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Digital Transformation in Cashless Payment-Based Public Transportation Policy

(Service Quality Evaluation of Suroboyo Bus in Surabaya City)

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Abstract. Digital transformation in the public transportation sector is part of the national development priority agenda aimed at improving service quality and operational efficiency. This study aims to analyze the implementation of cashless payment-based digital transformation in public transportation policy on the Suroboyo Bus in Surabaya, analyze service quality based on SERVQUAL dimensions, identify supporting and inhibiting factors for implementation, and evaluate the success and shortcomings of the policy. This research uses a qualitative approach with a descriptive research type. The results show that the implementation of cashless payment on the Suroboyo Bus has been running well since 2018, with four main payment methods: QRIS, e-money cards, plastic waste contributions, and the Child Identity Card (KIA). QRIS has become the dominant payment method with a 48% share in 2025. Service quality based on SERVQUAL dimensions shows good results in the aspects of tangibles, reliability, and responsiveness, but still requires improvement in the dimensions of assurance and empathy. Supporting factors for implementation include government commitment, the availability of regulations (Perwali No. 22 of 2023)., adequate infrastructure, and support from digital payment service providers. Inhibiting factors include limited digital literacy, internet network disruptions, limited economic access, and lack of socialization. The success of the policy is reflected in increased operational efficiency, financial transparency, and a rise in the number of users from 1.2 million (2019). to 3.5 million (2025). Shortcomings of the policy include the digital gap for vulnerable groups, dependence on internet networks, and a decrease in participation in the plastic waste payment program from 25% (2023). to 12% (2025).

Keywords: Cashless Payments; Digital Transformation; Public Transport; Quality Of Service; Suroboyo Bus.

1. INTRODUCTION

The development of digital technology has brought fundamental changes to various aspects of global society life, including the public transportation sector. The Industrial Revolution 4.0 drives the transformation of conventional transportation systems toward more modern, efficient, and digitally integrated systems. According to the World Economic Forum report (2020). cited in research by (Alviyah & Rodiyah, 2024). more than 70% of countries worldwide have adopted digital technology in their public transportation systems as an effort to improve service quality and operational efficiency. Digital transformation in the transportation sector not only encompasses fleet modernization but also includes digitalization of payment systems, smart traffic management, and Internet of Things (IoT).-based data integration (Budijaya & Situmeang, 2025).

The cashless payment system is one of the most significant forms of digital transformation in the public transportation sector. The implementation of cashless payment has proven effective in increasing transaction time efficiency, reducing revenue leakage, and

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providing convenience for transportation service users (Juniarti & Merdiani, 2025). Developed countries such as Singapore with the EZ-Link system, Japan with the Suica Card, and South Korea with T-Money have previously implemented integrated payment systems that can be used across transportation modes (Saputra & Savitri, 2020). The successful implementation of cashless payment in various countries serves as an important reference for developing countries, including Indonesia, in modernizing their public transportation systems.

Indonesia, as a developing country with a population of more than 270 million people, faces major challenges in providing quality public transportation systems. The Indonesian government through the Ministry of Transportation has established a digital transformation policy for transportation as part of the national priority agenda (Susilawati et al., 2023). Minister of Transportation Regulation Number PM 15 of 2019 concerning the Operation of Passenger Transportation with Public Motor Vehicles on Routes mandates the acceleration of digitalization of public transportation services throughout Indonesia. Additionally, Bank Indonesia Regulation Number 21/18/PBI/2019 concerning the Implementation of National Quick Response Code Standards for Payments encourages the adoption of QRIS payment systems in various sectors, including public transportation. The implementation of this policy includes the application of electronic payment systems, fleet monitoring applications, and digital-based passenger information systems.

According to research by (Kristyowati, 2024). urabaya City as the second-largest metropolitan city in Indonesia has a strategic role in implementing digital-based public transportation policies. The Surabaya City Government through the Department of Transportation launched Suroboyo Bus in 2018 as one of the leading public transportation modes adopting modern payment systems. Suroboyo Bus is managed by the Technical Implementation Unit (UPTD). for Public Transportation Management at the Surabaya City Department of Transportation and operates in several strategic corridors carrying an environmentally friendly and technology-based concept. The legal basis for Suroboyo Bus operations is regulated in Surabaya Mayor Regulation Number 60 of 2016 concerning Position, Organizational Structure, Description of Duties and Functions, and Working Procedures of the Surabaya City Department of Transportation, which grants authority to the transportation sector to develop route networks and determine urban transportation vehicle needs.

As a form of public transportation policy innovation, the Surabaya City Government issued Surabaya Mayor Regulation Number 67 of 2018 concerning Waste Contributions in Using Surabaya Bus Services. This policy introduces a unique plastic-to-ride payment program using plastic bottle waste as an effort to reduce the impact of plastic waste in Surabaya while

providing an alternative payment method for the community (Wahyudi et al., 2025). This policy was later refined through Surabaya Mayor Regulation Number 22 of 2023 concerning Tariffs and Waste Contributions in Using Regional Public Service Agency Services of the Technical Implementation Unit for Public Transportation Management at the Surabaya City Department of Transportation, which replaced Mayor Regulation Number 56 of 2021 concerning Surabaya Bus Service Tariffs.

The implementation of the cashless payment system on Suroboyo Bus in Surabaya City has adopted various integrated non-cash payment methods. First, payment can be made through QRIS by scanning QR codes using various e-wallet applications such as GoPay, OVO, DANA, ShopeePay, and LinkAja, as well as banking applications that support QRIS features. The QRIS payment system on Suroboyo Bus has been implemented since September 2021 (Natika, 2024). Second, users can utilize electronic money (e-money). cards from various banks, including Mandiri e-Money, Brizzi (BRI)., TapCash (BNI)., and Flazz (BCA). through the Tap on Bus (TOB). system similar to toll road payment mechanisms. Third, there is a payment option through plastic bottle waste contributions that can be exchanged for vouchers or points through the Gobis application. Fourth, for Child Identity Card (KIA). holders, payment can be made through balance top-ups on the Katepay application or exchanging plastic bottles for KIA vouchers. Suroboyo Bus service fares are set at Rp5,000 for general passengers and Rp2,500 for students.

Based on data from the Surabaya City Department of Transportation (2023)., the number of Suroboyo Bus users has increased significantly from 1.2 million passengers in 2019 to 2.8 million passengers in 2022. This increase in the number of users indicates a positive community response to digital-based public transportation services. However, the increase in user quantity does not necessarily correlate with the quality of service felt by the community as service users. Public service quality is a crucial aspect that must be considered in every transportation policy implementation. Zeithaml, Parasuraman, and Berry (1990). in research by (Sinollah & Masruro, 2019). suggested that service quality can be measured through five main dimensions: tangibles (physical evidence)., reliability, responsiveness, assurance, and empathy. In the context of implementing cashless payment on Suroboyo Bus, these five dimensions need to be comprehensively evaluated to determine the extent to which digital transformation contributes to improving public transportation service quality.

Although the implementation of cashless payment on Suroboyo Bus has been running for several years, there are various problems that still need serious attention. Based on initial observations and reviews of various sources, several obstacles were found in implementing the

non-cash payment system, including: (1). limited supporting infrastructure such as card tap machines that sometimes experience technical disruptions; (2). digital literacy gaps in society, especially among the elderly who are not familiar with electronic payment technology; (3). limited access to electronic payment cards for people with lower-middle economic levels; and (4). minimal socialization regarding the mechanism for using the cashless payment system. Evaluation of the implementation of digital transformation policies in public transportation systems is very important to identify existing successes and shortcomings. The evaluation results can serve as a basis for the government to make improvements and develop public transportation policies that are more responsive to community needs. Additionally, evaluation of cashless payment-based service quality can also contribute to the development of the smart city concept being promoted by the Surabaya City Government.

Based on the above background, this research intends to study in depth the digital transformation in cashless payment-based public transportation policy with a focus on evaluating the service quality of Suroboyo Bus in Surabaya City. This research is expected to provide a comprehensive picture of the implementation of the non-cash payment system and its implications for the quality of service received by Suroboyo Bus users.

2. LITERATURE REVIEW

Public Service Quality

Service quality is a fundamental concept in public administration related to meeting community needs and expectations. According to Parasuraman, Zeithaml, and Berry (1988). in research by (Bahri et al., 2020; Dwi Prayogo, 2019; Mulyono, 2024; Sinollah & Masruro, 2019; Steven Alim & Ibrahim, 2024). service quality is the result of comparing user expectations with perceptions of the performance of services received. The SERVQUAL theory they developed identifies five main dimensions for measuring service quality: tangibles (physical evidence). which includes the appearance of facilities and equipment, reliability which refers to the ability to provide services accurately and consistently, responsiveness related to the willingness to help users quickly, assurance which includes competence and the ability to build trust especially regarding transaction security, and empathy which refers to individual attention to specific user needs. In the context of cashless payment-based public transportation such as Suroboyo Bus, these five dimensions become important indicators in measuring service quality, from the availability of digital payment devices, reliability of electronic transaction systems, speed of complaint handling, security assurance of user data, to ease of access for all segments of society including the elderly and people with low digital literacy.

Public Policy Evaluation

Policy evaluation is a crucial stage in the public policy cycle to assess the achievement of set objectives. According to Dunn (2003). in (Riisyie Rantung, 2024). evaluating policy is an analytical procedure that produces information about the value or benefits of a series of actions that have been or will be carried out, not only producing conclusions about the extent to which problems are resolved but also providing criticism of the values underlying the policy. In research by (Fitri Meutia, 2017; Meutia, 2019; Munandar et al., 2023; Parabawati et al., 2020; Riisyie Rantung, 2024; Situmorang, 2020; Subianto, 2020). William N. Dunn developed a comprehensive evaluation framework with six main mutually complementary criteria: effectiveness related to achieving expected results or objectives, efficiency measuring the comparison between effort or cost and achieved results, adequacy assessing the extent to which results can solve existing problems, equity ensuring the distribution of costs and benefits evenly to various community groups, responsiveness measuring the policy's ability to satisfy the needs and preferences of certain community groups, and appropriateness questioning whether policy results are truly useful and valuable to society (Richad Rendra Mulya Maulana Pratama et al., 2024). In the context of cashless payment policy on Suroboyo Bus, these six criteria become important instruments to measure the success of digital transformation in improving public transportation service quality, from achieving system modernization goals, operational cost efficiency, adequacy of available payment methods, fair access for all user segments including vulnerable groups such as the elderly and low-income people, responsiveness to user complaints, to the appropriateness of solutions according to the socio-economic conditions of Surabaya society.

3. METHOD

This research uses a qualitative approach to analyze digital transformation in cashless payment-based public transportation policy through service quality evaluation of Suroboyo Bus in Surabaya City. This approach was chosen to understand how the implementation of non-cash payment systems affects service quality based on five SERVQUAL dimensions (tangibles, reliability, responsiveness, assurance, and empathy). and to evaluate the policy using William N. Dunn's criteria (effectiveness, efficiency, adequacy, equity, responsiveness, and appropriateness). Data was collected through in-depth interviews with managers from the Surabaya City Department of Transportation, Suroboyo Bus operators, and service users from various community segments, supplemented by direct observation of payment transaction processes and electronic device conditions, as well as document analysis including Law

Number 25 of 2009 concerning Public Services, smart city policies, and Suroboyo Bus user statistics. The collected data was analyzed using the Miles and Huberman interactive model which includes data reduction, data presentation, and conclusion drawing to provide deep understanding of service quality and supporting and inhibiting factors for the success of public transportation digital transformation in Surabaya City.

4. RESULTS AND DISCUSSION

Implementation of Cashless Payment-Based Digital Transformation on Suroboyo Bus

The implementation of the cashless payment system on Suroboyo Bus in Surabaya City is an integral part of the digital transformation policy for public transportation initiated by the Surabaya City Government. Based on research results, the implementation of cashless payment on Suroboyo Bus has been running since 2018 and continues to develop until now. The non-cash payment system implemented includes four main methods: (1). payment through QRIS using e-wallet applications; (2). payment using electronic money (e-money). cards; (3). payment through plastic bottle waste contributions; and (4). payment using Child Identity Cards (KIA).

The digital transformation policy on Suroboyo Bus is based on Surabaya Mayor Regulation Number 67 of 2018 which was later updated through Surabaya Mayor Regulation Number 22 of 2023 concerning Tariffs and Waste Contributions in Using Surabaya Bus Services. This regulation provides a clear legal basis for implementing the non-cash payment system while regulating alternative payment mechanisms through plastic waste contributions. The existence of clear regulations becomes an important foundation in ensuring the sustainability and legitimacy of the cashless payment program on Suroboyo Bus. An interview with the Head of UPTD Public Transportation Management of the Surabaya City Department of Transportation revealed that:

"The implementation of cashless payment on Suroboyo Bus is the Surabaya City Government's commitment to realizing a smart city. This system not only facilitates users but also increases transparency and accountability in financial management. Transaction data is recorded in real-time, minimizing the potential for revenue leakage." (Mr. Agus Widodo, S.T., M.T., Head of UPTD Public Transportation Management, Surabaya City Department of Transportation, January 2026).

Based on Mr. Agus Widodo's statement, it can be concluded that the implementation of cashless payment on Suroboyo Bus has two interrelated strategic objectives. First, from a public service perspective, the non-cash payment system is intended to provide ease and

convenience for users in making payment transactions. Second, from a financial governance perspective, this system is designed to increase transparency and accountability through digital and real-time transaction recording, thereby minimizing the potential for irregularities or revenue leakage.

The implementation of cashless payment is supported by adequate infrastructure in every Suroboyo Bus fleet. Each bus is equipped with electronic card reader devices for the Tap on Bus (TOB). system and QR codes for payment through QRIS. The TOB devices used have been certified by Bank Indonesia and are integrated with the national banking system, ensuring the security and validity of every transaction made. Based on data obtained from the Surabaya City Department of Transportation, the composition of payment method usage on Suroboyo Bus can be seen in Table 1 below:

Table 1. Composition of Payment Methods on Suroboyo Bus 2023-2025.

No	Payment Method	Percentage 2023	Percentage 2024	Percentage 2025
1	QRIS (GoPay, OVO, DANA, etc.).	35%	42%	48%
2	E-Money Cards (Mandiri, BRI, BNI, BCA).	28%	30%	32%
3	Plastic Waste Contribution	25%	18%	12%
4	Child Identity Card (KIA).	12%	10%	8%
	Total	100%	100%	100%

Source: Data processed from Surabaya City Department of Transportation (2025).

As shown in Table 1, there is a shift in payment method preferences from year to year. Payment through QRIS shows a consistent increasing trend from 35% in 2023 to 48% in 2025. Conversely, payment through plastic waste contributions experienced a significant decrease from 25% to 12% in the same period. This phenomenon indicates that Surabaya City residents are increasingly accustomed to smartphone-based digital payment systems, along with increasing penetration of e-wallet application usage among urban communities.

Suroboyo Bus Service Quality Based on SERVQUAL Dimensions

Tangibles Dimension (Physical Evidence)

Evaluation of the tangibles dimension shows that Suroboyo Bus has adequate digital payment infrastructure. Each bus fleet is equipped with at least two electronic card reader units placed at the front and middle entrance doors. Additionally, QR codes for QRIS payment are posted in locations easily visible to passengers. The physical condition of payment devices is generally well-maintained, although some units show wear due to high usage intensity. Field observations show that 85% of electronic card reader devices function well, while the other

15% experience minor disruptions such as slow response or unclear screens. One Suroboyo Bus user expressed their opinion:

"The card tap machine is already good, quick response. But sometimes during rush hours, the queue is long because there are only two machines. Maybe more could be added to speed up the process." (Mrs. Ratna Dewi, 32 years old, Private Employee, Suroboyo Bus User, January 2026).

Based on Mrs. Ratna Dewi's statement, it can be concluded that in terms of physical evidence, the digital payment infrastructure on Suroboyo Bus has functioned well, but device capacity still needs to be increased to accommodate passenger volume during rush hours.

Reliability Dimension

The reliability of the cashless payment system on Suroboyo Bus is generally rated well by most users. The electronic payment system can process transactions accurately and consistently. E-money card balance deductions and payments through QRIS run according to established tariffs, namely Rp5,000 for general passengers and Rp2,500 for students. However, there are reliability issues that need attention. Based on interviews with Suroboyo Bus operational staff:

"Sometimes the system experiences disruptions, especially when the internet network is unstable. QRIS payment is most often affected because it requires real-time internet connection. When this happens, passengers who don't have e-money cards become confused." (Mr. Hendra Prasetyo, 45 years old, Operational Staff Suroboyo Bus Rajawali-Kenjeran Corridor, January 2026).

Based on Mr. Hendra Prasetyo's statement, it can be concluded that the reliability of the digital payment system heavily depends on internet network stability. Connectivity disruptions can hinder transaction processes and cause discomfort for passengers. Internet connectivity problems become the main challenge in maintaining digital payment system reliability, especially in areas with weak signals or when network disruptions occur from telecommunication service providers.

Responsiveness Dimension

Service responsiveness in the context of cashless payment systems can be seen from transaction process speed and staff ability to handle problems. Research results show that the average transaction time using e-money cards is 2-3 seconds per transaction, while payment through QRIS requires 8-15 seconds depending on internet network speed and passenger readiness in scanning QR codes. Bus staff show alertness in helping users experiencing payment difficulties. One user stated:

"The staff is friendly and willing to help. When I first rode, didn't understand how to tap the card, was immediately helped by the staff. Was also told that I could use GoPay." (Ms. Anisa Putri, 24 years old, Student at Airlangga University, Suroboyo Bus User, January 2026).

Based on Ms. Anisa Putri's statement, it can be concluded that Suroboyo Bus staff have good responsiveness in helping users experiencing difficulties. Staff's proactive attitude in providing information about various payment methods shows commitment to service quality.

Assurance Dimension

Security assurance in digital payment systems is an important aspect affecting user trust. Research results indicate that Suroboyo Bus users generally feel safe using the cashless payment system. Transaction security is guaranteed through encryption systems on e-money cards and security protocols on QRIS payment applications. The Head of UPTD Public Transportation Management explained:

"Transaction security is our priority. The TOB system used has been certified by Bank Indonesia. Transaction data is encrypted and stored on a secure server. There is no recording of passenger personal data except transaction data." (Mr. Agus Widodo, S.T., M.T., Head of UPTD Public Transportation Management, Surabaya City Department of Transportation, January 2026).

Based on Mr. Agus Widodo's statement, it can be concluded that Suroboyo Bus management has provided security assurance for the digital payment system through certification from authorized authorities and implementation of data encryption technology. Nevertheless, there is still a small portion of users, especially from the elderly, who feel less confident about digital payment security due to limited understanding of technology.

Empathy Dimension

The empathy dimension relates to attention to specific needs of various user groups. Research results show that Suroboyo Bus has attempted to accommodate the needs of various user segments through providing diverse payment methods. The availability of payment options through plastic waste contributions provides an alternative for people who do not have e-money cards or smartphones. However, there are still challenges in the empathy aspect, particularly for users from the elderly and people with low digital literacy. One user from the elderly stated:

"I'm sometimes confused using this card. Where to tap, how much balance is left, how to top up. Young people might find it easy, but for older people like me it's quite difficult." (Mr. Suyanto, 67 years old, Retired Civil Servant, Suroboyo Bus User, January 2026).

Based on Mr. Suyanto's statement, it can be concluded that elderly user groups require special attention in terms of assistance and education regarding digital payment system usage. This obstacle shows the need for increased socialization and assistance efforts for user groups vulnerable to experiencing digital divide.

Policy Evaluation Based on William N. Dunn's Criteria

Effectiveness

The cashless payment-based digital transformation policy on Suroboyo Bus can be considered quite effective in achieving set objectives. Based on obtained data, there was an increase in the number of Suroboyo Bus users from 1.2 million passengers in 2019 to 3.5 million passengers in 2025. Transaction time efficiency also increased significantly compared to conventional cash payment systems.

Efficiency

From the efficiency aspect, the implementation of the cashless payment system has a positive impact on operational management. The absence of cash transactions eliminates the need to manage change and reduces the risk of revenue loss. The financial reconciliation process becomes faster and more accurate because all transactions are recorded digitally.

Adequacy

The availability of four non-cash payment methods shows efforts to meet the needs of various user segments. However, the adequacy criterion has not been fully met for community groups who do not have access to e-money cards or smartphones, although the plastic waste payment option is available as an alternative.

Equity

The equity or fairness aspect becomes a challenge in implementing this policy. There is potential for access gaps between technology-literate community groups and groups with digital literacy or economic access limitations. Community digital literacy and age factors become the most influential factors on users' ability to adopt non-cash payment systems. The Surabaya City Government has attempted to overcome this equity challenge through providing various alternative payment methods and socialization programs to the community.

Responsiveness

The cashless payment policy on Suroboyo Bus is considered quite responsive to user needs. This is demonstrated by continuous development of the payment system, addition of new payment methods (such as integration with more e-wallet applications)., and response to user complaints channeled through various communication channels.

Appropriateness

From the appropriateness aspect, the cashless payment-based digital transformation policy is considered appropriate to the context of Surabaya City development which carries the smart city vision. This policy is aligned with national policy directions regarding digitalization of public services and supports efforts to reduce the cash-based economy (cashless society).

Supporting and Inhibiting Factors

Based on research results, supporting and inhibiting factors in implementing the cashless payment system on Suroboyo Bus can be identified as presented in Table 2 below:

Table 2. Supporting and Inhibiting Factors for Cashless Payment Implementation on Suroboyo Bus.

No	Supporting Factors	Inhibiting Factors
1	Strong commitment from Surabaya City Government in realizing smart city	Limited digital literacy in some communities, especially the elderly
2	Availability of clear regulations (Perwali No. 22 of 2023).	Internet network disruptions affecting QRIS system
3	Adequate digital payment infrastructure	Limited economic access to e-money cards and smartphones
4	Support from various digital payment service providers	Minimal socialization to vulnerable community groups
5	Increased smartphone and e-wallet application penetration	Resistance to change from some users accustomed to cash systems
6	Innovation in plastic waste payment program	Limited number of payment devices during rush hours

As presented in Table 2, supporting factors for cashless payment implementation are dominated by policy and infrastructure aspects that have been well-prepared by the government. Meanwhile, inhibiting factors come more from socio-economic aspects of diverse user communities and technical challenges in system operationalization.

Evaluation of Policy Success and Shortcomings

a) Policy Success

The implementation of cashless payment-based digital transformation policy on Suroboyo Bus in Surabaya City has shown various successes that can be identified through field research results. The first most visible success is increased operational efficiency in passenger service processes. Before implementing the non-cash payment system, the passenger boarding process required relatively long time because staff had to receive cash, count it, and give change. This condition often caused long queues at bus entrance doors, especially during rush hours. After cashless payment implementation, the payment process became faster because passengers only need to tap e-money cards or scan QR codes within seconds. Based

on field observations, the average transaction time using e-money cards only requires 2 to 3 seconds, while payment through QRIS requires 8 to 15 seconds. This time efficiency has a positive impact on bus operational smoothness and passenger comfort.

The second success is increased transparency and accountability in Suroboyo Bus financial management. The digital payment system allows all transactions to be automatically recorded in an integrated information system. Every transaction made by passengers is directly recorded in the database with complete information including transaction time, payment method, and tariff amount. The Head of Finance Division of the Surabaya City Department of Transportation stated:

"Before the cashless system, revenue recording was done manually and was prone to errors or manipulation. Now with the digital system, all transactions are recorded in real-time and can be audited anytime. The accuracy level of financial reporting has increased significantly and the potential for revenue leakage can be minimized." (Mrs. Dra. Sri Wahyuni, M.M., Head of Finance Division, Surabaya City Department of Transportation, January 2026).

Based on Mrs. Sri Wahyuni's statement, it can be concluded that the cashless payment system has made a positive contribution to better financial governance. This increased transparency and accountability also facilitates the budget planning process and periodic financial performance evaluation.

The third success is a significant increase in the number of Suroboyo Bus users. Data from the Surabaya City Department of Transportation shows that the number of passengers increased from 1.2 million passengers in 2019 to 2.8 million passengers in 2022, and continued to increase to 3.5 million passengers in 2025. This increase in user numbers indicates that Surabaya City residents gave a positive response to public transportation services that have been modernized with digital payment systems. Ease of payment has become one of the factors encouraging people to switch to using public transportation.

The fourth success is the presence of environmentally friendly payment innovation through the plastic waste contribution program. The plastic-to-ride program initiated by the Surabaya City Government is a unique innovation not found in public transportation systems in other cities in Indonesia. Through this program, the community can exchange used plastic bottles for travel vouchers through the Gobis application. Although there has been a decrease in the percentage of users of this payment method in recent years, the existence of the program remains an added value that differentiates Suroboyo Bus from other public transportation modes. This program also contributes to plastic waste reduction efforts in Surabaya City.

The fifth success is the contribution of cashless payment policy to achieving Surabaya's vision as a smart city. The application of digital payment technology in public transportation is one of the success indicators in developing a smart city based on information technology. The integration of the Suroboyo Bus payment system with various national e-wallet platforms such as GoPay, OVO, DANA, ShopeePay, and LinkAja shows that Surabaya City has succeeded in building an integrated digital ecosystem in the public transportation sector.

Policy Shortcomings

Although the implementation of cashless payment policy on Suroboyo Bus has shown various successes, research results also identified several shortcomings that need serious attention from the government and management. The first most fundamental shortcoming is the occurrence of digital divide in access to non-cash payment systems. Some communities, especially the elderly and economically weak groups, experience difficulties in adopting and using digital payment technology. An interview with one user from the elderly revealed:

"Young people nowadays are used to cell phones and those applications, but for older people like me it's very difficult. I don't have a good smartphone, don't know how to use QRIS, and to buy an e-money card also have to go to a minimarket or bank. Sometimes I become reluctant to ride Suroboyo Bus because it's troublesome with the payment." (Mrs. Sumiati, 63 years old, Housewife, Suroboyo Bus User, January 2026).

Based on Mrs. Sumiati's statement, it can be concluded that the cashless payment policy has indirectly created access barriers for certain community groups. This digital gap potentially reduces the inclusivity of public transportation services that should be accessible to all levels of society without exception. This condition contradicts the principle of equity in public policy evaluation as suggested by William N. Dunn.

The second shortcoming is the high dependence of the payment system on internet network stability. Payment through QRIS requires a stable internet connection to process transactions in real-time. When network disruptions occur, either from the user side or from the telecommunication service provider side, the payment process through QRIS cannot be completed. This condition causes discomfort for passengers who do not have alternative payment methods such as e-money cards. A Suroboyo Bus operational staff shared their experience:

"There was an incident when the internet network was down for almost an hour. Passengers who only relied on QRIS couldn't pay. We were forced to record manually and ask passengers to make payment on the next trip. Situations like this are quite troublesome and

disappoint passengers." (Mr. Bambang Setiawan, 38 years old, Operational Staff Suroboyo Bus Purabaya-Tanjung Perak Corridor, January 2026).

Based on Mr. Bambang Setiawan's statement, it can be concluded that dependence on internet network infrastructure becomes a vulnerability point in the digital payment system. A backup mechanism or alternative solution is needed to anticipate situations when network disruptions occur so that service continuity is maintained.

The third shortcoming is the still limited scope of socialization and education programs to the community. Although the Surabaya City Government has conducted socialization regarding the cashless payment system on Suroboyo Bus, the program has not reached all levels of society evenly. The socialization conducted tends to be passive through social media and official websites, making it ineffective in reaching community groups with limited access to digital media. Elderly community groups, people with low education levels, and communities in suburban areas are often not exposed to information about non-cash payment system usage mechanisms.

The fourth shortcoming is limited payment infrastructure capacity during rush hours. Each Suroboyo Bus fleet is only equipped with two electronic card reader units placed at the front and middle doors. During rush hours such as morning during work commute and afternoon during return commute, the number of passengers boarding the bus simultaneously is very large. This condition causes long queues at bus entrance doors due to limited number of payment devices. Long waiting times to make payment impact bus departure schedule delays and passenger discomfort.

The fifth shortcoming is the decline in community participation in the plastic waste payment program. Based on obtained data, the percentage of users of the plastic waste payment method experienced a significant decrease from 25% in 2023 to only 12% in 2025. This decline is caused by several factors, including: increased ease of access to e-wallet applications and e-money cards, lack of continuous promotion of the plastic-to-ride program, and limited locations for exchanging plastic waste for travel vouchers. The decline in participation in this program is very unfortunate considering the plastic waste payment program is a flagship innovation that differentiates Suroboyo Bus from other public transportation while supporting environmental conservation programs.

5. CONCLUSION

The implementation of cashless payment-based digital transformation on Suroboyo Bus in Surabaya City has been running well since 2018, with QRIS as the dominant method in

2025. Service quality shows good results in the dimensions of tangibles, reliability, and responsiveness, but requires improvement in assurance and empathy, especially for vulnerable groups. Supporting factors include government commitment, regulations, infrastructure, and digital payment service support, while inhibiting factors include limited digital literacy, network disruptions, economic access, and socialization. Policy evaluation shows increased efficiency and transparency, but there is a digital gap and decreased participation in the plastic waste program. Recommendations for the government are to increase socialization of the cashless payment system, Suroboyo Bus management needs to add device capacity and provide backup mechanisms for network disruptions, and revitalize the plastic waste program. Future research should focus on measuring user satisfaction and comparative analysis with other cities.

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