

Scale Evaluation of the Trans Batam Passenger Information System Application (SIP TB) Using the System Usability Scale Method

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Abstract

This study aims to evaluate the Usability of the Trans Batam Passenger Information System (SIP TB) application using the System Usability Scale (SUS). The study involves 200 respondents who use the SIP TB application in Batam City. The quantitative method used includes questionnaire distribution and SUS scoring analysis. The results show that the average SUS score is 76, placing the application in the "Good" category and falling within the "Acceptable (High)" range. The Grade Scale also falls under category C. These results indicate that the application is generally usable, although there is room for improvement, particularly in user interface design and cross-platform availability.

Keywords: mobile app, SIP TB, SUS method, Usability

1. Introduction

Public services are basic rights of the community guaranteed in Law No. 25 of 2009. As public awareness of service quality increases, the government is required to provide responsive services, including in the transportation sector (Maysara & Asari, 2021). Batam City, as a national strategic area, also encourages strengthening public services, one of which is the Trans Batam City bus transportation system. To support residents' mobility, the Batam City Transportation Agency launched the Trans Batam Passenger Information System (SIP TB) application, which allows users to monitor bus positions in real time and access route information. Inspired by the TransSemarang and TransJakarta applications, this application is designed to make it easier for the public to access route information, bus locations, and ticket purchases digitally. Even so, the features and appearance of the SIP TB interface differ and are tailored to the needs of users in Batam City. (Khotimah, 2023)

This application is still limited to the Android platform and is not yet available for iOS, which is one of the obstacles in reaching all levels of users. To ensure a high-quality user experience, a usability evaluation is needed. The widely used method in this measurement is the System Usability Scale (SUS), which provides an overall score for effectiveness, efficiency, and user satisfaction (Huda et al., 2023). Based on the etymology, the word "evaluation" comes from English, namely "Evaluation," which is rooted in

the word "value," meaning value or price. In Arabic, the term "value" is called al-qiamah or al-taqdir, which means judgment (Idrus, 2019). According to Rubin & Chisnell in a 2008 study, "Usability is derived from English." "Usable" generally refers to the ability of an item or system to be used effectively and efficiently by users (Yuliyana et al., 2019).

This study aims to evaluate the level of Usability and user satisfaction with the SIP TB application using the System Usability Scale (SUS). The SUS method has been widely used effectively in various studies to assess the usability level of mobile applications, as evidenced by several previous studies (Sylvia, 2024). The analysis method involved providing 10 statements designed to measure users' perceptions of ease of use and satisfaction with the application. The final score is obtained through special calculations that produce the overall usability value (Purwati & Jemakmun, 2019).

This study offers several contributions. First, unlike previous studies that primarily evaluated the usability of commercial applications such as Shopee, Instagram, or educational platforms (Derisma, 2020; Huda et al., 2023), this research evaluates the usability of the Trans Batam Passenger Information System (SIP TB), which is the official digital public transportation application developed by the Batam City Government. To the best of the authors' knowledge, no previous study has systematically assessed the usability of SIP TB using the System Usability Scale (SUS). Second, this research contributes empirical evidence regarding user acceptance of a regional public transportation digital service in Batam, an area where usability

studies remain limited. Third, the findings provide practical recommendations for improving government-owned digital transportation services, particularly regarding interface design, navigation, and platform accessibility, thereby extending the application of usability evaluation in the context of Indonesian smart city initiatives.

2. Research Methodology

This research is quantitative, with Purposive Sampling used to select subjects. In this study, the researcher took 200 subjects using the formula Slovin as a research sample. The focus of this research is on users of the Trans Batam Passenger Information System (SIP TB) application who are 18 years old and older using the System Usability Scale. This study uses Microsoft Excel and SPSS ver 30 software.

Table 1 List of Questionnaire Statements

No.	Statement
1.	The SIP TB app is easy to use when you first try it.
2.	The SIP TB application is complicated to use.
3.	The information presented by the SIP TB application meets expectations.
4.	The SIP TB app slows down my work.
5.	Menurut saya, Aplikasi SIP TB memberikan The SIP TB App provides a pleasant experience, so users feel satisfied when using it to complete tasks.
6.	The navigation feature in the SIP TB app is difficult to remember.
7.	I think app users can quickly learn the features of the SIP TB app in just a few simple steps.
8.	I think the SIP TB application is difficult to understand and use, even for new users, and requires special guidance
9.	I am recommending the SIP TB app to others.
10.	The design of the SIP TB application is unattractive and boring.

Source: Processed author (2025)

Responses to each statement were given using a 5-point Likert scale, ranging from strongly agree to disagree strongly.

Table 2 Likert Scale

Answer	Score
Strongly Disagree	1
Disagree	2
Less Disagree	3
Agree	4

Strongly Agree

Data Analysis Techniques

In this study, there are several important stages that must be carried out to ensure the validity and consistency of the results, starting with a validity test that aims to evaluate the extent to which the instrument is able to accurately measure the construct in question, and continues with a reliability test to ensure that the instrument produces consistent and stable data. The data analysis technique used is by using the System Usability Scale (SUS), which is an assessment tool designed to provide a comprehensive overview of the usability aspects of a system, including the effectiveness, efficiency, and satisfaction of users based on their subjective experience during the use of the application or service being tested (Derisma, 2020).

The SUS rating uses a scale of 1 to 5, from "strongly disagree" to "strongly agree". The value for an odd statement is calculated with $n - 1$, while for an even statement of $5 - n$. The overall total score is multiplied by 2.5 to get the final score. This score is then interpreted through an adjective rating and acceptability range to assess the level of Usability and acceptance of the system by users (Huda & Maulana, 2023).

3. Results and Discussion

Description of Respondent Characteristics

The data obtained for this study was carried out by distributing questionnaires to 200 respondents from the Batam city community who used the Trans Batam Passenger Information System application using Google Form online. In Figure 1, the respondents consist of men and women. The number of male respondents was recorded as 52 people, or equivalent to 26%, while female respondents were more dominant with a total of 148 people, or 74% of the total respondents.



Figure 1 Graph of respondents by gender

Source: Processed Researcher (2025)

In Figure 2, respondents with an age range of 18–24

years are 98 respondents with a percentage (49%), 25-35 years old as many as 81 respondents (40%), 36-44 years old as many as 17 respondents (9%), and over 45 years old as many as 4 respondents (2%).



Figure 2 Respondent Chart by Age

Source: Processed Researcher (2025)

In Figure 3, the respondents with the last goal of using the SIP TB application for Work amounted to 88 respondents with a percentage (44%), School/College amounted to 60 respondents (30%), Shopping amounted to 30 respondents (15%) and Others amounted to 22 respondents (11%).



Figure 3 Respondent Chart by Travel Destination

Source: Processed Researcher (2025)

Test Research Instruments

Validity Test

This test evaluates the accuracy or authenticity of a research instrument. Instrument testing was carried out with a significance level of 5%. An item is considered valid if its correlation value is significant. In this study, 200 respondents were included. The r-value of the table for this study was calculated using $df = N - 2 = 200 - 2 = 198$ at a significance level of 5%, so that the r-value of the table was 0.138.

Table 3 Validity Test

Variable	Item	R Table	R count	Remarks
Usability	Q1	0,138	0,38	Valid
	Q2	0,138	0,57	Valid
Efficiency	Q3	0,138	0,27	Valid
	Q4	0,138	0,63	Valid
User	Q5	0,138	0,35	Valid

satisfaction	Q6	0,138	0,53	Valid
Ease of Learning	Q7	0,138	0,30	Valid
	Q8	0,138	0,66	Valid
	Q9	0,138	0,35	Valid
User Engagement	Q10	0,138	0,57	Valid

Source: Processed Researcher (2025)

Based on the table above, it can be concluded that the coefficient between variables is determined by comparing the value of r calculated and r of the table. An indicator is considered valid if the calculated r value is greater than the r of the table. Based on the results obtained, all indicators displayed meet the validity criteria so that the data obtained is declared valid and feasible for further analysis.

Reliability Test

The results of the reliability test showed that 10 questions had a Cronbach's Alpha value above 0.60 which indicates that the instrument used is reliable and trustworthy in measuring user perception of the SIP TB application. This value reflects the consistency of respondents' answers and shows that the instrument has good internal reliability in measuring aspects such as ease of use, satisfaction, effectiveness, and application design. The results of the reliability test can be seen in Table 4.

Table 4 Reliability Test Results

Cronbach Alpha	Question Items	Remarks
0,611	10	Reliable

Source: Processed Researcher (2025)

System Usability Scale Test



Figure 4 Preliminary Data on Respondent Assessment

Source: Processed Researcher (2025)

In Figure 4, the results of the initial respondent on the research instrument in the form of a questionnaire that has been given, after the respondent data is collected, the next step is to calculate the System Usability Scale (SUS) on the question with an odd number of scores for each question item subtracted by 1 so that it becomes $n - 1$. Meanwhile, on the question with an even number, the score is reduced by 5 so that it becomes $n - 5$. All the adjusted scores are then added up to get the total score. Furthermore, the SUS (System Usability Scale) value is calculated by multiplying the total score obtained by the number 2.5 and then dividing it by the number of respondents as many as 200. Results of System Usability Scale (SUS) Calculation in Table 5.

Table 5 System Usability Scale (SUS) Calculation Results

Value	Frequency									
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
0	3	5	3	7	3	4	2	5	1	5
1	5	19	5	14	5	24	5	18	7	15
2	10	17	22	20	15	18	16	21	10	22
3	94	123	97	101	109	92	101	103	92	104
4	88	36	73	58	68	62	76	53	90	54
0	3	5	3	7	3	4	2	5	1	5
1	5	19	5	14	5	24	5	18	7	15
2	10	17	22	20	15	18	16	21	10	22
3	94	123	97	101	109	92	101	103	92	104

Source: Processed Researcher (2025)



Figure 5 Calculation Results Using SUS

Source: Processed Researcher (2025)

$$\text{Mean SUS} = \frac{\text{Jumlah Seluruh skor SUS}}{\text{Jumlah Responden}} = \frac{15.348}{200} = 76,74$$

The average score or final score of SUS was 76.74. This final score is then used to determine the grade assessment by referring to the SUS score range which includes Acceptability Ranges, Grade Scale, and Adjective Rating.

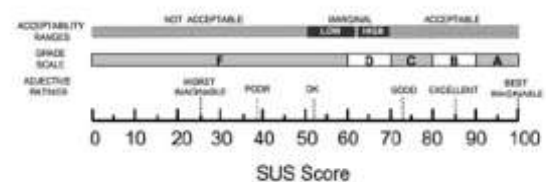


Figure 6 System Usability Scale Value Range

Source: Processed Researcher (2025)

The results of the system usability level assessment were obtained through the System Usability Scale (SUS) method for the Trans Batam Passenger Information System (SIP TB) application, which is 76.74. This assessment covers three aspects, namely Acceptability Ranges, Grade Scale, and Adjective Ratings, each of which provides an overview of how users perceive the quality and ease of use of the application. Acceptability Ranges indicate that a SIP TB application is in the Acceptable (High) category. This indicates that in general this application has met user expectations and is considered feasible and comfortable to use in the context of its use. In the Grade Scale aspect, the SIP TB application obtained a category C which illustrates that even though the application has worked well, there is still room for improvement in terms of design, performance, and ease of use. Meanwhile, in the Adjective Ratings aspect, the application is categorized in the "Good" level, which means that the majority of users give a positive assessment of their experience when using this application.

Compared with Derisma (2020), which evaluated an online learning platform, the usability score obtained in this study is relatively comparable, indicating that the SUS instrument consistently measures perceived usability across different application domains. However, unlike educational or e-commerce applications, SIP TB serves a public transportation function where users require quick access to route information and real-time bus tracking. Therefore, interface simplicity and navigation become more critical factors influencing user satisfaction.

Although the overall usability score is satisfactory, several usability issues remain. Respondents gave

relatively lower evaluations regarding navigation and interface attractiveness. These findings are consistent with Farrahi et al. (2019), who argued that interface complexity and unclear navigation significantly reduce users' efficiency and satisfaction when interacting with digital systems.

Another important finding is that younger respondents (18–24 years old) reported higher usability perceptions than older users. This result supports previous studies suggesting that younger users generally adapt more quickly to mobile technologies because of their higher digital literacy. Conversely, older users may require more intuitive navigation and clearer interface guidance.

Overall, the results indicate that while SIP TB has achieved acceptable usability, continuous improvements are required to increase accessibility for broader user groups and enhance user experience.

4. Conclusions

The findings from the System Usability Scale (SUS) evaluation indicate that users generally perceived the SIP TB application positively. Among the ten SUS statements, the application received the highest ratings for ease of use and users' willingness to recommend it to others, suggesting a high level of user trust and satisfaction with the application's integrated features. However, lower scores were observed in statements related to navigation and interface design. These results imply that some users, particularly first-time users, experience difficulty remembering certain features and perceive the application's visual design as less attractive and intuitive.

The demographic analysis further revealed differences in usability perceptions across user groups. Female respondents, who represented 74% of the participants, generally reported higher SUS scores than male respondents, indicating that the application's interface may better align with the preferences of female users. Respondents aged 18–24 years provided the highest usability ratings, suggesting that younger users adapt more easily to the application's interface and functionality. Additionally, users who primarily utilized the application for work or educational purposes expressed higher levels of satisfaction than those who used it for other activities, such as shopping. This may be attributed to their more frequent interaction with the application and greater familiarity with its features.

Overall, the results demonstrate that the SIP TB application effectively supports users in planning their trips through features such as Nearby Bus and AR Shelter while providing a satisfactory user experience. Nevertheless, improvements are still needed in navigation, interface design, and overall usability to

accommodate new users better and enhance the application's visual appeal.

Based on these findings, several improvements are recommended to enhance the overall usability of the SIP TB application. These include redesigning the user interface to create a more modern, intuitive experience; providing onboarding tutorials or user guides for first-time users; improving the application's response speed and overall performance; and expanding its availability on iOS to increase accessibility and reach a broader user base.

Implications

This study contributes to the growing body of literature on usability evaluation by demonstrating that the System Usability Scale (SUS) remains an effective instrument for evaluating government-owned public transportation applications. The findings support previous usability theories proposed by Brooke (1996) and Rubin & Chisnell (2008), indicating that perceived usability encompasses effectiveness, efficiency, and user satisfaction. Furthermore, this research extends usability literature into the context of regional smart transportation systems in Indonesia, where empirical studies remain relatively limited.

The findings provide useful insights for the Batam City Transportation Agency as the developer of SIP TB. Although the application has achieved acceptable usability, several improvements should be prioritized, including redesigning the user interface, simplifying navigation, improving application performance, and expanding platform compatibility to iOS users. These improvements may increase user satisfaction and encourage greater adoption of digital public transportation services.

Research Limitations

This study has several limitations. First, the respondents were limited to users in Batam City, limiting the generalizability of the findings to other regions. Second, usability was measured only using the System Usability Scale (SUS), which captures subjective user perceptions but does not directly measure task completion time or error rates. Third, this study employed a cross-sectional design; therefore, changes in user perceptions over time were not examined.

Future Research

Future studies are encouraged to combine SUS with other usability evaluation techniques such as the User Experience Questionnaire (UEQ), heuristic evaluation, or task-based usability testing to obtain a more comprehensive understanding of user experience. Future research may also compare SIP TB with similar transportation applications such as TransJakarta or Trans Semarang to identify best practices in digital

public transportation services.

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