to reflect the experience of all passenger groups equally.

Field observations showed a mixed pattern of compliance and operational readiness. Arrival and departure routes were generally organized with limited conflict, the terminal management office and control room were available, drainage was functional, parking areas were provided, and a lactation room existed. Nevertheless, several indicators were incomplete or inadequately operated, including written schedule and fare information, visible security complaint channels, dedicated security personnel, health facilities, evacuation routes, a designated smoking area, luggage storage, visual and audio information systems, wheelchair ramps, and accessible toilets. These findings indicate that service deficiencies were related not only to the physical absence of infrastructure, but also to functionality, visibility, maintenance, and operational continuity.

Table 2. Dominant respondent characteristics (n = 101)

Characteristic	Dominant category	Proportion
Sex	Male	82.9%
Age	25-34 years	77.8%
Occupation	Laborer/casual worker	61.4%
Household income	IDR 3-6 million/month	71.5%
Terminal-use frequency	1-5 times/year	82.9%
Visit status	Departing passenger	53.8%
Trip destination	Intercity	84.2%
Disability status	Neither disabled nor accompanying a disabled user	98.1%

Importance, Satisfaction and CSI

The overall mean importance score was 4.254, compared with an overall mean satisfaction score of 3.964. The resulting gap of -0.290 indicates that perceived service performance did not fully meet users' stated importance. Although the gap was modest and the overall satisfaction score was relatively favorable, every service dimension showed a negative gap. This pattern suggests that incremental improvements remain necessary even where current performance is considered satisfactory.

Table 3. Importance, satisfaction, service gap, and CSI by dimension

Service dimension	MIS	MSS	Gap	CSI (%)	Classification
Safety	4.308	3.977	-0.331	79.59	Satisfied
Security	4.333	3.937	-0.396	78.76	Satisfied
Reliability/regularity	4.370	4.053	-0.317	81.08	Highly satisfied
Comfort	4.204	3.942	-0.262	78.90	Satisfied
Convenience/affordability	4.182	3.946	-0.236	78.97	Satisfied
Equity	4.069	3.767	-0.302	75.41	Satisfied
Overall	4.254	3.964	-0.290	79.20	Satisfied

The overall CSI of 79.20% placed Pasir Hayam Terminal in the satisfied category, but only narrowly below the 81% threshold used for the highly satisfied category. Reliability/regularity was the only dimension classified as highly satisfactory (81.08%), indicating comparatively favorable assessments of schedules, ticket-counter operation, operational control, and staff presence. Equity produced the lowest CSI (75.41%), consistent with the observed deficiencies in wheelchair ramps, accessible toilets, and the completeness of the lactation facility. The

security dimension recorded the largest negative gap (-0.396), suggesting that security-related expectations were more weakly met than those in other dimensions.

This combination of a favorable overall CSI and dimension-specific gaps is consistent with findings from other Indonesian transport facilities. Studies at Bandung Station, Soekarno-Hatta Airport Terminal 2, Kalisat Station, and Bau-Bau Ferry Port similarly found that aggregate satisfaction did not eliminate the need for targeted attribute-level intervention (Almaliki et al., 2024; Kinasih & Permata, 2022; Sabilla & Herman, 2022; Sulistyono et al., 2023). Accordingly, the CSI should be interpreted as a system-level indicator rather than a substitute for diagnosing specific service weaknesses.

Service Improvement Priorities Based on IPA

The overall IPA matrix assigned two attributes to Quadrant I, 17 to Quadrant II, 14 to Quadrant III, and six to Quadrant IV. The Quadrant I attributes were B1, representing the availability and effective operation of security posts, CCTV, and designated security points, and D4, representing adequate and clean green open space equipped with separate organic and inorganic waste bins. Both attributes were rated above the grand mean for importance but below the grand mean for satisfaction, making them the immediate priorities for intervention.

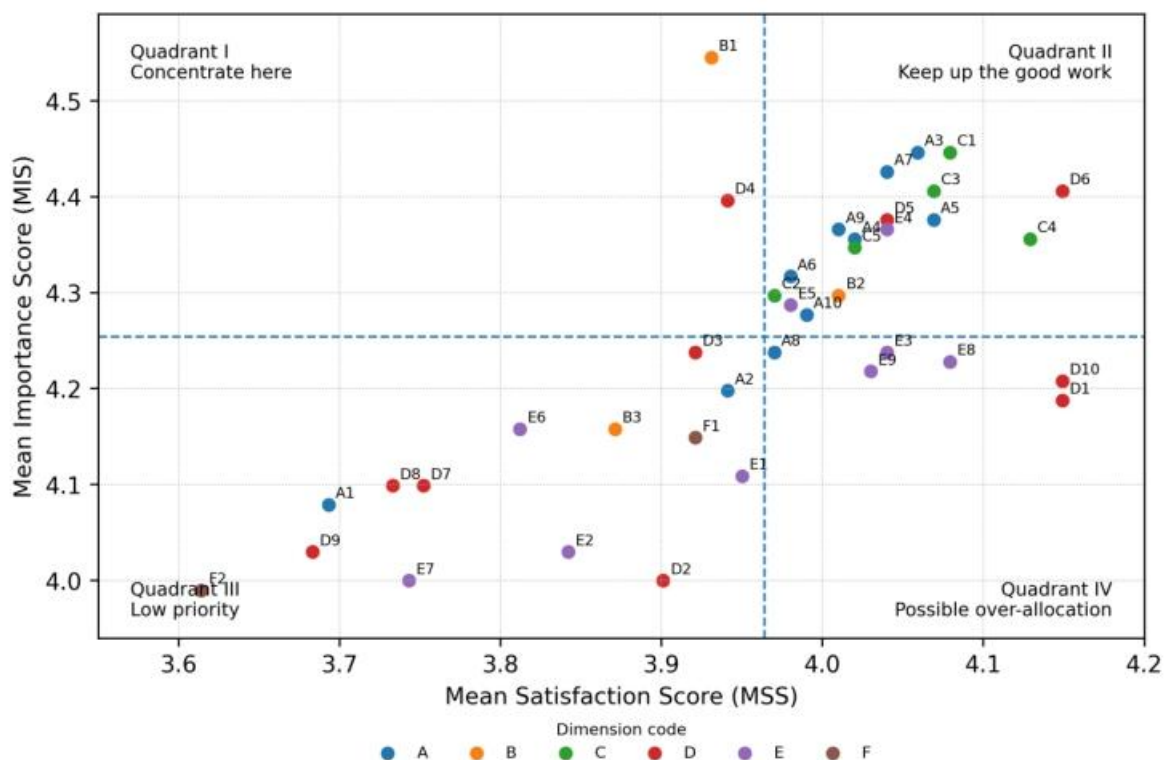


Figure 1. Overall Importance-Performance Analysis matrix for Pasir Hayam Terminal services.

The priority status of B1 is notable because the field checklist recorded the physical presence of a security post and CCTV. The divergence demonstrates why facility inventories and user perceptions should be examined together. Users may not observe personnel at critical locations, may be unaware of camera coverage, or may not experience an effective response when security concerns arise. Improvement should therefore focus on operational performance

rather than construction alone: staffing the security post throughout service hours, auditing camera functionality and coverage, establishing visible patrol points, and providing an easily identifiable complaint channel.

Table 4. Distribution of service attributes across IPA quadrants

IPA quadrant	Number	Principal attributes	Management implication
I - Concentrate here	2	B1 and D4	Immediate improvement and priority allocation of resources.
II - Keep up the good work	17	A3-A7, A9-A10, B2, C1-C5, D5-D6, E4-E5	Maintain service quality through routine inspection and operational control.
III - Low priority	14	A1-A2, B3, D2-D3, D7-D9, E1-E2, E6-E7, F1-F2	Improve gradually according to risk, regulatory obligation, user need, and budget availability.
IV - Possible over-allocation	6	A8, D1, D10, E3, E8-E9	Maintain efficiently and avoid disproportionate additional investment.

Attribute D4 indicates that environmental quality is experienced as a functional component of terminal comfort rather than as a purely aesthetic feature. Green-space maintenance, area cleaning, accessible segregated bins, routine waste collection, and visible cleanliness supervision should be managed as an integrated service process. Comparable terminal research has likewise identified cleanliness and environmental management as recurring determinants of user satisfaction (Dewi et al., 2025).

Quadrant II contained most reliability/regularity attributes as well as several safety, security, comfort, and information attributes. These services should be protected from deterioration because their importance weights are relatively high. Routine inspection of ticketing and schedule information, operational control, cleanliness, food-service facilities, and passenger information is therefore necessary even though users currently perceive their performance as satisfactory.

The interpretation of Quadrant III requires particular caution. Accessibility facilities and the lactation room were positioned in this quadrant because their average importance and satisfaction scores were below the sample means. This statistical location must not be interpreted as evidence that such facilities are dispensable. Only 1.9% of respondents were persons with disabilities or companions of disabled users, so the dominant sample may have understated the practical importance of inclusive infrastructure. Equity-related facilities are also rights-based regulatory requirements. Wheelchair ramps, accessible toilets, unobstructed routes, wheelchairs, and a properly equipped lactation room should therefore be provided irrespective of their relative IPA position. Evidence from railway-service research similarly shows that favorable general satisfaction does not remove the need to improve accessibility for users with disabilities (Fadilah et al., 2024).

Quadrant IV included selected safety information, the waiting area, lighting, service-information media, boarding/alighting platforms, and parking. The appropriate response is not

to reduce these services, but to maintain them efficiently and direct additional resources first toward Quadrant I. This interpretation avoids the common error of treating Quadrant IV as justification for service withdrawal rather than as a signal for cost-conscious maintenance.

Implementation Priorities

The combined CSI, IPA, and field-observation results were translated into short- and medium-term actions. Short-term measures emphasize the operation of existing facilities, staff visibility, maintenance, information clarity, and cleanliness management. Medium-term measures address accessibility and facilities that remain incomplete. Table 5 provides a practical monitoring framework so that improvements can be evaluated through observable indicators rather than assumed from capital expenditure alone.

Table 5. Recommended service-improvement actions and monitoring indicators

Priority area	Observed problem	Recommended action	Monitoring indicators
1. Security (B1)	Facilities were present, but their effectiveness and visibility did not satisfy users.	Operate the security post throughout service hours; audit and maintain CCTV; define patrol points; install a clearly visible complaint channel.	Patrol logs; operational camera ratio; response time; number and resolution of reports.
2. Green open space and cleanliness (D4)	Area maintenance, cleanliness, and segregated waste bins were inadequate.	Establish plant-maintenance and cleaning schedules; provide accessible organic/inorganic bins; ensure routine collection and separation guidance.	Cleaning frequency; bin availability; observed litter; inspection results.
3. Equity and accessibility	Ramps and accessible toilets were unavailable or incomplete; the lactation room required improvement.	Provide compliant ramps, an accessible toilet, barrier-free routes, wheelchairs, and a properly equipped lactation room.	Compliance audit; barrier-free route continuity; complaints from vulnerable users.
4. Passenger information	Visual/audio information, schedules, fares, and disruption notices were not consistently available.	Develop a centralized information board and announcement system; assign responsibility for updating schedules and fares.	Information currency and legibility; disruption-announcement time; passenger comprehension checks.

CONCLUSION

Pasir Hayam Terminal achieved an overall CSI of 79.20%, corresponding to a satisfied level of passenger service. Nevertheless, the mean importance score (4.254) remained higher than the mean satisfaction score (3.964), yielding an overall service gap of -0.290. Reliability/regularity recorded the highest CSI (81.08%) and was the only dimension classified as highly satisfactory, whereas equity recorded the lowest CSI (75.41%). The results indicate that core terminal operations were viewed relatively favorably, but inclusive facilities and selected supporting services remained incomplete or underperforming.

IPA identified two immediate priorities: improving the operational effectiveness and visibility of security posts, CCTV, and designated security points; and strengthening the management of green open space, cleanliness, and segregated waste facilities. Terminal management should address these attributes first while preserving the 17 high-importance/high-performance attributes in Quadrant II. Accessibility facilities located in Quadrant III must still be upgraded because their provision is a regulatory and equity obligation rather than a function of majority preference. Future evaluation should use a more balanced respondent composition, a revalidated importance scale, repeated survey periods, and measurable pre- and post-intervention indicators.

REFERENCES

- [1]. Ministry of Transportation of the Republic of Indonesia. (2015). Minister of Transportation Regulation No. PM 40/2015 concerning service standards for road passenger terminals. Jakarta, Indonesia.
- [2]. Ministry of Transportation of the Republic of Indonesia. (2021). Minister of Transportation Regulation No. PM 24/2021 concerning the operation of road passenger terminals. Jakarta, Indonesia.
- [3]. Kinasih, R. K., & Permata, S. (2022). Aplikasi IPA dan CSI untuk penentuan prioritas perbaikan kinerja Terminal 2 Bandara Internasional Soekarno-Hatta di masa pandemi COVID-19. *Rekayasa Sipil*, 11(1). <https://doi.org/10.22441/jrs.2022.v11.i1.03>
- [4]. Sabilla, R. A., & Herman. (2022). Kepuasan penumpang terhadap kualitas pelayanan jasa kereta api di Stasiun Bandung selama pandemi COVID-19 dengan metode IPA dan CSI. *Journal of Sustainable Construction*, 2(1). <https://doi.org/10.26593/josc.v2i1.6035>
- [5]. Sulistyono, S., Darmawan, A. R., & Hasanuddin, A. (2023). Pengembangan fasilitas Stasiun Kalisat berdasarkan standar pelayanan minimum dan metode Importance Performance Analysis. *Jurnal Transportasi*, 23(2), 135-145. <https://doi.org/10.26593/jtrans.v23i2.7362.135-145>
- [6]. Almaliki, M. F., Arsyad, L. O. M. N., Putra, A. A., Soeparyanto, T. S., Hado, H., Prasetyo, E. W., & Satyadharma, M. (2024). Analisis kinerja layanan penumpang di Pelabuhan Penyeberangan Bau-Bau dengan pendekatan Importance-Performance Analysis dan Customer Satisfaction Index. *Jurnal Penelitian Inovatif*. <https://doi.org/10.54082/jupin.809>
- [7]. Dewi, N. K. A. K., Pangaribuan, M. O. P., Mardikawati, B., & Prasetyo, H. (2025). Evaluasi kinerja pelayanan dan kepuasan pengguna terminal tipe C di Kota Semarang (Studi kasus: Terminal Cangkiran). *Jurnal Transportasi*, 25(2), 109-116. <https://doi.org/10.26593/jtrans.v25i2.9586.109-116>
- [8]. Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *Journal of Marketing*, 41(1), 77-79. <https://doi.org/10.1177/002224297704100112>
- [9]. Fadilah, R., Fitri, M., Sembiring, Y. P., & Pratama, A. (2024). Analisis aksesibilitas dan kepuasan pengguna transportasi kereta api di Stasiun Medan. *Jurnal Transportasi*, 24(1), 62-73. <https://doi.org/10.26593/jtrans.v24i1.7837.62-73>
- [10]. Ghozali, I. (2018). Aplikasi analisis multivariate dengan program IBM SPSS (9th ed.). Badan Penerbit Universitas Diponegoro.