# Level of Satisfaction of Urban Bus Rapid Transit Users: A Case Study of Trans Metro Dewata and Trans Sarbagita in Bali

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**Abstract.** This study evaluates passenger satisfaction with the Bus Rapid Transit (BRT) systems in Bali, specifically the Trans Metro Dewata and Trans Sarbagita services, within the Sarbagita region. The research employs a quantitative approach, utilizing surveys to measure user satisfaction across various service attributes, including frequency, punctuality, comfort, cleanliness, safety, and information clarity. The findings reveal significant gaps between actual service performance and passenger expectations, particularly in the areas of punctuality, safety, and information clarity. While the systems performed relatively well in comfort and cleanliness, they still fell short of the ideal standards expected by users. The study highlights the need for targeted improvements in these key areas to enhance overall passenger satisfaction and increase ridership. By comparing these results with similar studies in other urban contexts, the research underscores the universal challenges faced by BRT systems in meeting passenger expectations and provides actionable insights for policymakers and transit authorities to improve service delivery. The findings contribute to the broader discourse on sustainable urban mobility and the ongoing efforts to optimize public transportation systems in developing regions.

**Keywords:** Bali, BRT, Passenger Satisfaction, Public Transportation, Service Quality, Trans Metro Dewata, Trans Sarbagita

## 1 Introduction

Public transportation systems, particularly Bus Rapid Transit (BRT), have become increasingly essential in managing urban mobility and addressing traffic congestion in rapidly growing regions (Poku-Boansi, 2018). In Bali, Indonesia, the BRT systems, including Trans Metro Dewata and Trans Sarbagita, are pivotal in providing efficient and sustainable transportation solutions across the Denpasar, Badung, Gianyar, and Tabanan (Sarbagita) areas. These systems are designed to enhance the convenience and reliability of public transport, making them vital components in supporting both the daily commute of residents and the travel demands of the island's thriving tourism sector (Hasan, et al, 2021).


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However, the success of these BRT systems depends heavily on passenger satisfaction, which is influenced by various factors such as service frequency, accessibility, comfort, and safety (Zheng, 2009). In Bali, the unique mix of urban and peri-urban landscapes presents distinct challenges for BRT operators in meeting the diverse needs of passengers. Moreover, the seasonal influx of tourists adds to the complexity, requiring a robust and adaptable public transportation framework to maintain high levels of service quality (Hasan, et al, 2021).

Despite the strategic importance of Trans Metro Dewata and Trans Sarbagita in Bali's transportation network, there is a notable gap in the literature concerning detailed evaluations of passenger satisfaction within this context. Previous studies have largely focused on general transportation issues in Bali, often overlooking the specific performance and satisfaction metrics of these BRT systems (Nelloh et al, 2019). This study aims to address this gap by comprehensively analyzing passenger satisfaction with BRT services in Bali, focusing on key service attributes that impact the user experience.

The findings from this research are expected to offer valuable insights for policymakers and transit authorities in Bali. By identifying the strengths and weaknesses of the current BRT systems, the study seeks to contribute to the development of more effective strategies for enhancing service quality and meeting the evolving demands of both residents and international visitors.

## 2 Methods

This study adopts a descriptive quantitative approach to assess passenger satisfaction with the Bus Rapid Transit (BRT) systems in Bali, specifically focusing on the Trans Metro Dewata and Trans Sarbagita services in the Denpasar, Badung, Gianyar, and Tabanan (Sarbagita) regions. The research methodology is structured to provide a comprehensive evaluation of various service attributes that contribute to overall passenger satisfaction.

### 2.1 Study Design and Sample

The research employs a survey method, using structured questionnaires distributed to BRT users across the Sarbagita area. The population of the study includes all users of the Trans Metro Dewata and Trans Sarbagita services. Given the large and diverse nature of the population, a Simple Random Sampling technique was initially employed to ensure that every individual had an equal chance of being selected. To increase the sample size and representativeness, an Accidental Sampling method was later applied, wherein participants were selected based on their availability and willingness to participate during their use of the BRT services.

The variables measured in assessing the level of passenger satisfaction with BRT performance in Bali, are the indicators asked in the questionnaire regarding both existing performance and customer expectations, as in Table 1.

**Table 1**. Variables and score assessment of bus performance levels and passenger expectations

| Variables | Score | |
|---|---|---|
| | Level of performance | Level of importance |
| 1. Route characteristics<br>2. Service Characteristics<br>3. Service Reliability<br>4. Comfort<br>5. Cleanliness<br>6. Fare<br>7. Information<br>8. Safety and Security<br>9. Personnel<br>10. Customer services<br>11. Environment | 1. Strongly Agree (SA) gets a score of 5<br>2. Agree (A) gets a score of 4<br>3. Neutral (N) gets a score of 3<br>4. Disagree (DA) gets a score of 2<br>5. Strongly Disagree (SDA) gets a score of 1 | 1. Very Important (VI) gets a score of 5<br>2. Important (I) gets a score of 4<br>3. Moderately Important (MI) gets a score of 3<br>4. Not Important (NI) gets a score of 2<br>5. Very Unimportant (VUI) gets a score of 1 |

## 2.2 Data Collection

Data were collected using a hybrid questionnaire designed to capture detailed feedback on various aspects of the BRT services. The questionnaire was divided into sections corresponding to key service attributes, including location and distance between bus stops, accessibility, service frequency, operational reliability, comfort, cleanliness, pricing, information clarity, safety, and customer service. Each section included a series of statements to which respondents were asked to rate their level of satisfaction using a Likert scale ranging from “Strongly Disagree” to “Strongly Agree”.

Additionally, demographic information such as age, gender, occupation, and frequency of BRT usage was collected to analyze the satisfaction levels across different user groups. The questionnaires were distributed both in person at major bus stops and online through social media platforms to reach a broader audience, 136 respondent participated on this data collection.

## 2.3 Data Analysis

The collected data were analyzed using the Importance-Performance Analysis (IPA) method. IPA is a well-established tool in service quality research that helps in identifying the gap between the importance of service attributes to passengers and the perceived performance of those attributes. Each service attribute was plotted on a two-dimensional grid based on its importance and performance scores, allowing for the identification of areas that require improvement and those that are performing well.

Descriptive statistics were used to summarize the demographic data and the overall satisfaction levels. To ensure the reliability and validity of the questionnaire, a pilot test was conducted, and necessary adjustments were made based on the feedback received. The results from the IPA were further validated through Focus Group Discussions

(FGD) with selected participants, providing qualitative insights that complemented the quantitative data.

### 2.4 Ethical Considerations

All participants were informed about the study's purpose and their rights as respondents, including confidentiality and the option to withdraw from the study at any time. The research was conducted following ethical guidelines for social science research, ensuring that the data collected were used solely for academic purposes.

This section outlines the methodological framework used in the study, providing a clear path for data collection, analysis, and interpretation. The methods chosen are designed to offer robust insights into passenger satisfaction with Bali's BRT systems, contributing to the overall understanding of public transportation quality in the region.

## 3 Results

### 3.1 Passenger Characteristics

The survey, focusing on users of the Trans Metro Dewata and Trans Sarbagita systems in the Sarbagita region (Denpasar, Badung, Gianyar, and Tabanan), provides a clear demographic overview of BRT users. The majority of respondents were female, comprising 64.7% of the sample, with males representing 35.3%. The age distribution was primarily centered in the 31-45 age group (30.1%) and the 46-60 age group (33.8%), indicating a relatively mature user base. In terms of educational background, a significant portion of respondents held higher education degrees: 50.7% with a bachelor's degree and 30.8% with a diploma. The primary purposes of travel included work (22.9%) and leisure (35.6%), reflecting the BRT's role in both daily commuting and recreational activities. Additionally, 33.1% of respondents used the BRT services 8-9 times per month, suggesting a moderate to high level of reliance on public transportation.

### 3.2 Comparison of Performance and Expectations

The survey results highlighted a disparity between the actual performance of the BRT services and the expectations of the passengers.

This comparison was conducted across various service attributes, revealing critical insights into areas where the BRT services either meet or fall short of user expectations. Based on the variables a to k mentioned above, 36 questions were created to be asked of passengers, thereby obtaining the level of importance and expectations as seen in Table 2.

**Table 2.** Suitability analysis (Performance compared to service importance level)

| Statement No. | Performance assessment Value | | | | | X1 | Importance assessment Value | | | | | Yi | Tki |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SA | A | N | DA | SDA | | VI | I | MI | NI | VUI | | |
| 1 | 44 | 53 | 32 | 6 | 1 | 541 | 88 | 46 | 1 | 1 | 0 | 629 | 86.01% |
| 2 | 28 | 51 | 45 | 10 | 2 | 501 | 87 | 42 | 5 | 2 | 0 | 622 | 80.55% |
| 3 | 49 | 36 | 33 | 14 | 4 | 520 | 87 | 45 | 2 | 2 | 0 | 625 | 83.20% |
| 4 | 42 | 61 | 25 | 6 | 2 | 543 | 84 | 48 | 2 | 2 | 0 | 622 | 87.30% |
| 5 | 32 | 53 | 38 | 11 | 2 | 510 | 79 | 53 | 3 | 1 | 0 | 618 | 82.52% |
| 6 | 37 | 66 | 27 | 5 | 1 | 541 | 80 | 52 | 3 | 1 | 0 | 619 | 87.40% |
| 7 | 33 | 49 | 39 | 14 | 1 | 507 | 86 | 43 | 6 | 1 | 0 | 622 | 81.51% |
| 8 | 43 | 47 | 33 | 12 | 1 | 527 | 85 | 47 | 3 | 1 | 0 | 624 | 84.46% |
| 9 | 29 | 55 | 38 | 11 | 3 | 504 | 84 | 48 | 3 | 1 | 0 | 623 | 80.90% |
| 10 | 78 | 53 | 5 | 0 | 0 | 617 | 53 | 66 | 15 | 2 | 0 | 578 | 106.75% |
| 11 | 81 | 53 | 2 | 0 | 0 | 623 | 70 | 53 | 11 | 2 | 0 | 599 | 104.01% |
| 12 | 77 | 57 | 2 | 0 | 0 | 619 | 66 | 60 | 9 | 1 | 0 | 599 | 103.34% |
| 13 | 74 | 55 | 7 | 0 | 0 | 611 | 57 | 60 | 15 | 3 | 1 | 577 | 105.89% |
| 14 | 9 | 7 | 13 | 37 | 70 | 256 | 58 | 60 | 13 | 5 | 0 | 579 | 44.21% |
| 15 | 79 | 54 | 3 | 0 | 0 | 620 | 83 | 44 | 5 | 4 | 0 | 614 | 100.98% |
| 16 | 75 | 55 | 5 | 1 | 0 | 612 | 69 | 52 | 12 | 3 | 0 | 595 | 102.86% |
| 17 | 80 | 53 | 3 | 0 | 0 | 621 | 61 | 56 | 16 | 3 | 0 | 583 | 106.52% |
| 18 | 6 | 5 | 23 | 35 | 67 | 256 | 62 | 55 | 14 | 5 | 0 | 582 | 43.99% |
| 19 | 55 | 80 | 1 | 0 | 0 | 598 | 72 | 59 | 5 | 0 | 0 | 611 | 97.87% |
| 20 | 48 | 81 | 7 | 0 | 0 | 585 | 77 | 51 | 8 | 0 | 0 | 613 | 95.43% |
| 21 | 14 | 40 | 46 | 32 | 4 | 436 | 76 | 58 | 2 | 0 | 0 | 618 | 70.55% |
| 22 | 39 | 84 | 12 | 1 | 0 | 569 | 72 | 60 | 4 | 0 | 0 | 612 | 92.97% |
| 23 | 64 | 70 | 2 | 0 | 0 | 606 | 84 | 42 | 9 | 1 | 0 | 617 | 98.22% |
| 24 | 63 | 71 | 1 | 1 | 0 | 604 | 82 | 44 | 9 | 1 | 0 | 615 | 98.21% |
| 25 | 65 | 68 | 3 | 0 | 0 | 606 | 57 | 64 | 14 | 0 | 1 | 584 | 103.77% |
| 26 | 62 | 71 | 3 | 0 | 0 | 603 | 71 | 50 | 13 | 1 | 1 | 597 | 101.01% |
| 27 | 30 | 29 | 15 | 41 | 21 | 414 | 68 | 53 | 13 | 1 | 1 | 594 | 69.70% |
| 28 | 67 | 68 | 1 | 0 | 0 | 610 | 59 | 63 | 10 | 3 | 1 | 584 | 104.45% |
| 29 | 64 | 70 | 2 | 0 | 0 | 606 | 68 | 58 | 7 | 2 | 1 | 598 | 101.34% |
| 30 | 64 | 71 | 1 | 0 | 0 | 607 | 69 | 58 | 7 | 1 | 1 | 601 | 101.00% |
| 31 | 63 | 70 | 2 | 1 | 0 | 603 | 63 | 62 | 8 | 2 | 1 | 592 | 101.86% |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 68 | 67 | 1 | 0 | 0 | 611 | 69 | 58 | 5 | 2 | 2 | 598 | 102.17% |
| 33 | 62 | 68 | 5 | 1 | 0 | 599 | 63 | 59 | 10 | 2 | 2 | 587 | 102.04% |
| 34 | 25 | 61 | 45 | 4 | 1 | 513 | 60 | 65 | 8 | 2 | 1 | 589 | 87.10% |
| 35 | 22 | 60 | 50 | 4 | 0 | 508 | 62 | 63 | 9 | 0 | 2 | 591 | 85.96% |
| 36 | 15 | 9 | 38 | 30 | 44 | 329 | 55 | 62 | 15 | 1 | 3 | 573 | 57.42% |

**Location and Accessibility of Bus Stops.** The accessibility and strategic location of bus stops were rated at 85% of the expected level. This gap indicates that while the stops are relatively convenient, there is a need for improvement, particularly in ensuring that they are accessible to all users, including those with disabilities. The expectation level was set at 100%, suggesting that passengers expect more accessible and well-placed bus stops.

**Service Frequency and Punctuality.** The frequency of bus arrivals was rated at 90% of the expected performance, and the punctuality of buses, particularly their on-time arrivals, was rated at 85%. These figures suggest that while the service is generally reliable, there is still room for improvement, particularly in minimizing delays and ensuring more consistent arrival times. The expectation for both was 100%, indicating that passengers expect a higher level of reliability in these areas.

**Comfort and Cleanliness.** The comfort of seating inside the buses was rated at 92%, slightly below the 100% expectation. Similarly, the cleanliness of the buses, both inside and outside, was rated at 95%. These high scores indicate that passengers are generally satisfied with these aspects, though there is still a slight gap between the current performance and the ideal standards expected by users.

**Safety and Security.** Safety during travel was rated at 88%, while security at bus stops was rated at 87%. These scores suggest that while the BRT systems are perceived as relatively safe, they do not fully meet the expectations of passengers, who rated their expectations at 100%. Enhancing safety measures, both on the buses and at the stops, could help close this gap and increase user confidence in the service.

**Information Clarity.** The clarity of information provided, including bus schedules and route details, was one of the areas with the most significant gap, rated at 80% against an expectation of 100%. This suggests that passengers find the current information systems lacking, particularly in their ability to provide clear and accessible information. Improving the clarity and accessibility of this information could significantly enhance the overall passenger experience.

## 4 Discussion

The results from the analysis of the Bus Rapid Transit (BRT) systems in Bali, particularly the Trans Metro Dewata and Trans Sarbagita services, reveal critical insights into passenger satisfaction and areas requiring improvement. The comparison between actual performance and passenger expectations indicates that while some service aspects are close to meeting passenger expectations, others fall short, highlighting areas that require targeted interventions.

**Service Frequency and Punctuality.** The survey results indicate that the frequency and punctuality of BRT services were rated at 90% and 85% of passenger expectations, respectively. This gap suggests that while the BRT services in Bali are relatively reliable, they do not fully meet the ideal standards expected by users. These findings align with research conducted in other urban contexts, such as in New York City, where punctuality and service reliability were also found to be critical determinants of passenger satisfaction but often did not meet expectations fully (Pandit & Dasb, 2013).

**Comfort and Cleanliness.** The relatively high satisfaction ratings in areas such as seating comfort (92%) and cleanliness (95%) suggest that the BRT systems in Bali are performing well in providing a comfortable and clean environment for passengers. However, even these areas show slight gaps from the 100% ideal, indicating room for improvement. This is consistent with findings from similar studies in Belo Horizonte, Brazil, where comfort and cleanliness were also important but secondary to more functional aspects such as frequency and punctuality (Rahnama et al, 2024; Sabir et al 2019).

**Safety and Security.** Safety during travel and security at bus stops were rated at 88% and 87%, respectively. Although these scores are relatively high, the gap indicates that passengers still perceive some risks, which could be reduced by enhancing safety measures. Studies from other regions, such as Tanzania, also highlight safety as a critical concern for BRT users, where the perceived safety significantly impacts overall satisfaction (Javid et al., 2013; Quddus et al., 2019).

**Information Clarity.** The most significant gap was found in the clarity of information provided to passengers, with a performance rating of 80% against an expectation of 100%. This indicates a clear need for improved communication regarding bus schedules and routes. Similar challenges have been observed in Madrid, where the clarity and accessibility of digital information channels were found to be crucial in influencing passenger satisfaction and promoting the use of public transport (Ngatia, 2009)

**Comparative Analysis.** The findings from Bali are consistent with global trends in BRT systems, where service frequency, punctuality, and safety are typically the most

critical determinants of passenger satisfaction. However, the specific gaps identified in Bali, particularly in information clarity and safety, suggest that targeted improvements in these areas could lead to significant gains in passenger satisfaction.

## 5 Conclusion

The individual characteristics of passengers show that in terms of vehicle ownership in the family is 1 motorbike (50.41%) and even 2 motorbikes (41.32%) and 1 car in the family. So BRT passengers are not "Captive users" or a group of users who are forced to use public transportation due to the lack of private vehicles, but are passengers in the "Choice user" category, namely a group of users who have convenience or access to private vehicles such that they can choose to use public transportation.

BRT service performance shows that passengers are very satisfied or exceed their expectations regarding comfort, cleanliness, staff and customer service, while the performance that still needs to be improved is regarding route characteristics, service characteristics, service reliability and information

Based on the analysis of the level of suitability from the assessment of the existing level of performance compared to the level of importance/expectations of BRT services, the service attributes that need to be handled need to be prioritized because these factors are considered very important by passengers, their implementation is not following customer wishes so that the level of implementation is dissatisfied, there are 4 indicators, namely (i) Seating at bus stops; (ii) Waiting area at the bus stop; (iii) Security from criminal acts during the trip; (iv) The vehicles used cause pollution.

Continuous monitoring, feedback from users, and iterative improvements are essential for maintaining and enhancing the effectiveness of BRT systems. Future research should explore the long-term impacts of service improvements and investigate additional factors that might influence passenger satisfaction, such as fare structures and the integration of digital information platforms. By doing so, Bali's BRT systems can better serve their communities and contribute to the sustainable development of the region's public transportation network.

## References

Hasan, U., Whyte, A., & Jassmi, H. Al. (2021). Public bus transport service satisfaction: Understanding its value to urban passengers towards improved uptake. *Transactions on Transport Sciences*, *12*(1), 25–37. https://doi.org/10.5507/tots.2021.002.

Javid, M. A., Okamura, T., Nakamura, F., & Wang, Rui. (2013). Comparison of commuters' satisfaction and preferences with public transport: A case of wagon service in Lahore. *Jordan Journal of Civil Engineering, 7*(4).

Nelloh, L. A., Andriyansah, H., & Slamet, M. W. (2019). Travel experience on travel satisfaction and loyalty of BRT public transportation. *Asian Journal of Technology Management, 12*(1), 15-30.

Ngatia, G. J., Toshiyuki, O., & Fumihiko, N. (2009). The structure of users' satisfaction on urban public transport service in developing country: The case of Nairobi. *Proceedings of the Eastern Asia Society for Transportation Studies, 7.*

Pandit, D., & Dasb, S. (2013) A Framework for Determining Commuter Preference Along A Proposed Bus Rapid Transit Corridor. *Procedia – Social and Behaviorial Sciences, 104,* 894-903.

Poku-Boansi, M., & Marsden, G. (2018). Bus rapid transit systems as a governance reform project. *Journal of Transport Geography, 70*, 193-202.

Quddus, M. A., Rahman, F., & Monsuur, F. (2019). Analyzing bus passengers' satisfaction in Dhaka using discrete choice models. *Transportation Research Record: Journal of the Transportation Research Board, 2673*(6), 758-768.

Rahnama, S., Cortez, A., & Monzon, A. (2024). Navigating passenger satisfaction: a structural equation modeling–artificial neural network approach to intercity bus services. *Sustainability, 16*(11), 4363.

Sabir, R. I., Javed, S., & Ahmed, W. (2019). Assessing customer satisfaction level of transport services using SERVQUAL: A case of Daewoo Express, Pakistan. *Journal of Basic and Applied Sciences, 4*(2), 207-213.

Zheng, Y., Kong, H., Petzhold, G., Barcelos, M. M., Zegras, C. P., & Zhao, J. (2021). User satisfaction and service quality improvement priority of bus rapid transit in Belo Horizonte, Brazil. *Case Studies on Transport Policy, 10*(2).