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Proposed Improvement of Trans Semanggi Suroboyo Services Using IPA and QFD Methods

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Abstract
The high intensity of private vehicle usage has led to uncontrolled road congestion. To encourage residents to switch to public transportation, the Surabaya City Government introduced Trans Semanggi Suroboyo. Trans Semanggi Suroboyo experienced a decrease in passengers in 2023, with a decline of 324,711 passengers. Based on a preliminary survey with direct interviews conducted with 35 Trans Semanggi Suroboyo passengers, frequent complaints were related to service and facilities. Therefore, it is important to analyze and propose improvements to the services of Trans Semanggi Suroboyo as public transportation in Surabaya. To enhance the quality of services and facilities, it is essential to identify and evaluate passenger perceptions using service quality dimensions based on the Decree of the Director General of Land Transportation Number SK.5923/AJ.005/DRJD/2016. The most important service quality priorities for passengers are measured using the Importance Performance Analysis (IPA) method. This research identified 9 critical attributes that require improvement. Subsequently, a service quality improvement design was developed using the Quality Function Deployment (QFD) approach through the House of Quality (HoQ) matrix, resulting in 5 priority technical responses. Based on these findings, a plan for improving the service and facilities of the Trans Semanggi Suroboyo bus was proposed to maintain the quality of public transportation services.

Keywords: Service Quality Dimensions; Importance Performance Analysis; Quality Function Deployment; House of Quality Matrix; Trans Semanggi Suroboyo

INTRODUCTION

The increasing population mobility in Surabaya has led to a significant rise in private vehicle usage, which contributes to severe traffic congestion. According to recent data from Korlantas Polri, East Java, especially Surabaya, accounts for 10.91% of Indonesia's total motor vehicle traffic (Widyastuti, 2023). To alleviate congestion, the Surabaya City Government has introduced several initiatives, including the launch of the Suroboyo Bus

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in 2018 as an alternative public transportation system. In 2022, the city collaborated with PT. Seduluran Bus Suroboyo to introduce Trans Semanggi Suroboyo, a new bus service aimed at supporting the Buy The Service (BTS) initiative, enhancing public transportation, and contributing to the reduction of emissions in line with the city's environmental goals (Surabaya City Government, 2022).

A performance survey conducted by the Ministry of Transportation of the Republic of Indonesia revealed that Trans Semanggi Suroboyo served approximately 890,000 passengers in 2022, achieving an occupancy rate of 70.6 percent (Manumoyoso, 2023). However, by 2023, the service experienced a noticeable decline in passenger numbers, with only 565,289 passengers recorded and a reduced occupancy rate of 34.4 percent. This decline was accompanied by various complaints from passengers, as observed in a preliminary survey involving 35 Trans Semanggi Suroboyo passengers. Key service issues included discrepancies in arrival schedules, higher fares for students, and difficulties in contacting customer support. Additionally, facility-related concerns such as limited routes, long waiting times, and malfunctioning stop buttons were also frequently reported (Manumoyoso, 2023).

The Surabaya City Government has proposed an expansion of the Trans Semanggi Suroboyo routes in 2024, in conjunction with plans to optimize multimodal transportation connectivity. This initiative is expected to enhance intermodal transport efficiency and improve overall service quality (Widyastuti, 2023). To support these efforts, a comprehensive analysis and evaluation of the current service quality is required, with a focus on identifying key attributes that influence passenger satisfaction. In line with established quality management frameworks, this research employs the Importance Performance Analysis (IPA) method to evaluate passenger perceptions and prioritize service improvement areas. Furthermore, the Quality Function Deployment (QFD) method is used to translate passenger needs into actionable recommendations aimed at improving the quality of the Trans Semanggi Suroboyo bus service (Rosenthal, 1992).

This study seeks to assess service quality attributes, determine key areas for improvement, and propose recommendations aligned with the Surabaya City Government's broader transportation goals, which emphasize integrated multimodal systems to enhance public transportation accessibility and efficiency.

LITERATURE REVIEW

Service quality plays a pivotal role in influencing customer satisfaction and shaping user perceptions of transportation systems. As defined by Lewis and Booms, service quality reflects how well the provided service aligns with customer expectations (Tjiptono & Chandra, 2017). In the context of public transportation, service quality is a key determinant in encouraging people to use public systems rather than relying on private vehicles. This is particularly crucial in congested urban areas, where improving the quality of transportation services is a fundamental strategy for addressing traffic issues and promoting environmental sustainability (Deni, Trianto, Bangsawan, & Welly, 2022).

The development of quality management systems involves systematic processes such as quality planning, control, and improvement. Parasuraman, Zeithaml, and Berry (1985) identified six critical dimensions of service quality: reliability, responsiveness, assurance, empathy, tangibility, and accessibility. Reliability refers to the provider's ability to deliver promised services consistently and accurately. Responsiveness reflects the provider's willingness to assist customers promptly. Assurance is tied to the knowledge, competence, and professionalism of service personnel, fostering customer trust. Empathy encompasses the personalized attention given to customers, while tangibility pertains to the physical aspects, such as equipment, facilities, and communication materials, that influence customer perceptions. Lastly, accessibility emphasizes the ease of accessing the service, including the availability of supplementary transport options.

Previous studies have extensively explored the impact of service quality on passenger preferences. Wickramaratne & Karunaratna (2018) found that passengers prioritize speed, comfort, and availability when choosing public transportation over private vehicles. Additionally, research by Ferreira et al. (2023) highlights that households often opt for public transport due to the lower cost and lack of private vehicles, making accessibility and reliability crucial for fostering public transport use and reducing urban traffic congestion.

Efforts to measure and enhance service quality in public transportation systems frequently utilize the Importance Performance Analysis (IPA) method. The IPA framework enables providers to evaluate service attributes based on their importance to passengers and the level of satisfaction passengers experience (Carman, 1990). This method has been widely applied in various industries, including tourism, education, and government services, to identify critical areas for improvement and ensure customer needs are addressed effectively (Martilla & James, 1977). Moreover, Quality Function Deployment (QFD) offers a structured approach for translating customer requirements into specific service features, ensuring that quality improvements align with user expectations (Rosenthal, 1992).

In this context, applying the IPA and QFD methodologies to the Trans Semanggi Suroboyo bus service will provide a comprehensive understanding of passenger needs and priorities, guiding efforts to enhance service quality and supporting the city's goal of developing an efficient and sustainable public transportation system.

METHODOLOGY

This research began by identifying key problems related to the quality of service provided by the Trans Semanggi Suroboyo bus system. The initial phase involved conducting a preliminary survey to assess current service conditions, followed by formulating the research questions and objectives. A comprehensive review of relevant literature was carried out to establish a theoretical basis for understanding the determinants of service quality in public transportation.

Data Collection Stage

In the data collection process, careful preparation was undertaken to design a questionnaire that would capture essential service quality dimensions. These dimensions, derived from public transportation standards outlined in the Decree of the Director General of Land Transportation (SK.5923/AJ.005/DRJD/2016), include reliability, responsiveness, assurance, comfort, empathy, tangible elements, and accessibility. Primary data was collected through a combination of interviews and questionnaires distributed to passengers of the Trans Semanggi Suroboyo bus service. The questionnaire was structured to assess passengers' perceptions and expectations across the identified service quality dimensions. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used to record passenger responses, which were designed to gauge both the perceived importance and satisfaction with each service attribute.

This research employed a non-probability sampling method, which does not guarantee equal selection opportunities for every individual in the population. To determine the sample size in this research, the Bernoulli method is used, with the formula as follows:

$$n = \frac{(Z\frac{\propto}{2})^2.P.q}{e^2} \qquad (1)$$

where n is the sample size, $Z\frac{\propto}{2}$ represent the critical value from the standard normal distribution, and P is the estimated proportion of the population exhibiting the characteristic of interest. q is $1 - P$, while e is the margin of error. Based on this method, the minimum required sample size was calculated to be 83 respondents.

Data Processing Stage

Once the data were collected, the next stage involved processing the data to develop actionable insights for improving service quality. A validity test was conducted to verify whether the data accurately represented the service quality attributes being measured. Data were deemed valid if the calculated correlation coefficient (rrr) exceeded the critical value from the correlation table (rrr-table) (Kurniasari & Santosa, 2013). Additionally, a reliability test was performed to assess the consistency of responses. The data were considered reliable if the Cronbach's alpha coefficient exceeded the threshold of 0.6 (Ghozali, 2006).

Following the validation and reliability testing, the data were analyzed using the Importance Performance Analysis (IPA) framework. The IPA method is utilized to compare the importance that passengers place on various service attributes against their satisfaction with the actual service provided (Wu, Liao, & Zhang, 2023). The results are plotted on a four-quadrant diagram, where attributes in Quadrant 1—those with high importance but low performance—are identified as priorities for improvement (Ormanović et al., 2017).

Quality Function Deployment (QFD)

The final stage of the methodology involves applying the Quality Function Deployment (QFD) approach. QFD is a systematic process that translates customer needs into specific technical requirements to guide service development and enhancement. This method is widely regarded for its ability to align service improvements with customer satisfaction by focusing on key performance attributes (Erdil & Arani, 2018). The QFD process for this study culminates in the creation of a House of Quality (HoQ) matrix, which organizes and correlates customer needs with technical specifications.

The steps in constructing the House of Quality matrix include:

(1) Identifying Customer Needs: Customer needs were derived from the responses to the questionnaire, particularly focusing on attributes identified as priorities through the IPA analysis.
(2) Developing the Planning Matrix: The planning matrix outlines customer expectations and the relative importance of each attribute.
(3) Defining Technical Responses: The technical responses specify the design or service changes needed to meet the identified customer needs.
(4) Building the Relationship Matrix: This matrix evaluates the strength of the relationship between customer needs and technical responses.
(5) Constructing the Technical Correlation Matrix: The correlation matrix assesses the interrelationships between the various technical responses.
(6) Compiling the Final Technical Matrix: The final matrix quantifies the technical specifications required to enhance service quality in alignment with customer expectations.

By implementing these methodological steps, this research seeks to provide a structured framework for evaluating and improving the service quality of the Trans Semanggi Suroboyo bus, thereby supporting the broader goals of the Surabaya City Government in optimizing public transportation systems.

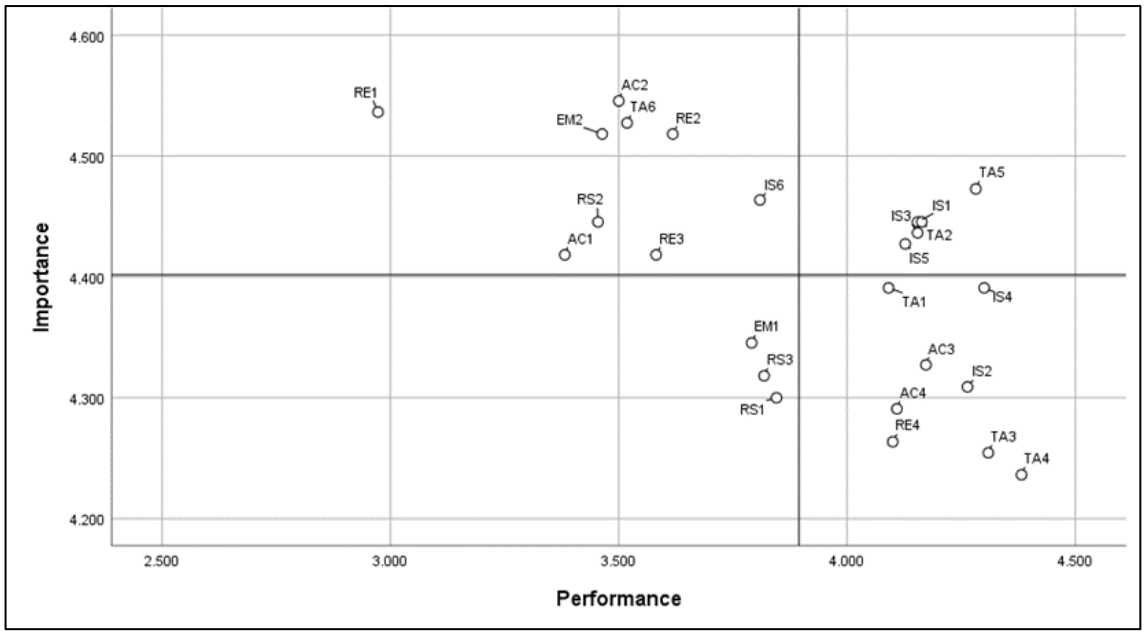
RESULTS AND DISCUSSION

The research gathered data through questionnaires distributed to 110 respondents from Corridor II and Corridor III of the Trans Semanggi Suroboyo bus service. The survey covered multiple dimensions of service quality, including perceived reality, passenger expectations, and the perceived importance of these dimensions as presented in Appendix 1. The demographic analysis revealed that the majority of respondents, aged 21 to 30 years, were female (61 individuals). Most respondents were employed in the private sector, accounting for 68 individuals, and the largest group of users had used the Trans Semanggi Suroboyo bus between 3 to 10 times. Additionally, 80 respondents indicated that they reside in Surabaya.

The questionnaire data underwent a validity and reliability test using SPSS Version 26 software. The results indicated that all calculated correlation coefficients were higher than the critical rrr-table value of 0.1874, confirming the validity of the data.

Furthermore, Cronbach's alpha values were greater than the required threshold of 0.6, confirming the reliability of the data. The next step was to compare the average perceived experience of passengers with their desired expectations, which provided a measure of the gap between service performance and expectations. The summary of this gap analysis is presented in Appendix 2.

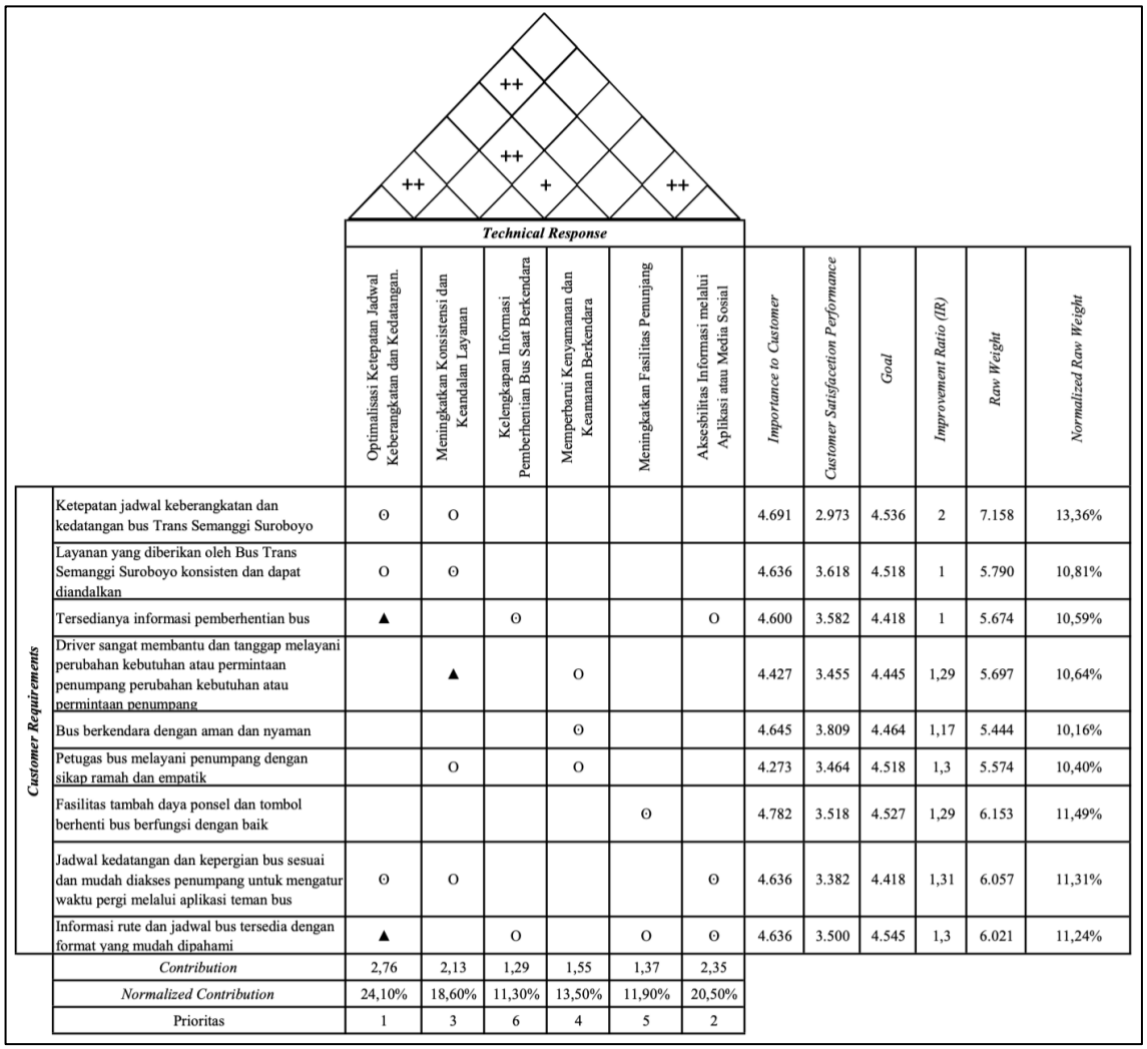
Figure 1. IPA diagram results



Source: Author own estimation (2024)

Using the Importance Performance Analysis (IPA) method, an IPA diagram was generated to assess the position of each service attribute within four quadrants. Figure 1 presents the IPA diagram, which includes 25 service attributes. Of these, nine attributes fell into Quadrant 1, indicating their high importance but low performance, thus highlighting them as priority areas for improvement. The identified critical attributes are: punctuality of bus schedules (RE1), consistency and reliability of services (RE2), availability of bus stop information (RE3), responsiveness of drivers to passenger needs (RS2), driving comfort and safety (IS6), friendly and empathetic staff (EM2), functional phone charging and stop button facilities (TA6), accurate and accessible schedule information through the app (AC1), and clear bus route and schedule information (AC2).

Figure 2. HoQ Trans Semanggi Suroboyo Bus services



		Technical Response: Optimalisasi Ketepatan Jadwal Keberangkatan dan Kedatangan.	Meningkatkan Konsistensi dan Keandalan Layanan	Kelengkapan Informasi Pemberhentian Bus Saat Berkendara	Memperbarui Kenyamanan dan Keamanan Berkendara	Meningkatkan Fasilitas Penunjang	Aksesbilitas Informasi melalui Aplikasi atau Media Sosial	*Importance to Customer*	*Customer Satisfacetion Performance*	*Goal*	*Improvement Ratio (IR)*	*Raw Weight*	*Normalized Raw Weight*
Customer Requirements	Ketepatan jadwal keberangkatan dan kedatangan bus Trans Semanggi Suroboyo	Θ	O					4.691	2.973	4.536	2	7.158	13,36%
	Layanan yang diberikan oleh Bus Trans Semanggi Suroboyo konsisten dan dapat diandalkan	O	Θ					4.636	3.618	4.518	1	5.790	10,81%
	Tersedianya informasi pemberhentian bus	▲		Θ			O	4.600	3.582	4.418	1	5.674	10,59%
	Driver sangat membantu dan tanggap melayani perubahan kebutuhan atau permintaan penumpang perubahan kebutuhan atau permintaan penumpang		▲		O			4.427	3.455	4.445	1,29	5.697	10,64%
	Bus berkendara dengan aman dan nyaman				Θ			4.645	3.809	4.464	1,17	5.444	10,16%
	Petugas bus melayani penumpang dengan sikap ramah dan empatik		O		O			4.273	3.464	4.518	1,3	5.574	10,40%
	Fasilitas tambah daya ponsel dan tombol berhenti bus berfungsi dengan baik					Θ		4.782	3.518	4.527	1,29	6.153	11,49%
	Jadwal kedatangan dan kepergian bus sesuai dan mudah diakses penumpang untuk mengatur waktu pergi melalui aplikasi teman bus	Θ	O				Θ	4.636	3.382	4.418	1,31	6.057	11,31%
	Informasi rute dan jadwal bus tersedia dengan format yang mudah dipahami	▲		O		O	Θ	4.636	3.500	4.545	1,3	6.021	11,24%
	Contribution	2,76	2,13	1,29	1,55	1,37	2,35						
	Normalized Contribution	24,10%	18,60%	11,30%	13,50%	11,90%	20,50%						
	Prioritas	1	3	6	4	5	2						

Source: Author own estimation (2024)

Following the identification of these priority attributes, the next step was to construct a House of Quality (HoQ) matrix. This matrix provides a structured approach to align customer needs with technical solutions. The process began with the identification of customer needs based on the critical attributes identified through the IPA analysis. The planning matrix was then developed, which included calculations such as the importance to the customer, performance satisfaction, improvement ratios, and weighted values. Technical responses were determined through interviews with the operational manager and head mechanic of Trans Semanggi Suroboyo, resulting in key recommendations for improvements. These technical responses include optimizing the punctuality of bus schedules, enhancing service reliability, improving bus stop information, ensuring driving comfort and safety, and optimizing supporting facilities. The relationship matrix established correlations between these technical responses and the identified customer needs.

Table 1. Technical Corellation Matrix Results

Technical Responses	Customer Requirements	Rel.	Desc.
Optimization of Bus Departure and Arrival Schedule Accuracy	RE1	Θ	Strong
	RE2	O	Moderate
	RE3	▲	Weak
	AC1	Θ	Strong
	AC2	▲	Weak
Improving Service Reliability	RE1	O	Moderate
	RE2	Θ	Strong
	RS2	▲	Weak
	EM2	O	Moderate
	AC1	O	Moderate
Updating the Completeness of Bus Stop Information While in Transit	RE3	Θ	Strong
	AC2	O	Moderate
Enhancing Driving Comfort and Safety	RS2	O	Moderate
	IS6	Θ	Strong
	EM2	O	Moderate
Optimizing Supporting Facilities	TA6	Θ	Strong
	AC2	O	Moderate
Information Accessibility through Applications or Social Media	RE3	O	Moderate
	AC1	Θ	Strong
	AC2	Θ	Strong

Source: Author own estimation (2024)

Table 1 presents the technical correlation matrix, which illustrates the strength of relationships between technical responses and customer requirements. Strong positive correlations were observed between optimizing schedule punctuality and improving service reliability, as well as between supporting facility optimization and the accessibility of information via applications or social media. Moderate positive correlations were identified between improving bus stop information and enhancing driving comfort and safety. Table 2 further details the technical correlations, highlighting that punctuality and service reliability are closely linked, and that facility upgrades contribute positively to information accessibility. Based on these correlations, several technical responses were prioritized for improvement.

Table 2. Technical Corellation Matrix Results

Technical Responses		Rel.	Desc.
Optimization of Bus Departure and Arrival Schedule Accuracy	Improving Service Reliability	++	Strong Positive
Optimizing Supporting Facilities	Information Accessibility through Applications or Social Media	++	Strong Positive

Updating the Completeness of Bus Stop Information While in Transit	Enhancing Driving Comfort and Safety	+	Moderate Positive
Enhancing Driving Comfort and Safety	Improving Service Reliability	++	Strong Positive

Source: Author own estimation (2024)

The technical matrix calculations identified "Optimizing the punctuality of bus departure and arrival schedules" as having the highest contribution value, both in raw and normalized terms, with a contribution value of 3.163 and a normalized contribution of 24.1%. This finding underscores the significance of reducing headway times between bus arrivals to improve passenger satisfaction and service reliability.

As a result of this comprehensive analysis, five priority technical responses were proposed as recommendations for service quality improvements. First, optimizing bus schedules involves refining the accuracy of both departure and arrival times, with a recommendation to reduce the headway between buses from 20 to 15 minutes to minimize waiting times. Second, enhancing information accessibility through a user-friendly application would provide passengers with real-time updates on schedules, routes, fares, and stops, while also improving customer service through digital platforms. Third, improving service reliability requires increasing the number of buses or adjusting fleet management to better match passenger demand, ensuring consistency in service provision. Fourth, enhancing driving comfort and safety involves conducting safety education programs for both drivers and passengers, and maintaining adherence to speed limits of 30 km/h as prescribed by operational standards. Finally, optimizing supporting facilities would involve regular maintenance and upgrades to ensure that all amenities, such as charging stations and bus stop buttons, are functional. Additionally, it is recommended to introduce visual media, such as in-bus screens, to provide passengers with updated information.

These recommendations align closely with the goal of improving the overall passenger experience and enhancing the operational efficiency of the Trans Semanggi Suroboyo bus system. By addressing the identified priority areas, this research contributes to the ongoing efforts of the Surabaya City Government to optimize public transportation services and meet the evolving needs of its citizens.

CONCLUSION

This study utilized service quality dimension attributes based on Parasuraman's framework, integrated with the Decree of the Director General of Land Transportation (SK.5923/AJ.005/DRJD/2016), to assess the quality of the Trans Semanggi Suroboyo bus service. The Importance Performance Analysis (IPA) and Quality Function Deployment (QFD) methods provided comprehensive insights into the service gaps between passenger expectations and their actual experiences. The analysis revealed nine critical attributes that passengers identified as highly important but with low performance. These findings

underscored the need for targeted improvements, focusing on punctuality, information accessibility, service reliability, safety, and the functionality of supporting facilities.

The key findings of this research highlight the significant gaps between the expected and actual service quality, particularly in the attributes related to timeliness, reliability, and customer service. Among the recommendations proposed to address these issues, optimizing bus schedules and improving real-time information accessibility emerged as top priorities. Furthermore, enhancing driving safety and conducting regular maintenance on supporting facilities were identified as crucial steps to improve overall passenger satisfaction. These recommendations align with broader efforts to improve the public transportation system in Surabaya, ensuring that the Trans Semanggi Suroboyo service meets passenger expectations more effectively.

Despite the valuable insights gained, this research faced some limitations. The study's scope was confined to passengers of Corridors II and III, and the sample size, while adequate, may not fully capture the diverse experiences of all passengers across the entire network. Additionally, the use of non-probability sampling limits the generalizability of the findings. Future studies could address these limitations by expanding the scope to include more corridors and using probabilistic sampling methods. Furthermore, while the research focused on service quality dimensions, other factors such as pricing and external conditions like traffic congestion could also influence passenger satisfaction and should be explored further.

For future research, several avenues are suggested. First, providing additional assistance during data collection would ensure higher response rates and more accurate data. Comparative studies could also be conducted, analyzing public transportation services across Surabaya or other cities with similar urban characteristics. Incorporating queuing theory in future studies could help improve system efficiency by managing bus schedules and minimizing waiting times. Additionally, employing the Kano method would offer a more detailed analysis of passenger preferences, helping transportation providers prioritize improvements that address a broader range of user aspirations.

REFERENCE

Bajcetic, S., Tica, S., Zivanovic, P. V., Milovanovic, B., & Djorojevic Nad, A. M. (2018). Analysis of public transport users' satisfaction using quality function deployment: Belgrade case study. *Transport*, 609-618.

Carman, J. M. (1990). Consumer Perceptions of Service Quality: An Assessment of the SERVQUAL Dimensions. *Journal of Retailing*, 33-55.

Deni, M., Trianto, A., Bangsawan, A., & Welly, K. (2022). Pengaruh kualitas pelayanan terhadap keputusan pengguna jasa transportasi teman bus pt. trans musi palembang jaya di kota palembang. *Jurnal EK&BI*, 364-372.

Duleba, S., Ismael, K., & Esztergár-Kiss, D. (2023). Evaluating the quality of the public transport service during the COVID-19 pandemic from the perception of two user groups. *European Transport Research Review*.

Erdil, N. O., & Arani, O. M. (2018). Quality Function Deployment: More Than a Design Tool. *International Journal of Quality and Service Sciences*.

Fache, W. (2000). Methodologies for innovation and improvement of services in tourism. *Managing Service Quality: An International Journal*, 356-366.

Ferreira, S., Filgueiras, M., Tavares, J. P., & Rocha, H. (2023). Public Transport Usage and Perceived Service Quality in a Large Metropolitan Area: The Case of Porto. *MDPI Sustainability*.

Ghozali, I. (2006). *Aplikasi analisis multivariate dengan program SPSS.* Semarang: Badan Penerbit Universitas Diponegoro.

Girma, M. (2022). Evaluating service performance of public bus transit service: a case study of Addis Ababa, Ethiopia. *Urban, Planning and Transport Research*, 483-501.

Kurniasari, N. D., & Santosa, S. B. (2013). Analisis pengaruh harga, kualitas produk, dan kualitas pelayanan terhadap keputusan pembelian (Studi Kasus pada Konsumen Waroeng Steak & Shake Cabang Jl. Sriwijaya 11 Semarang). *Diponegoro Journal of Management*, 352-363.

Manumoyoso, A. H. (2023, February 14). *Keterisian Trans Semanggi Suroboyo Tertinggi di Indonesia*. Retrieved from Kompas.id: https://www.kompas.id/baca/nusantara/2023/02/14/keterisian-trans-semanggi-suroboyo-tertinggi-di-indonesia

Martilla, J. A., & James, J. C. (1977). Importance-Performance Analysis. *Journal of Marketing*, 77-79.

Ormanović, Š., Ćirić, A., Talović, M., Alić, H., Jelešković, E., & Čaušević, D. (2017). Importance-performance analysis: different approaches. *Acta Kinesiologica, 11*, 58-66.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). *A Conceptual Model of Service Quality and its Implications for Future Research.* Marketing Science Institute.

Rosenthal, S. R. (1992). *Effective product design and development : how to cut lead time and increase customer satisfaction.* Homewood, Illinois: Business One Irwin.

Surabaya City Government. (2022). *Berita*. Retrieved from Pemerintah Kota Surabaya: https://surabaya.go.id/id/berita/71510/pertama-di-indonesia-wali-kota-eri-cahyadi-bersama-kemenhub-launching-bus-listrik-di-surabaya

Tjiptono, F., & Chandra, G. (2017). *Pemasaran Strategik.* Yogyakarta: Andi.

Wickramaratne, & Karunaratna. (2018). The Impact of Service Quality on Passenger Satisfaction in Airport Services: A Case on International Passengers. *International Conference on Management and Economics*, 357-372.

Widyastuti, I. (2023). *Badan Perencanaan Pembangunan Daerah, Penelitian dan Pengembangan Kota Surabaya*. Retrieved from Badan Perencanaan Pembangunan Daerah, Penelitian dan Pengembangan Kota Surabaya: https://bappedalitbang.surabaya.go.id/images/File%20Upload/Pengembangan%20Transportasi%20Surabaya.pdf

Wu, X., Liao, H., & Zhang, C. (2023). Importance-performance analysis to develop product/service improvement strategies through online reviews with reliability. *Annals of Operations Research*. doi: https://doi.org/10.1007/s10479-023-05594-x

APPENDIX

Appendix 1. Attributes and Statements Based on Service Quality Dimensions

Code	Attribute
	Reliability
RE1	Timeliness of Trans Semanggi Suroboyo bus departures and arrivals
RE2	The service provided by Trans Semanggi Suroboyo bus is consistent and reliable
RE3	Availability of information regarding bus stops
RE4	The Trans Semanggi Suroboyo bus team can handle emergency situations during the journey (such as bus breakdowns or accidents)
	Responsiveness
RS1	Staff readiness to assist at the departure point and final destination
RS2	Drivers are very helpful and responsive to changes in passengers' needs or requests
RS3	Drivers are responsive to feedback or complaints from passengers
	Insurance
IS1	Security personnel are present, along with safety facilities on the bus, such as fire extinguishers and emergency contact numbers
IS2	The presence of CCTV inside the bus enhances passengers' sense of safety
IS3	The cabin space is clean, well-maintained, and odor-free
IS4	Priority seating facilities are available, significantly assisting elderly passengers, persons with disabilities, and mothers with young children
IS5	The air circulation system (AC) and lighting facilities on the bus are functioning properly
IS6	The bus operates safely and comfortably
	Emphaty
EM1	Elderly passengers, persons with disabilities, and mothers with young children are always served exceptionally well
EM2	Bus personnel serve passengers with a friendly and empathetic attitude
	Tangible
TA1	The modern transaction system, TOB (Tap On Bus) and QRIS, facilitates user transactions
TA2	Bicycle brackets are available for passengers who bring bicycles
TA3	The appearance and design of the Trans Semanggi Suroboyo are very appealing, making it easy to identify
TA4	The number of seats and layout within the bus is adequate for passengers
TA5	The bus has an attractive appearance with regional-themed paint and is well-maintained and clean
TA6	Facilities for mobile phone charging and the bus stop button are functioning properly
	Accessibility
AC1	The bus arrival and departure schedules are appropriate and easily accessible for passengers to plan their travel via the Teman Bus apps
AC2	Information on bus routes and schedules is provided in an easily understandable format

AC3	The bus is easy to locate and reach with connecting transportation (e.g., public transport) in the area of bus stops
AC4	Bus stops are conveniently located for passengers and accessible to various groups, including the elderly and persons with disabilities

Source: Author own estimation (2024)

Appendix 2. Results of Data Calculation on Average Actual Experience, Expectations, and Importance Levels

Code	Attribute	Mean		
		Actual Experience	**Expectations**	**Importance Levels**
	Reliability			
RE1	Timeliness of Trans Semanggi Suroboyo bus departures and arrivals	4,536	2,973	4,691
RE2	The service provided by Trans Semanggi Suroboyo bus is consistent and reliable	4,518	3,618	4,636
RE3	Availability of information regarding bus stops	4,418	3,582	4,600
RE4	The Trans Semanggi Suroboyo bus team can handle emergency situations during the journey (such as bus breakdowns or accidents)	4,264	4,100	4,345
	Responsiveness			
RS1	Staff readiness to assist at the departure point and final destination	4,300	3,845	4,409
RS2	Drivers are very helpful and responsive to changes in passengers' needs or requests	4,445	3,455	4,427
RS3	Drivers are responsive to feedback or complaints from passengers	4,318	3,818	4,555
	Insurance			
IS1	Security personnel are present, along with safety facilities on the bus, such as fire extinguishers and	4,445	4,155	4,427

	emergency contact numbers			
IS2	The presence of CCTV inside the bus enhances passengers' sense of safety	4,309	4,264	4,745
IS3	The cabin space is clean, well-maintained, and odor-free	4,436	4,155	4,727
IS4	Priority seating facilities are available, significantly assisting elderly passengers, persons with disabilities, and mothers with young children	4,391	4,300	4,355
IS5	The air circulation system (AC) and lighting facilities on the bus are functioning properly	4,427	4,127	4,318
IS6	The bus operates safely and comfortably	4,464	3,809	4,645
		Emphaty		
EM1	Elderly passengers, persons with disabilities, and mothers with young children are always served exceptionally well	4,345	3,791	4,736
EM2	Bus personnel serve passengers with a friendly and empathetic attitude	4,518	3,464	4,273
		Tangible		
TA1	The modern transaction system, TOB (Tap On Bus) and QRIS, facilitates user transactions	4,391	4,091	4,718
TA2	Bicycle brackets are available for passengers who bring bicycles	4,445	4,164	4,345
TA3	The appearance and design of the Trans Semanggi Suroboyo are very appealing, making it easy to identify	4,255	4,309	4,364

TA4	The number of seats and layout within the bus is adequate for passengers	4,236	4,382	4,455
TA5	The bus has an attractive appearance with regional-themed paint and is well-maintained and clean	4,473	4,282	4,482
TA6	Facilities for mobile phone charging and the bus stop button are functioning properly	4,527	3,518	4,782
	Accessibility			
AC1	The bus arrival and departure schedules are appropriate and easily accessible for passengers to plan their travel via the Teman Bus apps	4,418	3,382	4,636
AC2	Information on bus routes and schedules is provided in an easily understandable format	4,545	3,500	4,636
AC3	The bus is easy to locate and reach with connecting transportation (e.g., public transport) in the area of bus stops	4,327	4,173	4,473
AC4	Bus stops are conveniently located for passengers and accessible to various groups, including the elderly and persons with disabilities	4,291	4,109	4,382

Source: Author own estimation (2024)