DCEA Disaster in Civil Engineering and Architecture

POPULAR SCIENTIST

Research Article

Assessing Service Quality of a Type C Passenger Terminal Using Importance–Performance Analysis: A User-Based Approach

Fitri Sari[a], Yusria Darma[a,*], Mubarak Mubarak[a], Ahyin Bilhuda Dasopang[b]

[a]Department of Civil Engineering, Faculty of Engineering, Universitas Syiah Kuala, 23111, Banda Aceh, Indonesia

[b]College of Engineering, Universiti Tenaga Nasional, Putrajaya Campus, Jalan Ikram-Uniten, Kajang 43000, Malaysia

***Corresponding Author:** Yusria Darma (yusriadarma@usk.ac.id)

Articles History: **Received:** 19 February 2026; **Revised:** 4 March 2026; **Accepted:** 26 March 2026; **Published:** 20 April 2026

Abstract

As a passenger terminal, Lueng Bata Mini-Bus Terminal in Banda Aceh serves as a vital hub for regional mobility and local economic activities. However, the increasing volume of users has highlighted several service-related shortcomings, including inadequate facilities, poor sanitation, and the lack of accurate departure information. This study aims to evaluate the terminal's service quality from the users' perspective using the Importance-Performance Analysis (IPA) method. Primary data were collected through 250 respondents comprising passengers, drivers, local business operators, and community members who interact with the terminal. The findings reveal a Level of Suitability score of 78.561%, indicating that current service delivery falls short of user expectations. Several service attributes most notably, the availability of services information and the clarity of evacuation routes were identified as critical weaknesses that require immediate attention. These attributes were categorized in the IPA matrix as high-priority areas for improvement. The findings provide empirical evidence to support terminal upgrading decisions, particularly the need to align terminal status with actual service deman, with the ultimate goal of aligning operational performance more closely with user needs and expectations.

Keywords: Importance Performance Analysis, Terminal, Service Quality, User Perspective, Transportation

Introduction

Road transportation is a crucial component of the land transport system due to its extensive reach and its ability to connect various centers of activity [1]. In the context of urban mobility, transportation modes such as buses, city transport (angkot), and small public vehicles such as L300 vans and Hiace shuttles play a vital role in facilitating the movement of people. These modes are often preferred due to their affordability and relative comfort. As mobility demands continue to rise, the demand for public transport services has also increased, contributing

to higher traffic volumes and necessitating adequate transport infrastructure capable of addressing emerging challenges.

Within this system, passenger terminals serve as critical nodes that support the overall functionality of public transport networks. The classification of passenger terminals in Indonesia is regulated under Minister of Transportation Regulation No. 24 of 2021, which categorizes terminals into Types A, B, and C based on functional roles, service coverage, and administrative authority [2]. Within this classification system, Type C terminals primarily serve urban and rural transportation, operating on a comparatively limited scale.

However, the Lueng Bata Mini Bus Terminal currently classified as a Type C terminal, functions as a key hub for intercity and regional transportation, with daily services operated by small public vehicles such as L300s and Hiace shuttles [3]. This condition is incongruent, given that the volume of passenger movements and the characteristics of the services provided have demonstrated the need for Type B terminal functions, particularly to accommodate intercity transportation within the province. The misalignment between the terminal's designated function and actual service demands has led to a decline in the congruence between terminal service performance and users' perceived importance or expectations. As user numbers continue to increase, various service quality issues have emerged, including limited facilities, inadequate cleanliness, and the lack of accurate and timely departure information [4,5].

Cases of this nature remain relatively underexamined, particularly given that the Lueng Bata Mini Bus Terminal has not yet undergone a systematic evaluation based on the alignment between service performance and user expectations. The absence of a user perception–based assessment has left terminal management and local authorities without a robust empirical foundation to determine the extent to which existing services meet passengers' actual needs. Therefore, this study is essential to provide empirical evidence grounded in user perceptions, which may serve as a policy reference for government decision-making regarding the management and development of the Lueng Bata Terminal.

Literature Review

Service quality in transportation infrastructure has long been recognized as a multidimensional construct that determines user satisfaction, operational effectiveness, and long-term system sustainability. In passenger terminals, service quality extends beyond mere compliance with technical standards and the adequacy of physical infrastructure; it reflects the extent to which provided services meet user expectations in terms of safety, comfort, accessibility, information reliability, cleanliness, and operational efficiency. According to Ennew et al. [6], service quality is fundamentally defined by the gap between expected and perceived performance. Within transportation systems, such discrepancies directly influence user satisfaction, trust, and continued service utilization.

From a theoretical perspective, service quality can be explained through the service quality gap model proposed by Parasuraman et al. [7], which is commonly

operationalized using the SERVQUAL framework. This model defines service quality as the gap between users' expectations and their perceptions of actual service performance across key dimensions, including tangibles, reliability, responsiveness, assurance, and empathy. In the context of passenger terminals, these dimensions are reflected in the adequacy of physical facilities, accuracy of service information, staff performance, safety assurance, and overall user comfort.

The Importance–Performance Analysis (IPA) method has become one of the most widely adopted approaches in transportation service evaluation due to its capacity to identify priority attributes for managerial intervention. By mapping service indicators into four quadrants based on their relative importance and performance levels, IPA provides a strategic diagnostic framework for resource allocation and service improvement. Empirical evidence at the international level demonstrates the robustness of this approach. Girma et al. [8] found that more than half of the evaluated bus service attributes in Addis Ababa required immediate attention, while Esmailpour et al. [9] emphasized that comfort, cleanliness, and information reliability significantly influence passenger satisfaction in Tehran. These findings confirm that gaps between user expectations and actual service performance are a widespread phenomenon across diverse urban contexts. Cross-sectoral studies, such as that by Putri et al. [10], further demonstrate the versatility of the IPA method in evaluating service quality across different domains.

A similar pattern is observed in Indonesia. Andini et al. [11] identified deficiencies in traffic circulation systems and spatial layout at Bayuangga Terminal, whereas Hilmy et al. [12] reported congestion issues and operational management weaknesses at Lamongan Terminal. Putra et al. [13] and Primasworo et al. [14] further highlighted shortcomings in sanitation facilities, waiting areas, accessibility for vulnerable users, and staff responsiveness across several terminals. The recurrence of these issues suggests that terminal service challenges are systemic in nature, often associated with infrastructure governance limitations and operational coordination gaps.

Studies conducted in Aceh reinforce these concerns. Fajri et al. [15] and Mutiawati et al. [16] indicated that although the Trans Koetaradja bus service is generally acceptable, improvements are still required in schedule adherence and service consistency. Muharrami et al. [17] emphasized the necessity of enhancing Trans Meudiwana's operational performance to support tourism mobility, while Najwan et al. [18] and Ramadhan et al. [19] identified inadequacies in facilities and service delivery at Ulee Lheue Port. Collectively, these findings suggest that transportation service gaps in Aceh extend beyond vehicle operations to supporting infrastructure and terminal management systems.

In the context of the Type C Lueng Bata Terminal as the focal case of this study, the terminal functions as one of the primary land transportation hubs. Despite its formal role as a designated transport node, an existing condition analysis conducted by Sardi [20] revealed significant deficiencies in both facility provision and internal circulation systems. Currently, arrival and departure lanes

for public transport vehicles, private vehicles, and pedestrian movements share the same circulation pattern. This configuration creates movement conflicts, reduces user comfort, and increases the potential risk of accidents within the terminal area.

Furthermore, based on the study conducted by Monika [21], environmental noise measurements indicate that the noise level within the Lueng Bata Terminal area exceeds the permissible threshold established under the Decree of the Minister of Environment No. 48/MENLH/11/1996 concerning Environmental Noise Standards, which sets a maximum limit of 55 dB(A). Elevated noise levels reflect environmental stress conditions that may adversely affect user comfort and overall service experience. These findings underscore that the challenges faced by the terminal are not merely operational but also relate to environmental service quality dimensions.

Although various operational and environmental issues have been identified in previous assessments, the terminal has not yet undergone a systematic and structured evaluation based on user perception. The absence of a quantitative assessment of the gap between service importance and performance has limited evidence-based decision-making for managerial improvements. Therefore, this study applies the Importance–Performance Analysis framework to comprehensively assess the service quality of the Type C Lueng Bata Terminal, aiming to identify strategic priorities for improvement while strengthening user-oriented transportation infrastructure governance.

Methods

Research Object and Data Collection

The object of this study is Lueng Bata Terminal, a Type C passenger terminal located in Banda Aceh, Indonesia as shown in Figure 1. The terminal is managed

Figure 1. Location of Lueng Bata Terminal from Google Earth view

by the Department of Transportation of Banda Aceh City and occupies an area of approximately 5,896 m^2. As one of the key terminals in the city, it accommodates an average of 670 passengers per day. This research uses primary data collected through a structured survey questionnaire distributed in the Lueng Bata Terminal area and nearby regions.

The sampling was determined using the Slovin formula [22], with a 5% margin of error based on the estimated daily passenger population. This calculation resulted in a total of 250 respondents. Sampling was conducted using a purposive sampling technique, with all respondents being passengers, as they are the primary users of terminal services and have the highest intensity of interaction with the facilities and the quality of services provided.

The questionnaire used in this study was developed by adapting service quality indicators from the Regulation of the Minister of Transportation of the Republic of Indonesia Number 40 of 2015 [23], concerning the Minimum Service Standards for Passenger Terminals. Based on this regulation, five key variables were selected to assess the service quality at Lueng Bata Terminal, covering the core aspects of passenger satisfaction.

Each variable includes several service attributes, which were evaluated by respondents using a Likert scale [24] ranging from 1 (very unimportant/very dissatisfied) to 5 (very important/very satisfied) for both importance and performance ratings. Each variable in this study was confirmed to be valid and reliable through a pilot study involving 30 respondents outside the main sample, as presented in Table 1.

Based on the Pearson Product Moment correlation, an item is considered valid when the calculated correlation (r-calculated) exceeds the r-table value. With 30 respondents, the r-table value is 0.361. As shown in Table 1, all indicators for both performance and importance exceed this threshold, indicating that all items are valid. Furthermore, reliability is considered acceptable when Cronbach's Alpha is greater than 0.60 (or 0.70). The results in Table 1 show that all variables meet this criterion; therefore, the instrument is declared valid and reliable.

Data Analysis Procedure

To evaluate the quality of services at Lueng Bata Terminal, this study employs the Importance-Performance Analysis (IPA) method developed by Martilla and James [25]. IPA is a diagnostic tool designed to measure the gap between the importance of specific service attributes to users and the perceived performance of those attributes. This method assists in identifying both strengths and areas in need of improvement by plotting service attributes on a Cartesian diagram divided into four quadrants (see Figure 2). The interpretation of each quadrant is provided in Table 2.

Each step in the data analysis process was designed to ensure that the evaluation accurately captured both the users' expectations and their actual experience with the services provided at Lueng Bata Terminal. After identifying the key service variables and attributes, the analysis proceeded by asking

Table 1. Validity and reliability test results of the research instrument (pilot study)

Indicator	R Table	R Calculated		Remarks
		Performance	Importance	
1	0.361	0.447	0.472	Valid
2	0.361	0.396	0.767	Valid
3	0.361	0.447	0.544	Valid
4	0.361	0.384	0.614	Valid
5	0.361	0.373	0.586	Valid
6	0.361	0.386	0.583	Valid
7	0.361	0.361	0.610	Valid
8	0.361	0.394	0.554	Valid
9	0.361	0.490	0.400	Valid
10	0.361	0.576	0.783	Valid
11	0.361	0.484	0.698	Valid
12	0.361	0.398	0.657	Valid
13	0.361	0.383	0.498	Valid
14	0.361	0.514	0.369	Valid
15	0.361	0.705	0.467	Valid
16	0.361	0.748	0.585	Valid
17	0.361	0.719	0.512	Valid
18	0.361	0.451	0.390	Valid
19	0.361	0.427	0.416	Valid
20	0.361	0.506	0.476	Valid
21	0.361	0.410	0.385	Valid
22	0.361	0.507	0.544	Valid
23	0.361	0.541	0.380	Valid
24	0.361	0.491	0.375	Valid
25	0.361	0.799	0.467	Valid
26	0.361	0.539	0.446	Valid
27	0.361	0.579	0.626	Valid
28	0.361	0.665	0.424	Valid
29	0.361	0.576	0.397	Valid
30	0.361	0.396	0.626	Valid
31	0.361	0.486	0.479	Valid
32	0.361	0.366	0.372	Valid
33	0.361	0.624	0.397	Valid
34	0.361	0.754	0.495	Valid
35	0.361	0.533	0.385	Valid
Sum of Variance		14,836	3,668	
Total Variance		173,390	47,817	
Reliability (Cronbach's Alpha)		0.941		Very Strong
		0.950		Very Strong

Table 2. The Quadrant's Interpretation [14]

Quadrant	Meaning	Description
A. Main Priority/ concentrate here	High importance & low performance	Requires immediate attention for improvement and is a major weakness
B. Maintenance Achievement/ keep up with the good work	High importance & High Performance	Indicate opportunities for achieving or maintaining competitive advantage and are major strengths
C. Low priority	Low importance & Low performance	Are minor weaknesses and do not require additional effort
D.Excessive/Possible overkill	*Low importance & High performance*	The management should recognize that the present strength in these attributes is excessive and might consider transferring the resources elsewhere.

respondents to rate each attribute in terms of its importance and performance. Once these ratings were collected, the next phase involved determining the gap between perceived importance and actual performance for each service attribute. This step was essential for identifying whether the services delivered met, exceeded, or fell short of user expectations, as illustrated by Equation 1 where LoS is level of suitability, Xi is performance or service satisfaction score, and Yi is user importance score.

$$Level\ of\ Suitability\ (LoS) = \left(\frac{\mathrm{Xi}}{\mathrm{Yi}}\right) \times\ 100\% \tag{1}$$

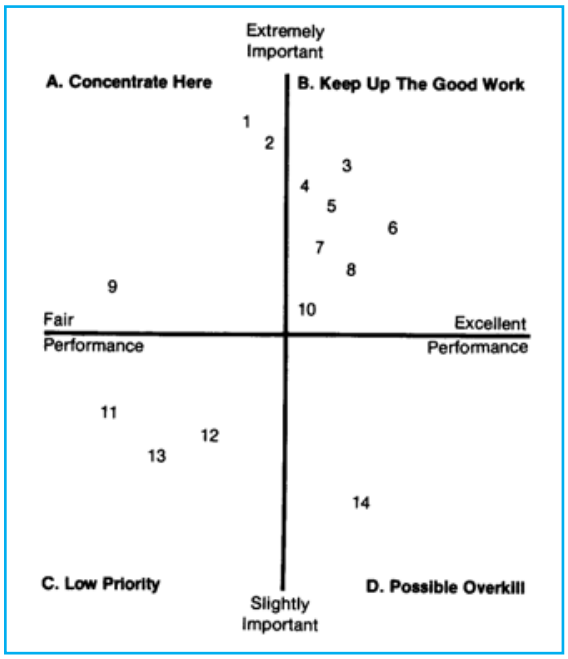

Figure 2. The standard IPA chart (Martilla and James, [25])

The Evaluation Criteria for Level of Suitability are [26]:

1. Level of Suitability > 100%: This indicates that users are very satisfied and assess that the performance demonstrated exceeds their level of importance.
2. Level of Suitability = 100%: This means users are satisfied and assess that the performance matches their level of importance.
3. Level of Suitability < 100%: This suggests that users are dissatisfied and assess that the performance does not meet their level of importance. When the degree of conformance is < 100%, the following further classifications apply:
    - 0% - 32%: Users are very dissatisfied
    - 33% - 65%: Users are dissatisfied.
    - 66% - 99%: Users are somewhat dissatisfied.

The establishment of these thresholds is intended to provide a more graduated interpretation of the gap between service performance and importance [26]. Lower percentage values indicate a greater mismatch between service performance and user expectations, whereas higher values suggest that the service has partially met user expectations.

With the central values (mean scores) for importance and performance established, the subsequent step was to analyze the strengths and weaknesses of terminal services using the Importance-Performance Analysis (IPA) framework. Each service attribute was plotted into a Cartesian matrix according to its mean importance and performance scores. This allowed the attributes to be categorized into one of four strategic quadrants, which provided a visual interpretation of service priorities and guided managerial decision-making, as shown in Figure 2.

Results and Discussion

Based on the results of student responses regarding the performance of services provided by the bus, the average importance and performance scores for each of all indicators are presented in Table 3.

Based on Table 3, some indicators still have a users conformity level below 100%, indicating that the performance of Lueng Bata Terminal falls short of the importance level expected by users. Among the 35 indicators measured, the average Level of Suitability is 78.561%, indicates a gap between user expectations and the actual experiences they encounter while using the terminal services. User dissatisfaction demonstrates that Lueng Bata Terminal has not yet succeeded in meeting user expectations comprehensively.

These findings align with those from previous studies conducted at other terminals, such as Arjosari Terminal [14], which reported a Level of Suitability of 77.01%. These studies reveal that many public transportation services still fall short of fulfilling user expectations, despite efforts to improve service quality. This underscores the primary challenge in public transport services, including at Lueng Bata Terminal, which lies in the inability to meet user expectations regarding comfort, facilities, and the information provided.

Additionally, a study by Girma [8] found similar results, where the average Level of Conformity (LoC) for service quality attributes was 76%, indicating that public transport users in that city also did not feel fully satisfied with the services provided. According to the conformance analysis, all service attributes in this study fell into the ‘satisfactory’ category (LoC < 100%), meaning that, while some service elements were reasonably good, the majority of users still felt that the services provided did not fully align with their expectations.

Subsequently, the mapping of service indicators is presented in Figure 3, which illustrates the position of each attribute within the IPA Cartesian Diagram. A more detailed interpretation of each indicator based on its quadrant placement can be found in Table 3.

Table 3. Satisfaction index result

Service indicators Code	Importance	Performance	Level of Suitability (%)
1	978	1180	82,881
2	740	1210	61,157
3	909	1185	76,709
4	1011	1173	86,189
5	702	1186	59,191
6	699	1183	59,087
7	701	1178	59,508
8	1062	1207	87,987
9	1048	1202	87,188
10	1083	1211	89,430
11	707	1211	58,382
12	559	1201	46,545
13	1169	1218	95,977
14	1089	1205	90,373
15	1095	1208	90,646
16	1013	1212	83,581
17	1006	1219	82,527
18	1047	1232	84,984
19	767	1132	67,756
20	1110	1203	92,269
21	1038	1211	85,714
22	1048	1188	88,215
23	1047	1140	91,842
24	1035	1202	86,106
25	850	1141	74,496
26	995	1219	81,624
27	1041	1192	87,332
28	1041	1190	87,479
29	667	1208	55,215
30	667	1197	55,723
31	673	1207	55,758
32	1073	1210	88,678
33	1034	1195	86,527
34	1104	1206	91,542
35	1108	1217	91,044
	average		78,561

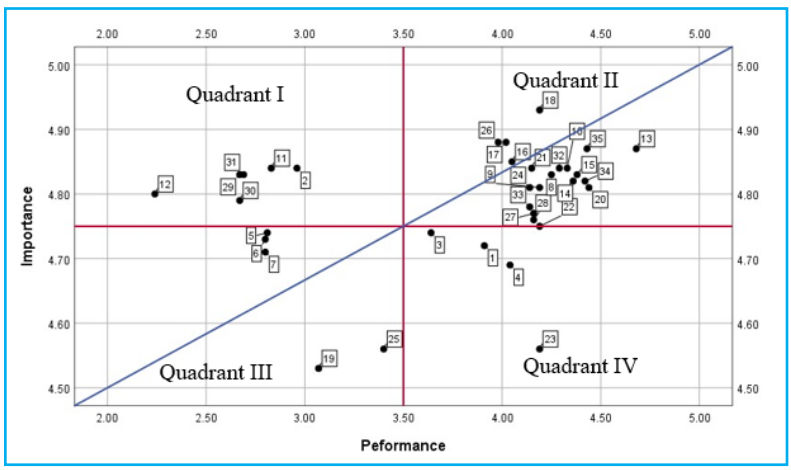

Figure 3. Cartesian diagram result

Based on the IPA results as shown on Table 4, the most critical weaknesses were addressed to Quadrant I where represents service attributes that are perceived by users as highly important but are evaluated as poorly performed. In the case of Lueng Bata Terminal, several attributes fall into this category, most notably the clarity of evacuation routes and the availability of service information, including timetables, connecting transport schedules, fare information, and disruption updates. The presence of these attributes in Quadrant I highlights critical weaknesses in the terminal's ability to deliver essential services that directly affect both safety and reliability.

Table 4. Service attribute mapping of Lueng Bata Terminal based on IPA quadrant results

Quadrant I		Quadrant II	
Code	**Atribute**	**Code**	**Atribute**
2	Evacuation route	8	Security facilities (Security post)
11	Schedule of arrivals and departures for public transport vehicles, and fare information, along with written schedule implementation	9	Security incident complaint media
		10	Security personnel
		13	Ticket sales counter
12	Schedule of connecting and non-connecting public transport routes, along with written schedule implementation	14	Terminal administration office, control room, and terminal information management system
		15	Terminal operational staff
29	Service information	16	Waiting area
20	Connecting transport information	17	Toilets
31	Information on service disruptions for public transport vehicles	18	Prayer room (Mushola)
Quadrant III		20	Restaurant facilities
5	Information on safety facilities	21	Cleaning facilities and cleaning staff
6	Information on health facilities	22	Rest area for vehicle crew
7	Information on vehicle inspection and minor repair facilities	24	Drainage system
19	Green open space	26	Indoor lighting
25	nternet access area	27	Departure lane location
Quadrant IV		28	Arrival lane location
1	Road safety facilities	32	Baggage storage area
3	Fire extinguishers	33	Battery charging facilities
4	Minor repair facilities for public transport vehicles	34	Passenger boarding and alighting area
23	Smoking area	35	Parking area for public and private vehicles

The low performance of these attributes cannot be attributed solely to deficiencies in physical facilities, but is also influenced by broader structural and managerial factors. One of the main contributing factors is the mismatch between the current functional status of Lueng Bata Terminal as a Type C passenger terminal and the actual volume of movement and service characteristics it accommodates. Although formally classified as a Type C terminal, Lueng Bata increasingly serves intercity transport within the province (AKDP), placing pressure on facilities, circulation systems, and management capacity that were not designed for such demand. This functional mismatch directly constrains service provision and contributes to lower performance scores, particularly in infrastructure and information related attributes.

The lack of clear and well-communicated evacuation routes is particularly alarming given the unique context of Banda Aceh as a post-tsunami city. The devastating 2004 Indian Ocean tsunami, which left deep social and psychological impacts, has heightened public awareness and sensitivity toward disaster preparedness. In this setting, evacuation routes are not merely technical infrastructure; they represent a symbol of safety assurance and institutional readiness in the face of potential emergencies. Users naturally expect passenger terminals, as key public facilities, to integrate effective evacuation management as part of their core services. The absence of adequate signage, clear pathways, and regular evacuation drills undermines public trust and contradicts the heightened expectations of communities that have directly experienced disaster risks.

Ensuring well-marked and accessible evacuation routes at Lueng Bata Terminal is therefore not only a matter of compliance with transportation safety standards but also a context-specific necessity to address the collective memory and resilience needs of Banda Aceh's residents. Strengthening this aspect will directly contribute to rebuilding user confidence in public transport facilities and positioning the terminal as a safe and reliable mobility hub.

These findings are consistent with previous studies on Indonesian passenger terminals, which frequently highlight information provision and safety management as underperforming attributes. For example, Putra et al. [13] at Anjuk Ladang Terminal emphasized inadequacies in passenger waiting facilities and staff responsiveness, while Primasworo et al. [14] identified safety-related features and accessibility for vulnerable users as critical shortcomings at Arjosari Terminal. Likewise, Andini et al. [11] and Hilmy et al. [12] underlined structural and circulation issues, which also affect user perceptions of service reliability and safety. These parallels suggest that informational and safety-related weaknesses are systemic challenges across many Indonesian terminals, rather than isolated to Lueng Bata.

Cross-sectoral applications of IPA, such as the study by Putri et al. [10] on housing services, reinforce the validity of this method in capturing mismatches between user expectations and actual performance. The consistency of findings across different settings supports Ennew et al.'s [7] conceptualization of service quality as the gap between perceived performance and user expectations.

Low service performance is also influenced by managerial aspects, particularly the absence of routine service performance evaluations based on user perceptions. This condition limits the management's ability to strategically determine improvement priorities, resulting in service enhancements that tend to be reactive and focused on meeting minimum standards rather than addressing the actual needs of users. Overall, the low service performance at Lueng Bata Terminal is the result of a combination of factors, including the mismatch between the terminal's functional status, limited infrastructure capacity, weak information systems, and suboptimal user-oriented management. Therefore, upgrading the terminal's status is a crucial prerequisite for improving service

quality and public satisfaction sustainably, in line with the increasing demand for intercity transport within the province (AKDP) in Banda Aceh.

Conclusion

This study assessed the service quality of Lueng Bata Terminal using the Importance Performance Analysis (IPA) method. The results show that the average Level of Suitability is 78.561%, indicating that overall service performance still falls short of user expectations. Several critical weaknesses were identified in Quadrant I, particularly related to service information provision (timetables, connecting transport, and disruption updates) and the clarity of evacuation routes, which users considered highly important but poorly performed. Addressing these weaknesses is crucial not only to enhance user satisfaction but also to restore and strengthen public trust in bus terminals as reliable nodes of urban and regional transport systems. This confirms that Importance–Performance Analysis (IPA) is an effective tool for evaluating passenger terminal service quality in Indonesia by identifying gaps between user expectations and actual performance, thereby strengthening its scientific validity in the context of land transportation terminals.

Based on the results, several managerial recommendations can be highlighted. The most urgent is the digitalization of service information, given that users identified schedule availability, connecting transport details, and disruption updates as critical gaps. Providing real-time information through electronic boards, mobile applications, and websites would significantly reduce uncertainty and improve reliability. Equally important is the enhancement of safety and evacuation systems, especially considering that Banda Aceh is a post-tsunami region where public awareness of safety remains highly sensitive. Installing clear signage, ensuring adequate lighting, and conducting regular evacuation drills will strengthen user perceptions of the terminal as a safe and trustworthy facility.

Beyond its practical implications, this study also opens opportunities for future research. Methodologically, combining IPA with more advanced analytical approaches such as Structural Equation Modeling (SEM) or the Decision-Making Trial and Evaluation Laboratory (DEMATEL) could help uncover causal relationships among service attributes, offering deeper insights for management. Future research could also integrate digital behavior data such as ticketing systems, passenger flows, or social media sentiment analysis to complement survey-based findings. Moreover, given Banda Aceh’s role as both an administrative center and a tourism gateway, further studies should explore the broader implications of terminal service quality for tourism mobility and regional economic development.

Acknowledgement

The authors would like to express their sincere gratitude to the Ministry of Transportation of the Republic of Indonesia for providing valuable support and guidance throughout this research. Appreciation is also extended to the

surveyors who assisted in the data collection process and to all respondents who willingly shared their time and insights. Their contributions were essential in making this study possible.

Conflicts of Interest

All authors declare that they have no conflict of interests.

Author Contributions

Fitri Sari: writing – original draft, data curation, formal analysis. **Yusria Darma:** conceptualization, supervision, writing – review & editing. **Mubarak Mubarak:** methodology, formal analysis. **Ahyin Bilhuda Dasopang:** project administration, investigation, data curation.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

References

[1] R. Adisasmita, Manajemen Pembangunan Transportasi. Yogyakarta, Indonesia: Graha Ilmu, 2014.

[2] Kementerian Perhubungan Republik Indonesia, “Peraturan Menteri Perhubungan Nomor 24 Tahun 2021 tentang Penyelenggaraan Terminal Penumpang Angkutan,” Jakarta, Indonesia, 2021.

[3] Pemerintah Kota Banda Aceh, “Jadwal transportasi,” [Online]. Available: https://bandaacehkota.go.id/jadwal-transportasi. [Accessed: May 6, 2025].

[4] N. Hazizah, S. Suhairi, and S. Ramadhani, “Pengaruh kualitas layanan dan kepuasan pelanggan terhadap loyalitas pelanggan Bus Trans Mebidang,” J. Ekon., vol. 30, no. 1, pp. 177–197, 2025, doi: http://dx.doi.org/10.24912/je.v30i1.2953

[5] A. Maulana and L. S. Putranto, “Pengaruh kualitas pelayanan terhadap kepuasan pelanggan pada layanan Bus Citra Raya rute Citra Raya–Grogol,” JMTS: J. Mitra Tek. Sipil, vol. 8, no. 2, pp. 437–444, 2025, doi: http://dx.doi.org/10.24912/jmts.v8i2.33232

[6] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, “SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality,” J. Retail., vol. 64, no. 1, pp. 12–40, 1988.

[7] C. T. Ennew, G. V. Reed, and M. R. Binks, “Importance-performance analysis and the measurement of service quality,” Eur. J. Mark., vol. 27, no. 2, pp. 59–70, 1993.

[8] M. Girma, B. Woldetensae, G. Nuriye, and T. Lika, “Importance performance analysis for evaluating city bus service quality in Addis Ababa, Ethiopia,” Urban Plan. Transp. Res., vol. 10, no. 1, pp. 451–465, 2022, doi: http://dx.doi.org/10.1080/21650020.2022.2099968

[9] J. Esmailpour, K. Aghabayk, M. Abrari Vajari, and C. De Gruyter, “Importance–performance analysis (IPA) of bus service attributes: A case study in a developing country,” Transp. Res. Part A Policy Pract., vol. 142, pp. 129–150, 2020, doi: http://dx.doi.org/10.1016/j.tra.2020.10.020

[10] V. N. Putri, Y. Darma, M. Hasan, and Z. Ziana, “Analysis of satisfaction of service quality designable house using importance performance analysis (case study: Banda Aceh City and Aceh Besar District),” in Proc. 4th Aceh Int. Symp. Civ. Eng. (AISCE 2023), E3S Web Conf., vol. 476, p. 01026, 2024, doi: http://dx.doi.org/10.1051/e3sconf/202447601026

[11] M. Andini, B. S. Waloejo, and S. Hariyani, “Evaluasi kinerja Terminal Bayuangga Kota,” PURE: J. Penelit. Tek. Sipil, vol. 10, no. 4, 2021. [Online]. Available: https://purejournal.ub.ac.id/index.php/pure/article/view/45

[12] A. N. Hilmy, S. Hariyani, and B. S. Waloejo, “Evaluasi kinerja Terminal Tipe B di Kabupaten Lamongan,” PURE J., 2021. [Online]. Available: https://purejournal.ub.ac.id/index.php/pure/article/viewFile/35/27

[13] K. H. Putra, I. S. Ingsih, and I. D. Mukharom, “Analyzing the level of service at Anjuk Ladang Terminal, Nganjuk Regency by Importance Performance Analysis (IPA) method,” J. Innov. Civ. Eng., vol. 3, no. 2, pp. 60–66, 2022.

[14] R. A. Primasworo, B. Oktaviastuti, and M. Retang, “Strategi peningkatan kualitas pelayanan Terminal Bus Arjosari Kota Malang,” J. Gradasi Tek. Sipil, vol. 8, no. 2, pp. 259–266, 2024.

[15] L. Fajri, S. Sugiarto, and R. Anggraini, “Penerapan metode IPA (Importance Performance Analysis) untuk menganalisis kepentingan dan kepuasan penumpang terhadap kualitas pelayanan Bus Trans Koetaradja (studi kasus: Koridor I Keudah–Darussalam),” J. Arsip Rekayasa Sipil dan Perencanaan, vol. 2, no. 2, pp. 164–173, 2019. [Online]. Available: https://jurnal.usk.ac.id/JARSP/article/view/13453

[16] C. Mutiawati, F. M. Suryani, R. Anggraini, and M. Isya, “Importance-performance analysis in public transport level of service: A case study of the Trans Koetaradja Bus in Banda Aceh,” Aceh Int. J. Sci. Technol., vol. 11, no. 1, pp. 70–84, 2022.

[17] H. Muharrami, S. M. Saleh, and Y. Darma, “Penilaian kinerja operasional Trans Meudiwana sebagai fasilitas penunjang pariwisata di Kota Banda Aceh dan Kabupaten Aceh Besar,” J. Ilm. Mhs. Tek. Sipil, vol. 5, no. 4, 2023. [Online]. Available: https://jim.usk.ac.id/CES/article/view/27362/13385

[18] N. Najwan, R. Anggraini, and A. T. Bulba, “Penilaian kinerja fasilitas dan pelayanan Pelabuhan Penyeberangan Ulee Lheue Kota Banda Aceh menggunakan metode Importance Performance Analysis,” Media Komun. Tek. Sipil, vol. 29, no. 3, 2023. [Online]. Available: https://ejournal.undip.ac.id/index.php/mkts/article/view/58377

[19] R. Ramadhan, S. Sugiarto, and Y. Darma, “Analisis kepuasan pengguna terhadap pelayanan kendaraan pada Pelabuhan Penyeberangan Ulee Lheue,” J. Ilm. Mhs. Tek. Sipil, vol. 5, no. 2, 2023. [Online]. Available: https://jim.usk.ac.id/CES/article/view/23515/11982

[20] M. I. A. Sardi, R. Sadili, and W. Wijianto, Redesain Terminal Tipe C Lueng Bata di Kota Banda Aceh. Politeknik Transportasi Darat Indonesia–STTD, 2025. [Online]. Available: https://digilib.ptdisttd.ac.id/11302/

[21] [21] A. Monika and A. Nasvirda, Analisis Kebisingan di Terminal Lueng Bata Kota Banda Aceh Menggunakan Metode Software Golden Surfer, Undergraduate thesis, Universitas Islam Negeri Ar-Raniry, 2024. [Online]. Available: https://repository.ar-raniry.ac.id/id/eprint/39777/

[22] T. M. Amirin, Populasi dan Sampel Penelitian 4: Ukuran Sampel Rumus Slovin. Jakarta, Indonesia: Erlangga, 2011.

[23] Kementerian Perhubungan Republik Indonesia, Peraturan Menteri Perhubungan No. 40 Tahun 2015 tentang Standar Penyelenggaraan Terminal Penumpang Angkutan Jalan, 2015.

[24] A. A. Santika, T. H. Saragih, Muliadi, D. Kartini, and R. Ramadhani, "Penerapan skala Likert pada klasifikasi tingkat kepuasan pelanggan agen BRILink menggunakan Random Forest," J. Sist. dan Teknol. Inf. (JUSTIN), vol. 11, no. 3, pp. 405–411, 2023, doi: http://dx.doi.org/10.26418/justin.v11i3.62086

[25] J. A. Martilla and J. C. James, "Importance-performance analysis," J. Mark., vol. 41, no. 1, pp. 77–79, 1977, doi: 10.1177/002224297704100112.

[26] J. Supranto, Pengukuran Tingkat Kepuasan Pelanggan untuk Menaikkan Pangsa Pasar. Jakarta, Indonesia: Rineka Cipta, 2011.