



EVALUATING URBAN PUBLIC BUS TRANSPORT SERVICE QUALITY: PERSPECTIVES FROM TWO USER GROUPS

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Abstract

This paper aims to compare the views of passengers and non-passengers on the service quality of public bus transport in urban areas. The methodology used combines importance and performance analysis, as well as importance and performance map analysis, to identify the critical components of the views of both groups. The sample consisted of 55 questions completed by passengers and non-passengers conducted around the Trans-Batam bus line in Batam City through an online panel. The analysis results show that non-passenger satisfaction is 65.59%. In comparison, passengers reach 66.19%, both of which fall into the "satisfied" level range. Still, both groups have different views on the priorities for improving service quality, primarily related to "travel time", "infrastructure", and "reaching time". However, both groups agree that the current service quality is in line with expectations, especially concerning "fit connections", "speed", and "accessibility". However, four indicators need to be improved, such as "distance of stops", "safety stops", "comfort in stops", and "waiting time". The other two indicators, namely "line frequency" and the "need for transfers", need to be maintained at the same level of improvement. The government and public transport operators can use the findings to identify areas where the quality of public bus transport services in urban areas can be improved.

Keywords: Service Quality, Urban public bus transportation, Service Satisfaction

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INTRODUCTION

In recent years, local governments and transport operators have paid serious attention to improving the quality of public transport services in urban areas, and decision-making regarding the continuous improvement of public transport involves considering factors such as habits, the environment, and the interests of various stakeholders. The critical contribution of public participation in improving the quality of urban transport services is recognised as key to achieving the goal of service quality improvement (Moslem & Duleba, 2018). Long-term improvement efforts with approaches that integrate the views of different groups in society are expected to reduce negative impacts, including perceptions and interest in public transport use, urban public transport improvement planning, stakeholder skills, and public transport use decisions. Improving service quality in urban public transport significantly impacts increasing the number of users. Local government statistics show a significant increase in private vehicle (PV) use each year in Indonesia, which poses a significant challenge for local governments and public transport operators in managing adequate and sustainable public transport. Therefore, the best step stakeholders can take is to improve the sustainability of service quality in public transport.

However, city governments and researchers need to consider the costs and potential problems associated with improving service quality, especially in public transport facilities and infrastructure in urban areas (Koryagin et al., 2018). These efforts should also take into account the subjective views of the public, both users and potential users, who are consumers of public services. Their views on travel, service, and quality can influence perceptions of public service improvements. Before implementing improvements, it is advisable to examine conflicts between the needs of the groups involved. Measuring the boundaries of requirements is an excellent first step in decision-making to resolve conflicts of views or opinions. Therefore, the purpose of this paper is to evaluate the views of two user groups in decision-making related to improving the quality of public transport services in urban areas. also to answer several questions, namely: (1) whether there is a significant difference in views between passengers and non-passengers on service quality improvement, (2) how the quality improvement affects them, (3) what are the causes of low use of urban public transport, and (4) how service quality improvement should be carried out based on passengers' and non-passengers viewpoints. Using the *Importance Performance Analysis* (IPA) and *Customer Satisfaction Index* (CSI) methods, it is hoped that this paper can provide the answers to these questions to be helpful for the government and transport operators, especially policymakers, in improving the quality of sustainable public transport services in the future.

LITERATURE REVIEW

Service Quality in Urban Public Transport

Transport is crucial to urban development, involving various aspects such as infrastructure, culture, economy, and behaviour (Sugito et al., 2024). Improving urban public transport is important, especially in terms of environmental impact (Zawawi et al., 2024). Therefore, assessing sustainable service quality is important when choosing the most suitable urban transport option. The concept of service quality has sparked significant debate among researchers and policymakers due to its inherent challenges in measurement and explanation (Kandeepan et al., 2023). This discourse comes from various perspectives, but service quality generally refers to how well a service meets customer expectations. Alternatively, it can be seen as the gap between customer expectations and perceptions of the service. Quality encompasses various dimensions of service, including reliability, convenience, affordability, safety, and range of services. Understanding service quality is critical for businesses to ensure sustainability and competitiveness. In public bus transport, service quality is also influenced by the passengers' perspective, considering factors such as comfort, safety, performance, journey time, waiting time, cost, cleanliness, and safety (Rocha et al., 2023).

Public Bus Transportation in Urban Areas

Public bus transport in urban areas plays a crucial role in providing affordable, accessible, and sustainable mobility solutions for residents, especially in developing countries where urban public transport is still highly dependent on the role of government in its planning and operation (Fadhlullah Abu Bakar et al., 2023). A well-planned and efficiently run public bus transport system is essential to promote sustainable urban mobility, improve quality of life, and foster economic growth in urban areas (Tuvikene et al., 2023). As a result, public bus transport has been recognised as an efficient, convenient, and economical travel option. The introduction of Bus Rapid Transit (BRT) systems has provided significant benefits to low-income communities, including time and cost savings, improved accessibility, and safety and health benefits (Saleem et al., 2023), so a comprehensive performance evaluation of public bus transport systems is important to consider various aspects of the service and the viewpoints of all stakeholders in helping to reduce private vehicle use and alleviate congestion in urban areas.

Service Satisfaction in Public Bus Transportation

The measurement of public transport satisfaction is described as a result of the quality of services provided by the urban transport system (Minelgaite et al., 2020). However, satisfaction and quality of the urban public transport sector can be taken into account from various aspects, which consist of three parts, namely

service quality, transfer quality, and service production. However, when it comes to satisfaction, according to Hasan et al. (2021), satisfaction is influenced by four factors: convenience, staff, systems, and security, and can be categorised into transfer conditions, information, safety and security, emergencies, service design and image, and comfort. So, in evaluating the quality of urban public transport services, recommending analysing the quality of public transport services suggests including and evaluating the level of satisfaction as an important indicator of service quality that includes the operator's image, people's expectations, and perceived service quality (Abenzoza et al., 2017).

METHODOLOGY

Sample and Research Location

In this study, a questionnaire was designed to measure public satisfaction with the quality of urban public transport services related to "Approachability" which consists of "distance of stop" (APL1), "safety stop" (APL2), "comport in stop" (APL3), "Directness" consists of "need to transfer" (DRS1), "fit connection" (DRS2), "Reliability" consists of "Accessibility" (RBT1), "Infrastructure Maintenance" (RBT2), "Time Availability" consists of "frequency of lines" (TAT1), "limit time to use" (TAT2), "Speed" consists of "travel time" (SPD1), "waiting time" (SPD2), "reaching time" (SPD3). The total consists of 10 items using a Linkert scale of 1 to 5 (1: strongly disagree; 2: disagree; 3: undecided; 4: agree and 5: strongly agree). On the same scale, participants were also asked about their overall satisfaction with the quality of public transport. Table 1 illustrates the two types of user mean and standard deviations regarding perceptions of service quality attributes obtained from recent research. Random sampling was selected for public bus transport passengers and non-passengers with the minimum sample size recommended by Barclay in 481 respondents consisting of 230 passengers and 251 non-passengers, where sampling was taken using probability sampling with simple random sampling technique to the public who use public transport and the community around the public transport line. This study is limited to public bus transport in Batam City. The path used in this study is the public users of Trans-Batam bus transportation with a bus operation path consisting of 8 travel routes.

Table 1: Statistical Indicator from Two Users

Code	Variable	Passenger		Non-Passenger	
		Mean	STDEV	Mean	STDEV
APL1	Distance of stop	3.28	1.15	3.27	1.15
APL2	Safety stop	3.27	1.15	3.27	1.15
APL3	Comport in stop	3.16	1.19	3.21	1.19
DRS1	Need to transfer	3.31	1.19	3.33	1.23
DRS2	Fit connection	3.32	1.20	3.34	1.19
RBT1	Accessibility	3.36	1.18	3.36	1.14
RBT2	Infrastructure	3.29	1.22	3.30	1.20
TAT1	Frequency of lines	3.32	1.23	3.28	1.15
TAT2	Limit time to use	3.31	1.20	3.34	1.18
SPD1	Travel time	3.25	1.20	3.27	1.17
SPD2	Awaiting time	3.24	1.18	3.24	1.18
SPD3	Reaching time	3.35	1.19	3.32	1.17

Analysis Methods

In the initial phase, the research database will be prepared, and data from the questionnaires will be analysed using SPSS. The main objective is to demonstrate reliability and validity with a significance level of 5%, using Cronbach Alpha values between 0.7 and 0.9. Validity and significant correlation are considered achieved if the r-calculated value exceeds the r-table value (Streiner, 2003). The next step is to apply the Importance Performance Analysis (IPA) method by giving a score to the assessment of the importance of service quality and performance satisfaction, given a scale of (1) very bad, (2) not good, (3) good, and (4) very good. The total value of the level of importance of service quality and performance satisfaction is obtained from the sum of the respondents' assessment scores, and the results will be described in a Cartesian diagram, with each attribute illustrated based on its average score. To evaluate the satisfaction of both groups towards improving the quality of public transport services, CSI analysis was used concerning the satisfaction index levels, namely 0 - 34% (very dissatisfied), 35% - 50% (unsatisfied), 51% - 65% (quite satisfied), 66% - 80% (satisfied) and 81% - 100% (very satisfied).

RESULT AND DISCUSSION.

Test Validity and Reliability

In the early stages of testing, validity and reliability become important as the data quality depends on these two aspects. Overall, the validity and reliability test steps are essential in maintaining the reliability and accuracy of the data collected, as well as in making a significant contribution to knowledge in the field under study. From the test results involving 481 respondents, the r-calculated value > 0.088 was obtained so that it was stated that this data was valid and in the adequate reliability test based on the Cronbach's alpha value of 0.966 from the

questionnaire so that the questionnaire data could be declared reliable. All the values obtained from data processing show that the data can be processed for further testing.

Customer Satisfaction Index (CSI) Test Results

The Customer Satisfaction Index (CSI) has several advantages in a service context. Firstly, CSI provides a clear measure to assess the level of customer satisfaction with a given product or service. This allows companies to understand the extent to which customers are satisfied with the service provided. Second, CSI enables evaluation of the effectiveness of strategies in meeting customer expectations. By knowing how satisfied customers are, companies can assess whether the strategies used have been successful or need to be adjusted. Thirdly, CSI helps identify areas where improvements are required. By knowing which aspects of the service are less satisfying for customers, companies can focus on improving service quality in those areas. In the context of this research, the Customer Satisfaction Index (CSI) value is calculated by multiplying the average satisfaction value of each attribute by the weight factor (WF) value of each attribute. The total weight value (WT) is divided by the maximum scale used and multiplied by 100%. Thus, the result of obtaining the CSI value from non-passengers is 65.59% (see Table 2).

Table 2: Customer Satisfaction Index (CSI) Non-Passenger

Indicator	MIS	MSS	WF	WS
APL1	3,27	3,26	8,32	27,12
APL2	3,27	3,26	8,32	27,16
APL3	3,15	3,20	8,02	25,62
DRS1	3,29	3,33	8,37	27,85
DRS2	3,31	3,32	8,43	28,02
RBT1	3,35	3,35	8,53	28,53
RBT2	3,28	3,24	8,35	27,02
TAT1	3,27	3,27	8,33	27,22
TAT2	3,29	3,32	8,38	27,82
SPD1	3,24	3,29	8,26	27,15
SPD2	3,22	3,22	8,21	26,46
SPD3	3,32	3,30	8,46	27,96
WEIGHT TOTAL				327,95
CSI Score (%)				65,59

CSI passengers obtained a result of 66.19%. This shows the quality of public transport services at the "satisfied" level (Table 3).

Table 3: Customer Satisfaction Index (CSI) Passenger

Indicator	MIS	MSS	WF	WS
APL1	3,28	3,28	8,27	27,12
APL2	3,28	3,28	8,28	27,19
APL3	3,17	3,22	7,98	25,73
DRS1	3,34	3,33	8,43	28,10
DRS2	3,34	3,35	8,41	28,18
RBT1	3,38	3,38	8,51	28,73
RBT2	3,29	3,37	8,30	27,99
TAT1	3,36	3,28	8,47	27,77
TAT2	3,33	3,36	8,40	27,21
SPD1	3,27	3,25	8,24	27,79
SPD2	3,25	3,25	8,20	26,69
SPD3	3,37	3,35	8,50	28,47
WEIGHT TOTAL				330,96
CSI Score (%)				66,19

From the evaluation results of the two user groups, both passengers and non-passengers, it can be seen that they give different ratings to the quality of public transport services in the city. Passengers scored 65.90%, while non-passengers scored 66.19%. Although there is a difference in the score, there is no significant difference in the final Customer Satisfaction Index (CSI) score for both, as both still fall into the satisfaction level category.

Importance Performance Analysis (IPA) Test Results

Improving performance attributes cannot be done simultaneously with other important attributes due to the limited resource allocation in urban public transport. Therefore, performance attributes that provide major benefits to service quality should be prioritised for improvement. On the other hand, attributes that should be prioritised are also considered very important to users but still have a level of performance that is considered low by users. The average importance and performance scores of passengers and non-passengers are 3.27 and 3.30, divided into four parts and plotted in a Cartesian diagram with points (a,b), forming four quadrants with different interpretations. Further details can be seen in Figures 2 and 3.

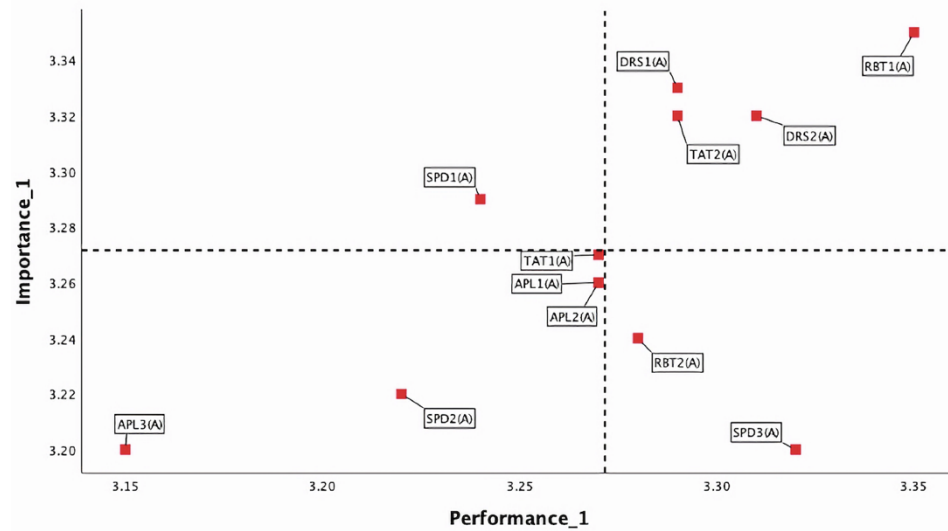


Figure 1: Non-Passenger Cartesian Diagram of Importance Performance Analysis

Figure 1 shows that the first quadrant shows a very low level of satisfaction, so improving service quality in urban public transport is the top priority. In this quadrant, there is one indicator, namely SPD1 (travel time), which has a very low level of satisfaction and is a top priority for improvement. The second quadrant is a picture that is expected by the community and follows the experience that has been felt by them. Four indicators fall into this quadrant, namely DRS1 (need for transfer), DRS2 (fitting connection), RBT1 (accessibility), and TAT2 (speed). Furthermore, the third quadrant is a low-priority quadrant that is considered less important by the community, but its performance could be better. There are five indicators in this quadrant, namely TAT1 (line frequency), APL1 (distance between bus stops), APL2 (safety at bus stops), APL3 (order at bus stops), and SPD2 (waiting time). Although considered less important by the public, these indicators' performance needs to be improved to increase user satisfaction. In quadrant four, there are two indicators, namely RBT2 (infrastructure maintenance) and SPD3 (time to reach destination). In this quadrant, performance is good enough and can be maintained because it already has higher satisfaction than user interest.

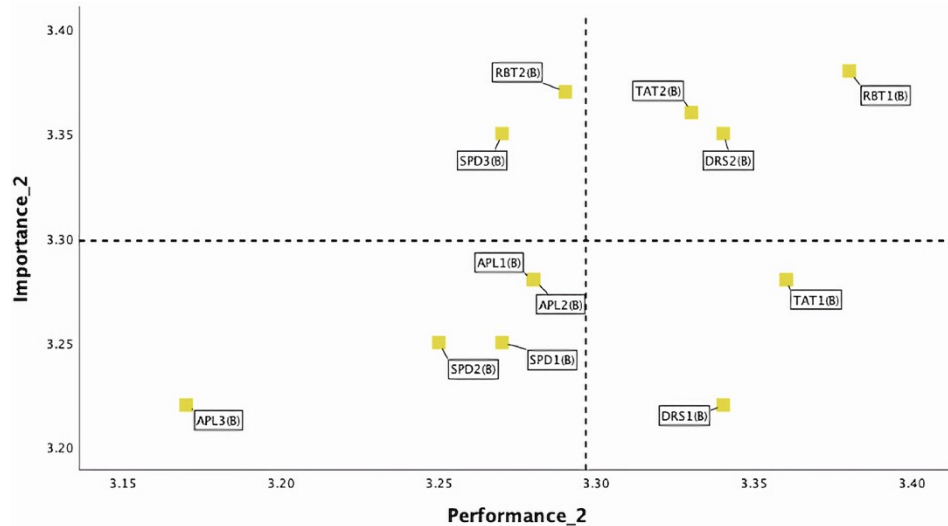


Figure 2: Passenger Cartesian Diagram of Importance Performance Analysis

In Figure 2, passengers' opinions are reflected in the first quadrant, which shows a very low level of satisfaction, making it a top priority to improve service quality in urban public transport. In this quadrant, two indicators with very low satisfaction levels are the top priority for improvement, namely RBT2 (infrastructure maintenance) and SPD3 (time to reach destination). The second quadrant reflects people's expectations and aligns with their experiences. Three indicators fall into this quadrant, namely DRS2 (proper connection), TAT2 (speed), and RBT1 (accessibility). Furthermore, the third quadrant is a low-priority quadrant that is considered less important by the community, but its performance could be better. There are five indicators in this quadrant, namely APL1 (distance between bus stops), APL2 (safety at bus stops), APL3 (order at bus stops), SPD2 (waiting time), and SPD1 (travel time). Although considered less important by the public, these indicators' performance needs to be improved to increase user satisfaction. Quadrant four shows a low level of importance but has a high level of performance implementation. There are two indicators in this quadrant, namely TAT1 (line frequency) and DRS1 (need for transfer).

Discussion

Governments and public transport managers have focused their plans and strategies on expanding the urban bus transport network, including additional lines and operating hours, and improving fares, with the ultimate goal of increasing public transport use. However, the response to these efforts could have been better due to a lack of alignment with the needs of users and the general

public. The research results show differences in the views of both groups (passengers and non-passengers) that can help policymakers improve the quality of urban public bus services. Therefore, a focused community-derived approach is needed in designing appropriate strategies and plans to overcome these differences. Public transport operators or local governments on public transport should be able to look deeper into the factors that can improve service quality and the attractiveness of using public transport. Both groups agreed that priority aspects of improving the quality of public transport services should focus on journey times (SPD1), infrastructure maintenance (RBT2), and timeliness to destination (SPD3), as reflected in quadrant one. This is due to traffic density causes congestion, making journey times longer, and lack of maintenance of bus stops, which causes passengers discomfort while waiting. On the other hand, in quadrant three, indicators such as distance between stops (APL1), safety (APL2), orderliness at stops (APL3), waiting time (SPD2), and frequency of lines (TAT1) are considered to have low priority. They are not performing well, which requires in-depth analysis to understand all the issues, consultation with relevant parties, technology utilisation, route optimisation, improved safety and orderliness, education, collaboration with external parties, and continuous evaluation. However, indicators such as fixed connection (DRS2), speed (TAT2), and accessibility (RBT1) need to be maintained as they fulfil user expectations, as seen in quadrant two. However, the challenge for the government and transport managers is how to maintain these qualities. In quadrant four, the service is considered good and needs to be maintained to optimise the use of public bus transport. According to non-passengers, infrastructure maintenance and punctuality to the destination have increased the likelihood of using public bus transport, whereas passengers emphasise the importance of high line frequency and ease of transfer to improve service quality. Understanding these different views is important in designing more effective improvement strategies that cater to the diverse needs of public bus transport users.

To improve the quality of public bus services based on the views of the two groups, a strategy can be concluded and serve as a basis for future decision-makers, such as: (1). Improving journey times by addressing traffic congestion and adjusting travel schedules. (2). Improving infrastructure maintenance such as bus stops and roads. (3). Ensure destination punctuality by adjusting timetables and improving scheduling systems. (4). Provide safety and order facilities at bus stops to enhance passenger experience. (5). Increase the frequency of low-priority lines to match user needs. However, it is necessary to continue to maintain the indicators of fixed connection (DRS2), speed (TAT2), and accessibility (RBT1), which, according to both, have met expectations so that in the future how public transport managers can continue to maintain this is of course a challenge for the government and transport managers.

CONCLUSION

This study adopts a quantitative approach supported by the use of open-ended questionnaires as part of the survey analysis to achieve the research objectives. The satisfaction survey was conducted from two perspectives of the public, namely passengers and non-passengers, located in Batam City and covering all operational lines of Trans-Batam public buses. It is important to note that the results of this study are highly influenced by people's social backgrounds, cultures, and customs; however, the study still has significant relevance for urban public transport planning and related decision-makers. As the main finding of this study, it is observed that the perceived satisfaction of the public, especially from passengers, is higher than non-passengers towards the quality of urban public transport. From these results, it can be concluded that passengers and non-passengers have different opinions on the service quality of public bus transport in terms of priority factors for improvement and factors that should be maintained and improved. However, both agree that they have felt the same satisfaction in improving the quality of public bus transportation services on the DRS2 (fitting connection), TAT2 (speed), and RBT1 (accessibility) factors and need to be improved on the APL1 (distance between stops), APL2 (safety at stops), APL3 (order at stops), SPD2 (waiting time), and TAT1 (frequency of lines) factors. However, improving the quality of public bus transportation services can influence them in terms of sustainability. This can be done by continuing to improve public bus services in all operational lines of public bus services so that people get the same experience and services. However, the low use of public bus transportation still occurs in several service lines due to waiting time for public buses that are still not following the predetermined schedule, order at bus stops and frequency of public buses. Of course, this is caused by insufficient supply of transportation. So how does the viewpoint of passengers and non-passengers should this service quality be improved? They concluded that the first is improving travel time by reducing waiting and making travel more efficient. The second is increased security during travel and at stops, as well as infrastructure security. The third is Facilities and security, such as comfortable seating and pending services for disabilities. Fourth is clear, accurate information and communication about schedules and service changes, including fares and travel routes. Fifth is accessibility, which is achieved by completing pedestrian lanes and increasing the number of stops on crowded passenger routes. Sixth is environmental safety, which can be achieved by reducing pollution and noise from public bus fleets. Further research can be carried out with steps such as surveys, participatory forums, and public consultations to help understand the needs and preferences of these two groups so that efforts to improve the quality of public bus transport services can be more effective and meet their overall expectations.

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