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# Chi-Square Analysis of Digital Payment Systems and Passenger Satisfaction among BRT Metro Jabar Trans Users in the Bandung Urban Area

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**ABSTRACT**

Digital payment is an important component of the passenger experience in public transportation. This study examines passenger satisfaction with six characteristics of the Metro Jabar Trans (MJT) payment system in the Bandung Urban Area: ease of use, transaction speed, security, payment facility availability and accessibility, system reliability, and access convenience. A quantitative descriptive-associative approach was applied using questionnaire data collected through purposive sampling. Of 163 responses, 135 were retained after excluding respondents with unclear identities and those who had never used MJT. Descriptive statistics and cross-tabulation were used to summarize satisfaction distributions. Pearson's Chi-Square test and association measures were also calculated for the combined table of 810 item responses. Satisfaction was generally favorable, particularly for ease of use, transaction speed, security, and access convenience. System reliability and payment facility availability and accessibility received comparatively higher proportions of neutral and negative responses. The pooled analysis produced a Pearson Chi-Square statistic of 53.752 with 20 degrees of freedom and a conventional p-value below 0.001, alongside low association coefficients. However, each respondent contributed six ratings, and the analysis did not account for dependence between these responses. Statistical significance therefore remains unconfirmed by an analysis appropriate to the repeated-measures structure. The descriptive findings identify system reliability and payment facilities as priorities for further evaluation. Interpretation is limited by purposive sampling and the absence of reported empirical evidence of instrument validity and reliability. The study does not establish causal effects or associations with separately measured overall service satisfaction.

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## 1. Introduction

The development of mass public transportation is an important part of urban mobility policy in Indonesia, particularly in metropolitan areas with high population growth and increasing travel demand. In the Bandung Basin Metropolitan Area (BBMA), the growth of urban activities and continued dependence on private vehicles have contributed to problems such as traffic congestion, limited accessibility, and inefficient travel. To address these issues, the Government of Indonesia has developed an integrated mass transit system with support from international development partners. The Indonesia Mass Transit (MASTRAN) Project supports the development of Bus Rapid Transit (BRT) systems in selected metropolitan areas, including Bandung and Medan. The project is financed by the Government of Indonesia, the World Bank, the Agence Française de Développement (AFD), and the private sector, with total financing of approximately USD 364 million [1].

The investment in mass transit infrastructure in the Bandung Basin reflects the government's commitment to improving public transportation services. The Ministry of Transportation reported that the MASTRAN program has a total financing value of approximately IDR 3.8 trillion, including a USD 224 million loan from the World Bank, a USD 40 million loan from AFD, and government counterpart funding. Approximately IDR 1.3 trillion is allocated to BRT development in the Bandung Basin, covering dedicated bus lanes, bus stops, depots, Intelligent Transport Systems (ITS), and supporting infrastructure. The BRT system is expected to serve approximately 99,000 passengers per day and improve travel efficiency and access to employment opportunities [2]. These targets require not only adequate infrastructure but also services that are convenient and reliable for passengers.

The current BRT service in Bandung developed from the Teman Bus program introduced by the Ministry of Transportation under the Buy The Service (BTS) scheme. The Bandung service began

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operating as Trans Metro Pasundan in December 2021. It was later rebranded as Metro Jabar Trans (MJT) on December 31, 2024, and its management was transferred to the West Java Provincial Government. Metro Jabar Trans currently operates several corridors serving the Bandung Urban Area and is part of the broader development of mass transportation under the MASTRAN program. The development of MJT has therefore been accompanied by changes not only in its physical infrastructure but also in its service and payment systems.

Passenger satisfaction is an important consideration in the use and continued development of public transportation. The availability of routes and vehicles does not necessarily ensure that passengers will choose public transportation over private vehicles. Previous studies have found that service reliability, travel conditions, waiting time, and other service attributes are associated with passenger satisfaction [3, 4]. Research on BRT systems has also shown that service quality is closely related to passenger satisfaction and that satisfaction varies across different service attributes and passenger groups [5-7]. Improving the quality of passenger-facing services is therefore relevant to efforts to increase public transportation use.

Payment is one of the services directly experienced by passengers during a public transportation journey. A payment system that is difficult to use, slow, unreliable, or perceived as insecure may reduce the convenience of the travel experience. Digital and mobile payment systems have been introduced in public transportation to simplify fare transactions and improve transaction efficiency [8, 9]. Studies have reported that digital payment adoption is influenced by factors such as user characteristics, previous experience, access to digital technology, and perceived convenience [10, 11]. The characteristics of the payment system are therefore relevant to how passengers evaluate their experience with public transportation.

Metro Jabar Trans has adopted cashless payment as part of the digitalization of its service. The integration of Kartu Multi Trip (KMT) with Metro Jabar Trans provides passengers with an additional non-cash payment option and supports the integration of public transportation services. Other digital payment options, including QR-based payment, have also been introduced as part of the development of the MJT payment system [12]. These developments make the payment system an increasingly important component of the passenger experience. Its performance can be assessed through several characteristics, including ease of use, transaction speed, security, payment facility availability, system reliability, and access convenience.

The relationship between payment systems and user perceptions can be considered from the perspective of technology acceptance and service quality. The Technology Acceptance Model (TAM) identifies perceived usefulness and perceived ease of use as important factors in technology acceptance [13]. Service-quality studies, meanwhile, have shown that reliability, accessibility, and other service attributes contribute to passenger evaluations of public transportation [3-7]. Recent research has also examined the role of digital competence in passengers' perceptions of public transport service quality and satisfaction [14]. These studies provide a basis for examining payment-system characteristics as part of the passenger service experience.

Several recent studies have examined digital payment in public transportation. Wani et al. [10] investigated digital payment adoption in public transportation in developing cities, while Owusu-Agyemang et al. [11] examined the adoption and use of mobile fare payment among bus passengers. Other studies have focused on mobile ticketing, payment convenience, and the benefits of digital fare payment for passengers and operators [8, 9, 15]. In Indonesia, research has examined mobile payment adoption in Trans Jatim [16] and the intention to use QRIS among Metro Jabar Trans users [12]. Purnawan et al. [17] also examined the relationship between digital payment, accessibility, service quality, and passenger satisfaction. These studies indicate that digital payment has become an important topic in public transportation research.

Previous studies have examined digital payment adoption, behavioral intention, and passenger satisfaction in public transportation. In the Metro Jabar Trans context, research has also addressed passengers' intention to use QRIS [12]. However, these studies leave room for a more focused examination of passengers' satisfaction with the payment services they experience. In particular, the distribution of satisfaction across ease of use, transaction speed, security, payment facility availability and accessibility, system reliability, and access convenience requires further attention in the Bandung Urban Area. Understanding these distributions can help identify aspects of the payment system that passengers evaluate favorably and those that require improvement.

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This study contributes empirical evidence on passenger satisfaction with six characteristics of the Metro Jabar Trans payment system. Its contribution lies in combining a descriptive assessment of satisfaction across these characteristics with an exploratory examination of the association between payment-system indicators and satisfaction categories in a combined cross-tabulation. This focus complements research on payment adoption and intention to use by examining passengers' reported experience with the service. It also provides a basis for discussing specific payment-service improvements in the Metro Jabar Trans context.

Accordingly, this study aims to: (1) describe the distribution of passenger satisfaction across the six payment-system indicators; (2) examine the association between payment-system indicators and satisfaction categories, including its statistical significance and strength, within the combined analysis; and (3) identify payment-service aspects that warrant improvement based on the observed satisfaction distributions. A quantitative descriptive-associative approach is used, employing descriptive statistics, cross-tabulation, Pearson's Chi-Square test, and measures of association. The analysis is exploratory and does not establish causal relationships. The findings are intended to support the evaluation of digital payment services on Metro Jabar Trans.

## 2. Methods

### 2.1 Research Design and Study Area

This study employed a quantitative descriptive-associative design to examine the association between the payment system and passenger satisfaction among Metro Jabar Trans (MJT) users. The study did not examine a causal relationship between the variables. A survey method was used to collect passenger perceptions through a structured questionnaire.

As presented in **Figure 1**, the study covered eight Metro Jabar Trans routes in the Bandung Urban Area: Leuwipanjang–Soreang, Kota Baru Parahyangan–Alun-alun Bandung, BEC (Bandung Electronic Center)–Baleendah, Leuwipanjang–Dago, Dipatiukur–Jatinangor, Leuwipanjang–Majalaya, Feeder Simpang Soetta Kiaracondong–Pasar Baru, and Feeder Simpang Cicadas Kiaracondong–Plaza Telkom Rajawali. These routes were selected because they represent the MJT services included in the study area.

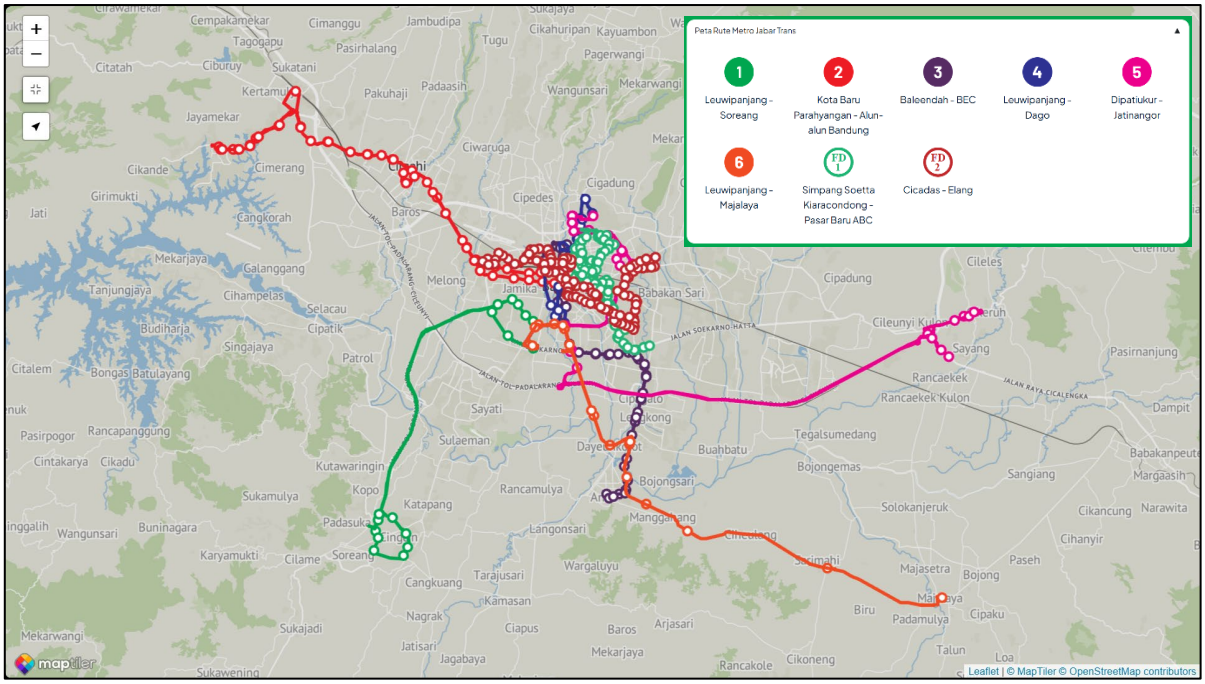



**Figure 1.** Metro Jabar Trans routes and route symbols. Source: Transport for Bandung.

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### 2.2 Data Collection and Sampling

Primary data were collected using a structured questionnaire distributed to Metro Jabar Trans passengers. The questionnaire was developed based on indicators related to technology acceptance and service quality, with particular attention to passengers' perceptions of the payment system and their satisfaction with the service.

The study population consisted of Metro Jabar Trans users. A non-probability purposive sampling technique was applied, with respondents required to have used the Metro Jabar Trans service. A total of 163 responses were initially collected. Four responses were excluded because the respondents' identities were unclear, while 24 responses were excluded because the respondents had never used Metro Jabar Trans. After data screening, 135 valid respondents remained for analysis.

The final sample consisted of 135 respondents, each of whom rated six payment-system indicators, yielding 810 item responses. The respondent was the sampling unit, whereas the combined cross-tabulation summarized responses across indicators. Accordingly, the 810 responses should not be interpreted as 810 independent respondents or independent observations. Responses to different indicators were obtained from the same individuals and may therefore be correlated. Percentages for each indicator were calculated using 135 respondents as the denominator.

### 2.3 Variables and Measurement

The cross-tabulation comprised six payment-system indicators and five ordered satisfaction categories. The indicators were ease of use, transaction speed, security, payment facility availability and accessibility, system reliability, and access convenience. Satisfaction responses were categorized as very dissatisfied, dissatisfied, neutral/don't know, satisfied, and very satisfied. The numerical codes assigned to the six indicators identified different payment characteristics and did not represent increasing levels of payment-system quality. The cross-tabulation therefore described satisfaction with each payment characteristic rather than a relationship between a separately measured payment-quality score and overall satisfaction with MJT services.

**Table 1.** Components of the satisfaction cross-tabulation

| Variable | Measurement level | Categories |
|---|---|---|
| Payment-system indicator | Nominal | 1. Ease of use;<br>2. Transaction speed;<br>3. Security;<br>4. Payment facility availability and accessibility;<br>5. System reliability;<br>6. Access convenience |
| Satisfaction response | Ordinal | 1. Very dissatisfied<br>2. Dissatisfied;<br>3. Neutral/don't know;<br>4. Satisfied;<br>5. Very satisfied |

The questionnaire indicators were informed by technology acceptance and service-quality concepts. However, empirical evidence of instrument validity and reliability is not reported in this study. The theoretical basis of the indicators should therefore not be interpreted as evidence that the questionnaire has been empirically validated. This limits the interpretation of the measures and should be considered when assessing the findings.

### 2.4 Data Analysis

The collected data were analyzed using descriptive statistics, cross-tabulation, and the Pearson Chi-Square test. Cross-tabulation was used to describe the distribution of passenger satisfaction across the six payment-system indicators. The frequency and percentage of each response category were calculated to identify the general pattern of passenger perceptions.

The percentage of responses in each category was calculated using:

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$$P = \frac{f}{N} \times 100\% \quad (1)$$

where $P$ is the percentage of responses, $f$ is the frequency of responses in a category, and $N$ is the total number of valid observations (N = 135).

The association between the payment system and passenger satisfaction was then examined using the Pearson Chi-Square test. The test compares the observed frequency in each cell of the cross-tabulation with the frequency expected under the assumption that the two variables are independent. The Pearson Chi-Square statistic was calculated using:

$$X^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad (2)$$

where $X^2$ is the Pearson Chi-Square statistic, $O_{ij}$ is the observed frequency in row $i$ and column $j$, and $E_{ij}$ is the expected frequency for the corresponding cell with N = 810 item responses. The expected frequency was calculated as:

$$E_{ij} = \frac{R_i C_j}{N} \quad (3)$$

where $R_i$ is the total frequency of row $i$, $C_j$ is the total frequency of column $j$, and $N$ is the total number of observations. The degrees of freedom for the Chi-Square test were determined by:

$$df = (r - 1)(c - 1) \quad (4)$$

where $r$ represents the number of rows and $c$ represents the number of columns. In this study, the cross-tabulation consisted of five passenger-satisfaction categories and six payment-system categories, resulting in:

$$df = (5 - 1)(6 - 1) = 20$$

The conventional Pearson Chi-Square calculation compared the observed distribution with the distribution expected under independence between indicator category and satisfaction category. However, because each respondent rated all six indicators, the pooled responses did not constitute independent observations. The resulting p-value is therefore reported as part of the original pooled analysis and is not used to make a hypothesis-testing decision.

The strength of the association was also considered using the directional measures obtained from the analysis, particularly Lambda, Goodman and Kruskal's tau, and the Uncertainty Coefficient. These measures were used to complement the Pearson Chi-Square result by indicating the extent to which the observed association provides information about the relationship between the variables.

Inspection of the expected frequencies in the combined 5 × 6 contingency table showed that six of the 30 cells (20.0%) had expected counts below five, with a minimum expected count of 1.667. No expected count was below one. These results describe the expected-frequency characteristics of the table but do not resolve the dependence arising from repeated responses by the same respondents. Consequently, the conventional Pearson Chi-Square p-value from the pooled table cannot be treated as valid evidence of statistical significance without accounting for this dependence.

### 2.5 Results and Discussion

The descriptive results show that passenger perceptions of the Metro Jabar Trans (MJT) payment system were generally positive across all six indicators as illustrated in **Figure 2**. For ease of use, 57 respondents (42.2%) reported being very satisfied and 68 respondents (50.4%) reported being satisfied. Only 10 respondents (7.4%) selected neutral/don't know or expressed dissatisfaction.

For transaction speed, 44 respondents (32.6%) were very satisfied and 73 respondents (54.1%) were satisfied. The proportion of neutral/don't know responses was 8.1%, while 5.2% of respondents reported dissatisfaction or strong dissatisfaction. The security indicator received similarly favorable responses. A total of 44 respondents (32.6%) were very satisfied and 76 respondents (56.3%) were

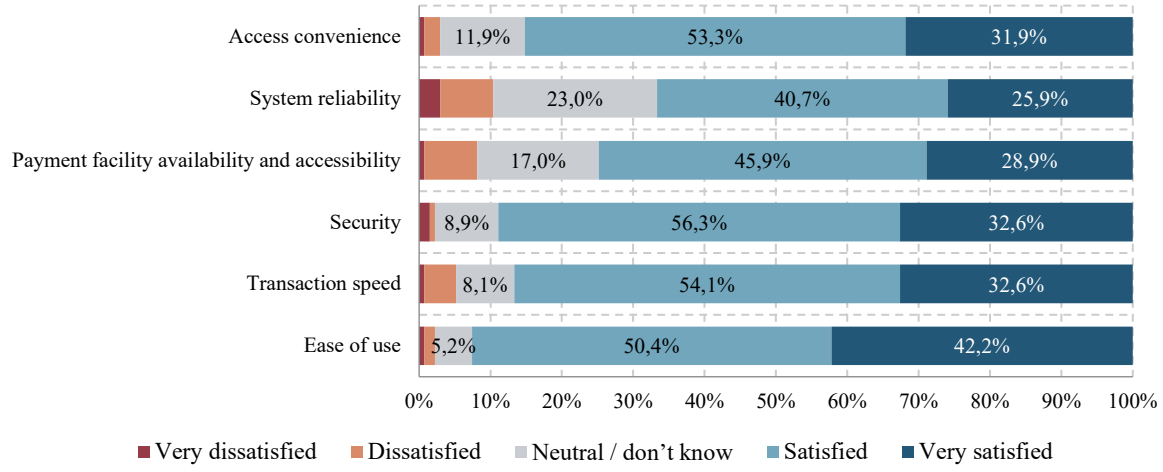
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satisfied. Neutral/don't know responses accounted for 8.9%, while only 2.2% of respondents expressed dissatisfaction or strong dissatisfaction.

For payment facility availability and accessibility, 39 respondents (28.9%) were very satisfied and 62 (45.9%) were satisfied. However, 23 respondents (17.0%) selected neutral/don't know, while 11 respondents (8.1%) reported dissatisfaction or strong dissatisfaction. Compared with the previous indicators, this result shows a relatively higher level of uncertainty and dissatisfaction. The lowest proportion of positive responses was observed for system reliability. Although 35 respondents (25.9%) were very satisfied and 55 (40.7%) were satisfied, 31 respondents (23.0%) selected neutral/don't know. In addition, 14 respondents (10.4%) reported being dissatisfied or very dissatisfied. This indicator therefore showed the greatest proportion of neutral and negative responses among the six payment-system characteristics.

For access convenience, 43 respondents (31.9%) were very satisfied and 72 (53.3%) were satisfied. Neutral/don't know responses accounted for 11.9%, while only 3.0% of respondents expressed dissatisfaction or strong dissatisfaction. Overall, the descriptive findings indicate that the MJT payment system was positively perceived by most respondents. The strongest responses were observed for ease of use, security, transaction speed, and access convenience. Meanwhile, payment facility availability and accessibility and system reliability showed comparatively less favorable distributions, particularly because of their higher neutral and negative response proportions.

**A. Distribution of satisfaction responses by payment indicator**




**B. Positive and non-positive responses by payment indicator**

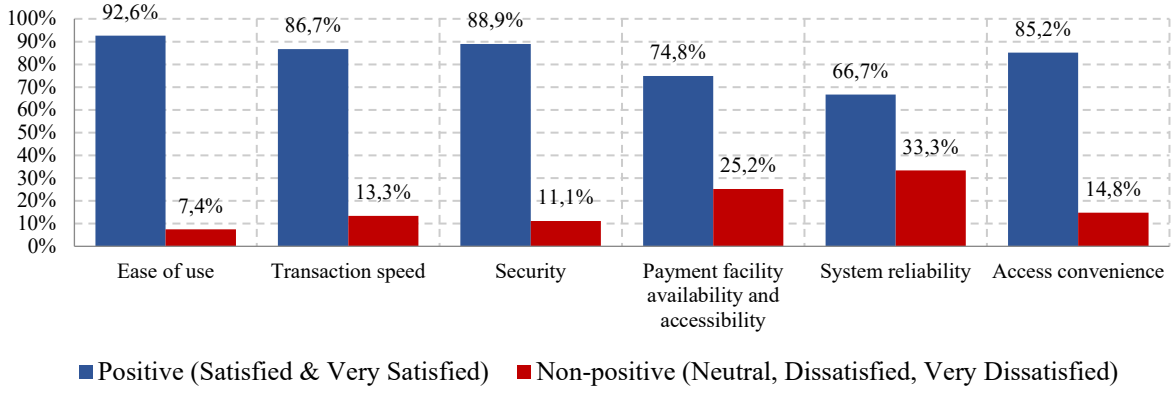



**Figure 2.** Passenger Perceptions of the Metro Jabar Trans Payment System

The combined response table produced a Pearson Chi-Square statistic of 53.752 with 20 degrees of freedom and a Likelihood Ratio statistic of 53.078 with 20 degrees of freedom. Both calculations yielded conventional p-values below 0.001 (**Table 2**). These p-values do not account for the repeated

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responses contributed by each respondent and are therefore not used to establish statistical significance. The association coefficients calculated from the pooled table are presented in **Table 3**.

**Table 2.** Pearson Chi-Square Test Results

| Test | Value | df | Conventional p-value |
|---|---|---|---|
| Pearson Chi-Square | 53.752 | 20 | <0.001 |
| Likelihood Ratio | 53.078 | 20 | <0.001 |

**Table 3.** Measures of Association

| Measure | Direction | Coefficient |
|---|---|---|
| Lambda | Symmetric | 0.040 |
| Lambda | Satisfaction dependent | 0.000 |
| Lambda | Indicator dependent | 0.064 |
| Goodman and Kruskal's tau | Satisfaction dependent | 0.016 |
| Goodman and Kruskal's tau | Indicator dependent | 0.013 |
| Uncertainty Coefficient | Symmetric | 0.022 |
| Uncertainty Coefficient | Satisfaction dependent | 0.028 |
| Uncertainty Coefficient | Indicator dependent | 0.018 |

The descriptive findings show that passengers generally evaluated the MJT payment system favorably, although satisfaction varied across the six indicators. Ease of use received the highest combined proportion of satisfied and very satisfied responses, followed by security, transaction speed, and access convenience. The favorable assessment of ease of use is consistent with the emphasis placed on perceived ease of use in the Technology Acceptance Model. However, the present study describes satisfaction with the payment experience and does not directly test technology acceptance or intention to use. It therefore complements studies of digital payment adoption and QRIS usage intention among MJT passengers by examining how passengers evaluate payment services they have experienced.

Transaction speed, security, and access convenience also received predominantly positive assessments. These findings suggest that most respondents were satisfied with the speed of payment, felt positively about its security, and considered access convenient. Such assessments are relevant to research on ticketing convenience and mobile fare payment. Nevertheless, the responses represent passenger perceptions rather than direct measurements of transaction duration, technical security, or accessibility across routes. The practical implication is to maintain these positively assessed aspects while examining the needs of passengers who reported less favorable experiences.

Payment facility availability and accessibility received less favorable assessments than ease of use, transaction speed, security, and access convenience. Although 101 of the 135 respondents were satisfied or very satisfied, 23 selected neutral/don't know and 11 expressed dissatisfaction. This distribution identifies payment facilities as an area requiring closer evaluation. The combined neutral/don't know category should not be interpreted as dissatisfaction because it may also reflect uncertainty or an inability to assess the facilities. Operators could use these findings to guide further examination of facility availability, ease of locating and using payment facilities, and the clarity of payment information. The questionnaire results do not establish which of these operational issues accounts for the observed responses.

System reliability received the least favorable satisfaction distribution. A total of 90 respondents were satisfied or very satisfied, while 31 selected neutral/don't know and 14 were dissatisfied or very dissatisfied. Compared with the other indicators, this pattern makes reliability a particular concern for service evaluation. The relevance of reliability is consistent with its role in public transport service-quality research, although payment-system reliability is a narrower aspect of service than overall operational reliability. Further investigation could examine transaction failures, device availability, and procedures for handling payment interruptions. These are potential areas for operational assessment, rather than problems directly demonstrated by the questionnaire data.

The combined table produced a Pearson Chi-Square statistic of 53.752 with 20 degrees of freedom and a conventional p-value below 0.001. However, the table pools six responses from each of the same 135 respondents, so its observations are not independent. The reported p-value therefore does not provide a sufficient basis for concluding that a statistically significant association has been established.

The low symmetric Lambda (0.040), Goodman and Kruskal's tau (0.016 and 0.013), and symmetric Uncertainty Coefficient (0.022) describe limited predictive information within the pooled table. These coefficients do not establish how much payment quality contributes to overall passenger satisfaction, because the table records satisfaction categories across payment indicators rather than two separately measured constructs.

Taken together, the descriptive findings support attention to system reliability and payment facility availability and accessibility while maintaining the favorable assessments of ease of use, transaction speed, security, and access convenience. This interpretation complements research examining digital payment, accessibility, service quality, and passenger satisfaction, while remaining limited to the payment characteristics measured in this study. The findings identify areas for further evaluation; they do not demonstrate that changing a particular payment characteristic will cause an increase in overall satisfaction with MJT.

## 3. Conclusion

This study examined passenger satisfaction across six characteristics of the Metro Jabar Trans digital payment system. Among the 135 respondents, satisfaction was generally favorable, particularly for ease of use, transaction speed, security, and access convenience. System reliability and payment facility availability and accessibility received comparatively higher proportions of neutral and negative responses. These descriptive findings identify the two latter aspects as priorities for further service evaluation while supporting the maintenance of aspects that passengers assessed favorably.

The combined cross-tabulation showed variation in satisfaction distributions across payment indicators, and the reported association coefficients indicated limited predictive information within the pooled table. However, each respondent contributed six responses, and the conventional Pearson Chi-Square analysis did not account for dependence between these responses. Consequently, the reported p-value cannot establish a statistically significant association without an analysis that accounts for this dependence. The findings also do not establish causal effects or a relationship with overall satisfaction with MJT services, which was not separately represented in the cross-tabulation.

The findings provide a descriptive basis for reviewing payment-system reliability and the availability and accessibility of payment facilities. Their interpretation is limited by purposive sampling, the dependence between repeated responses, and the absence of reported empirical evidence of instrument validity and reliability. The results should therefore be understood as assessments from the surveyed passengers rather than estimates representative of all MJT users. Further analysis should retain respondent-level records, account for repeated measurements, and establish the validity and reliability of the measures before drawing stronger inferential conclusions.

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## References

[1] W. Bank, "Indonesia Mass Transit (MASTRAN) Project," World Bank. [Online]. Available: https://www.worldbank.org/

[2] K. P. R. Indonesia, "Program MASTRAN dan Pengembangan Bus Rapid Transit di Bandung Basin," Kementerian Perhubungan Republik Indonesia. [Online]. Available: https://hubdat.dephub.go.id/

[3] Jaime Soza-Parra, Sebastián Raveau, Juan Carlos Muñoz, and Oded Cats, "The underlying effect of public transport reliability on users' satisfaction," *Transp. Res. Part A Policy Pract.*, vol. 126, pp. 83–93, 2019, https://doi.org/10.1016/j.tra.2019.06.004.

[4] E. Lunke, "Commuters' satisfaction with public transport," *J. Transp. Health*, vol. 16, p. 100842, 2020, https://doi.org/10.1016/j.jth.2020.100842.

[5] Susan Pike, "Open-loop payment preferences in public transit: Exploring alternatives to cash for unbanked riders," *Transp. Res. Interdiscip. Perspect.*, vol. 34, p. 101652, 2025, https://doi.org/10.1016/j.trip.2025.101652.

[6] H. Singh and A. Kathuria, "Heterogeneity in passenger satisfaction of bus rapid transit system among age and gender groups: A PLS-SEM Multi-group analysis," *Transp. Policy (Oxf).*, vol. 141, pp. 27–41, 2023, https://doi.org/https://doi.org/10.1016/j.tranpol.2023.07.009.

[7] M. A. Saleem, H. Afzal, F. Ahmad, H. Ismail, and N. Nguyen, "An exploration and importance-performance analysis of bus rapid transit systems' service quality attributes: Evidence from an emerging economy," *Transp. Policy (Oxf).*, vol. 141, pp. 1–13, 2023, https://doi.org/https://doi.org/10.1016/j.tranpol.2023.07.010.

[8] B. Bartin, "Evaluation framework for mobile ticketing applications in public transit: a case study," *IET Intelligent Transport Systems*, 2018, https://doi.org/10.1049/iet-its.2018.5248.

[9] D. Zalar, R. Ušpalytė-Vitkūnienė, D. Rebolj, and M. Lep, "A methodological framework for measuring the level of convenience of transport ticketing systems," *Transport*, vol. 33, no. 4, pp. 1005–1016, 2018, https://doi.org/10.3846/16484142.2017.1300783.

[10] S. A. Wani, A. Pani, R. Mohan, and B. Bhowmik, "Digital payment adoption in public transportation: Mediating role of mode choice segments in developing cities," *Transp. Res. Part A Policy Pract.*, vol. 191, p. 104319, 2025, https://doi.org/10.1016/j.tra.2024.104319.

[11] S. Owusu-Agyemang, R. A. Simons, M. Henning, and M. Marshall, "Transit made Easy: Examining the adoption and impact of mobile fare payment technology among bus riders," *Transp. Res. Interdiscip. Perspect.*, vol. 25, p. 101086, 2024, https://doi.org/10.1016/j.trip.2024.101086.

[12] F. R. Gienansa, H. A. Pradesa, A. S. Harahap, and F. A. T. Andikaputra, "Determinants of Intention to Use QRIS Payment System for Metro Jabar Trans Service Users," *MBA: Journal of Management and Business Application*, vol. 8, no. 2, pp. 84–92, 2025, https://doi.org/10.31967/mba.v8i2.1843.

[13] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, 1989, https://doi.org/10.2307/249008.

[14] J. Nilsson, J. Jansson, K. Nicholas, and C. Zhao, "Traveler perceived service quality and satisfaction with public transport: The influence of digital competence and environmental attitudes," *Transp. Policy (Oxf).*, vol. 172, p. 103741, 2025, https://doi.org/10.1016/j.tranpol.2025.07.022.

[15] C. Brakewood, "An evaluation of the benefits of mobile fare payment technology from the user and operator perspectives," *Transp. Policy (Oxf).*, vol. 93, pp. 54–66, 2020, https://doi.org/10.1016/j.tranpol.2020.04.015.

[16] R. Kharismawan, E. Pramana, and Y. Kristian, "Factors Influencing Mobile Payment Adoption Utilizing Extended UTAUT with a Case Study: Public Transportation Trans Jatim Buses," *Jurnal Teknologi dan Manajemen Informatika*, vol. 11, no. 1, 2025, https://doi.org/10.26905/jtmi.v11i1.15649.

[17] S. O. Purnawan, S. Hermawan, R. A. Sukmono, Z. K. A. Baharul Ulum, and T. T. Y. Alabdullah, "The Impact of Digital Payment and Accessibility on Passenger Satisfaction with Service Quality as an Intervening Variable," *Jurnal Organisasi dan Manajemen*, vol. 21, no. 1, pp. 116–132, 2025, https://doi.org/10.33830/jom.v21i1.9958.2025.