

Analysis of Perceptions, Ease of Use, and Barriers in The Use of Qris Digital Payment by Conventional Taxi Drivers at Hang Nadim International Airport Batam

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Abstract

This study aims to analyze the effect of perceptions, ease of use, and barriers on the use of QRIS by conventional taxi drivers at Hang Nadim International Airport, Batam. This research employs a quantitative approach by distributing questionnaires to 161 respondents and analyzing the data using multiple linear regression. The results of the F-test indicate that perceptions, ease of use, and barriers simultaneously have a significant effect on QRIS usage. However, based on the partial t-test, only ease of use has a significant individual effect, while perceptions and barriers do not. These findings indicate that ease of use is the dominant factor in encouraging QRIS adoption, while perceptions and barriers require further attention to enhance technology adoption. This research provides practical implications for transportation managers, government, and payment service providers to strengthen education, technical support, and supporting infrastructure in implementing digital payment systems in the transportation sector.

Keywords: QRIS, perceptions, ease of use, barriers, taxi drivers, digital payment

1. Introduction

The evolution of Indonesia's digital economy has been accompanied by the growing prevalence of electronic payment systems, which encompass e-money products, mobile banking facilities, and digital wallet services provided by a wide range of financial institutions and payment operators. This condition has led to various digital payment methods and codes being used in daily transactions by both businesses and (*Quick Response Code Indonesian Standard (QRIS)*, n.d.-a). Along with this development, QR code-based payments have also grown rapidly. However, before the existence of a national standard, each payment service provider had its own different QR code, requiring merchants to provide more than one QR code to serve various payment applications. This situation was considered inefficient and potentially hindered the wider adoption of digital payments (*Quick Response Code Indonesian Standard (QRIS)*, n.d.-a).

To address this issue, Bank Indonesia launched the Quick Response Code Indonesian Standard (QRIS)

on January 1, 2020, to establish a unified national framework for QR code payment transactions. QRIS was designed to unify various QR codes from different payment service providers into a single standard, allowing one QR code to be used to receive payments from multiple digital payment applications (*Quick Response Code Indonesian Standard (QRIS)*, n.d.-b). The implementation of QRIS aims to create a more efficient, secure, and inclusive payment system, as well as to encourage the digitalization of payments across various sectors, from MSMEs to service sectors such as retail and transportation (*Quick Response Code Indonesian Standard (QRIS)*, n.d.-b).

Several previous studies have highlighted the impact of QRIS usage on transaction activities and user performance. Research by Pangestika et al. (2025) found that perceptions have a positive and significant effect on the effectiveness of QRIS usage. This finding indicates that when users have a good understanding and positive perceptions of QRIS, their tendency to use digital payment systems increases. Pangestika et al. (2025) also concluded

that ease of use is a driving factor for QRIS adoption across various sectors. However, Arvitra & Hasibuan (2025) found that ease of use does not significantly affect the decision to use QRIS. This is driven by the dependence of QRIS on internet signal, which is considered a barrier to its use (Muhammad et al., 2024)

The inconsistency of these findings is reflected in the phenomenon of QRIS implementation among conventional taxi drivers at Hang Nadim Airport, Batam. Unlike the successful implementation of QRIS in Trans Batam (Bani, 2020), the adoption of QRIS among conventional taxi drivers at Hang Nadim Airport still faces various barriers. Although banks had offered QRIS adoption in 2023 with approval from the BP Batam Cooperative, some drivers refused to use QRIS due to lack of trust, previous negative experiences, and considerations that were perceived as more beneficial to certain parties. In 2024, there was further development through a collaboration between PT Blue Bird Tbk and PT Bank Negara Indonesia (BNI) in implementing QRIS in Blue Bird taxi fleets (Ramli & Ika, 2024). This initiative aims to improve customer convenience and accelerate the digital transformation of payment systems in the transportation sector.

Given the differences in QRIS adoption across sectors, this study aims to understand perceptions, ease of use, and barriers faced by conventional taxi drivers at Hang Nadim Airport, Batam. In addition, this research will evaluate the effectiveness of QRIS usage in 2025 in supporting Bank Indonesia's digital payment transformation. From a practical perspective, this study can provide recommendations for airport management, taxi service providers, and government agencies to enhance QRIS adoption among taxi drivers. From an academic perspective, this study contributes to the literature on technology adoption in the transportation sector. This research has limitations, as it focuses only on taxi drivers at Hang Nadim Airport, Batam, and examines QRIS usage without comparing it to other digital payment methods. The analysis is conducted within a specific period and focuses on aspects of perceptions, ease of use, and barriers in QRIS adoption.

2. Theoretical Review

The development of digital payment systems in Indonesia is characterized by the increasing use of non-cash payment instruments such as electronic money, mobile banking, and digital wallets, which has encouraged the need for an integrated payment standard to ensure transactions can be conducted efficiently and securely. In an effort to harmonize

QR payment practices, Bank Indonesia implemented the Quick Response Code Indonesian Standard (QRIS) on January 1, 2020, providing a single standardized platform for digital payment transactions. QRIS is designed to unify various QR codes from different payment service providers into a single standard, allowing one QR code to be used to receive payments from multiple digital payment applications. Its implementation is expected to improve transaction efficiency, expand financial inclusion, and support digitalization across various sectors, including the transportation service sector. In explaining the acceptance of QRIS usage, this study refers to the Technology Acceptance Model (TAM) proposed by Davis (1989), which states that technology acceptance is influenced by perceived usefulness and perceived ease of use that shape behavioral intention and drive actual system use. Therefore, user perception of QRIS becomes an important factor in explaining the use of this digital payment system.

User perception is a cognitive process in which individuals receive, interpret, and give meaning to a technology based on their experience and information obtained. Perception reflects general views, level of understanding, and user assessment of a system. In the context of QRIS, user perception is not limited to perceived benefits but also includes understanding of QRIS functions, its suitability for transaction needs, and assessment of system reliability. Research by Pangestika et al. (2025) shows that user perception significantly influences the intention to use QRIS among micro, small, and medium enterprises. However, other studies present different findings. Some research suggests that certain aspects of perception, such as perceived benefits, do not always have a significant effect on the decision to use QRIS, indicating that the influence of perception is contextual and affected by user characteristics and the usage environment (Arvitra & Hasibuan, 2025).

In the Technology Acceptance Model, perceived ease of use represents the belief that interacting with a system requires little effort from the user (Davis, 1989). The ease of use of QRIS is reflected in its simple transaction process, transaction speed, and ease of understanding the usage flow. However, research by Muchtar et al. (2024) indicates that perceived ease of use was found to influence QRIS among MSMEs. This is because ease of use has been considered a minimum standard by users, making it no longer a distinguishing factor in decision-making. Furthermore, the use of QRIS faces several barriers such as network limitations, technical application issues, limited digital literacy, and previous negative experiences (Muhammad et al., 2024). These barriers cause users to not consistently perceive QRIS as easy to use. Nevertheless, research

by Pangestika et al. (2025) found that security as a form of usage barrier does not significantly affect the decision to use QRIS, suggesting that for certain user groups, security is no longer a primary consideration in digital payment usage.

Based on theoretical review and previous studies, it can be concluded that user perception plays a key role in shaping intention and actual use of QRIS. Ease of use is part of the perception formation but does not always become a determining factor in all contexts. Meanwhile, usage barriers emerge as contextual factors that may weaken the influence of perception and ease of use on QRIS adoption. Therefore, this study positions perceptions, ease of use, and barriers as independent variables that are expected to influence QRIS usage, both partially and simultaneously, in the context of conventional taxi drivers at Hang Nadim International Airport, Batam.

3. Hypothesis

The hypotheses of this study were formulated by considering the theoretical framework and evidence from prior studies:

H1: Perceptions was found to influence QRIS by conventional taxi drivers at Hang Nadim International Airport, Batam.

Pangestika et al. (2025) found that user perception has a positive and significant effect on the effectiveness and intention to use QRIS among MSMEs. Davis (1989), in the Technology Acceptance Model (TAM), explains that user perception (perceived usefulness) influences the intention and actual use of technology, although Arvitra & Hasibuan (2025) found that perception (particularly perceived usefulness/ease) does not have a significant effect on the decision to use QRIS.

H2: Ease of use was found to influence QRIS by conventional taxi drivers at Hang Nadim International Airport, Batam.

Pangestika et al. (2025) stated that the ease of use of QRIS is a driving factor for QRIS adoption. Davis (1989) in TAM theory explains that ease of use influences the acceptance and use of technology. However, research by Muchtar et al. (2024) shows that the ease of use of QRIS does not have a significant effect on the intention to use QRIS among MSMEs.

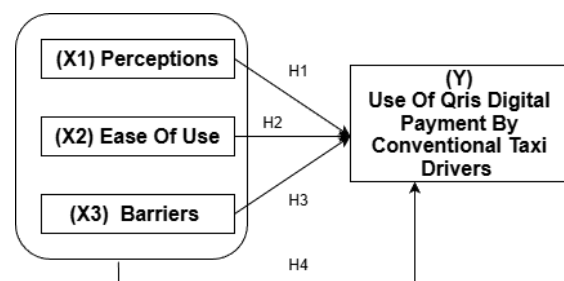
H3: Barriers was found to influence QRIS by conventional taxi drivers at Hang Nadim International Airport, Batam.

Muhammad et al. (2024) indicate that dependence on internet signals is a barrier to the use of QRIS. This finding is consistent with Arvitra & Hasibuan (2025) who argue that external conditions continue to influence users' decisions to adopt QRIS. However, research by Pangestika et al. (2025) shows that security as a form of usage barrier was not found to influence QRIS usage. This finding suggests that for certain user groups, security is no longer a primary consideration in the use of digital payment systems.

H4: Perceptions, ease of use, and barriers simultaneously was found to influence QRIS by conventional taxi drivers at Hang Nadim International Airport, Batam.

Technology adoption models (TAM and its variants) position several psychological and technical factors as jointly influencing technology use. The use of QRIS is not determined by a single factor but by a combination of perceptions, ease of use, and barriers.

By understanding the influence of perceptions, ease of use, and barriers, this study aims to provide strategic recommendations to improve QRIS adoption among taxi drivers at Hang Nadim International Airport, Batam. Figure 1 presents the conceptual framework of this study.



Flowchart 1: Conceptual Framework

Source: Processed by the Author, 2025

4. Research method

This study adopts a quantitative approach to analyze perceptions, ease of use, barriers, and the use of qris among taxi drivers at hang nadim international airport. Data were collected through a 5-point likert scale questionnaire as well as documentation studies from secondary sources.

The study population comprised 267 taxi drivers, from which a sample of 161 respondents was selected using the Slovin formula with a 5 percent margin of error. A random sampling technique was applied in selecting respondents to ensure objective representation. the formula used for sample determination is as follows.

$$n = \frac{N}{1 + N \cdot e^2} \quad (1)$$

$$n = \frac{267}{1 + 267 \times (0.05)^2} = 160.13 \quad (2)$$

Data analysis was conducted through several stages:

1. Descriptive analysis, to describe the characteristics of respondents and response tendencies.
2. Validity and reliability testing, using Corrected Item-Total Correlation, where items are considered valid if r is greater than r table, and Cronbach's Alpha, where the instrument is considered reliable if alpha is greater than 0.7.
3. Classical assumption tests, including normality, multicollinearity, and heteroscedasticity tests to ensure that the regression model meets statistical assumptions.
4. F test and T test, to examine the overall significance of the model and the significance of each independent variable.
5. Evaluation of the level of QRIS usage, through descriptive statistical analysis to observe the tendency of QRIS usage among taxi drivers at Hang Nadim Airport.

This research was conducted from November 2024 to February 2025 at Hang Nadim International Airport, focusing on the evaluation of QRIS implementation as a digital payment method.

5. Results and Discussion

Based on the respondent characteristics chart, the majority of respondents in this study were over 50 years old, had completed elementary school as their highest level of education, and had more than 10 years of working experience. This can be seen in the figure 2.

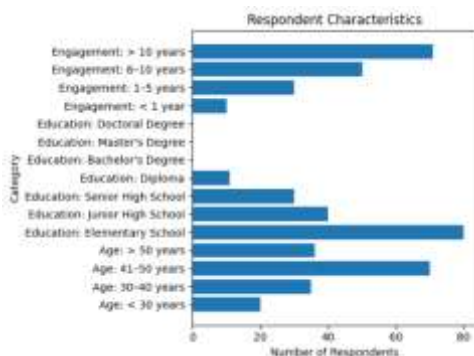


Figure 2: Respondent Characteristics

In the perspective of the TAM (Davis, 1989), age and level of education can influence the acceptance of new technology, where older users with lower educational backgrounds tend to be slower in adopting digital technology such as QRIS. However, long work experience can help drivers understand transaction needs in the field, so they still have the potential to accept new technology if it is perceived as useful and easy to use.

Descriptive Analysis

The results of the descriptive analysis show that the perception of QRIS is relatively positive with an average score of 15.01, and the ease of use is also considered high with an average score of 14.92. This finding is in line with TAM, which states that perceived usefulness and perceived ease of use are the main determinants in technology acceptance (Davis, 1989).

However, the presence of barriers with an average score of 15.12 indicates that contextual factors, particularly limited network connectivity and technical support, continue to influence the experience of using QRIS, consistent with the findings of Muhammad et al. (2024). This explains why the level of QRIS usage, with an average score of 15.27, is not yet optimal, even though perceptions and ease of use are relatively good. These findings suggest that technology adoption is shaped not only by users' perceptions but also by external facilitating conditions within the usage (Arvitra & Hasibuan, 2025).

Frequency Analysis

The high frequency of scores 4 and 5 on the statements "QRIS is easy to understand" and "Transactions using QRIS are fast" reflects the strength of perceived ease of use and perceived usefulness in the TAM, which play a role in shaping a positive attitude toward QRIS usage (Davis, 1989). However, the presence of low scores on indicators related to network signal and technical support indicates that external facilitating conditions continue to influence the user experience, consistent with the findings of Muhammad et al. (2024). This explains why ease of use alone is not sufficient to ensure optimal usage, as contextual barriers can weaken technology adoption (Arvitra & Hasibuan, 2025). This can be seen in Chart 2.

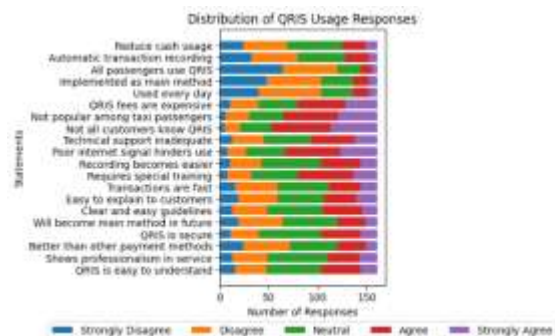


Figure 3: Respondent Characteristics

Source: Processed by the Author, 2025

Validity Test

The validity of all indicators shows that the research instrument is able to accurately capture user perceptions of QRIS because it has a correlation value greater than 0.5 and significance less than 0.05. This proves that all items are declared valid to measure the intended constructs. This is relevant to the concept of perception as a cognitive process in interpreting information based on experience and received stimuli (Asrori, 2020). Thus, the questionnaire items have represented the dimensions of perceptions, ease of use, and barriers in accordance with the constructs in the TAM (Davis, 1989). This can be seen in Table 1:

TABLE 1
VALIDITY TEST

Indicator Code	Correlation Value	Significance
X1.1	0.807	0
X1.2	0.877	0
X1.3	0.819	0
X1.4	0.885	0
X1.5	0.895	0
X2.1	0.880	0
X2.2	0.916	0
X2.3	0.875	0
X2.4	0.430	0.018
X3.1	0.643	0
X3.2	0.597	0
X3.3	0.846	0
X3.4	0.734	0
X3.5	0.614	0
Y1.1	0.819	0
Y1.2	0.964	0
Y1.3	0.930	0
Y1.4	0.939	0
Y1.5	0.883	0

Source: Processed in SPSS, 2025

Reliability Test

The Cronbach's Alpha value of 0.945 indicates that the research instrument is highly reliable. Most items have Corrected Item-Total Correlation above 0.4. No item significantly increases reliability if removed. Items such as x2.2 and y1.2 have the highest correlation, strengthening the reliability of the measured construct. In TAM-based research, the consistency of measuring perceptions, ease of use, and barriers is very important to ensure that the relationship between these variables and actual

QRIS usage can be analyzed validly (Davis, 1989). This can be seen in Table 2:

TABLE 2
RELIABILITY TEST

No.	Variable	Cronbach's Alpha
1	X1	0.913
2	X2	0.833
3	X3	0.890
4	X4	0.946

Source: Processed in SPSS, 2025

Normality Test

The normal distribution of residuals indicates that perceptions, ease of use, and barriers as psychological variables in technology adoption follow a reasonable distribution pattern in the population. This supports the basic assumption of TAM that the relationship between perceptions, ease of use, and technology use can be tested parametrically (Davis, 1989). This can be seen in Table 3:

TABLE 3
NORMALITY TEST

Statistic	Value
N	161
Mean	0.0000000
Std. Deviation	2.94302291
Most Extreme Differences – Absolute	0.050
Most Extreme Differences – Positive	0.035
Most Extreme Differences – Negative	-0.050
Test Statistic	0.050
Asymp. Sig. (2-tailed)	0.200

Source: Processed in SPSS, 2025

Multicollinearity Test

The absence of multicollinearity shows that perceptions, ease of use, and barriers are distinct but interrelated constructs in influencing QRIS usage. This is consistent with TAM, which views perceived usefulness and perceived ease of use as complementary variables in explaining technology acceptance (Davis, 1989). This can be seen in Table 4:

TABLE 4
MULTICOLLINEARITY TEST

Variable	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
Constant	17.170	1.923		8.929	.000		
TotalX1	.127	.068	.145	1.874	.063	.986	1.014
TotalX2	.198	.073	.210	2.725	.007	.998	1.002
TotalX3	.056	.070	.061	.794	.428	.987	1.013

Source: Processed in SPSS, 2025

Heteroskedastisitas Test

The random distribution of residuals indicates that the influence of perceptions, ease of use, and barriers on QRIS usage is relatively stable across respondents. This suggests that the experience of using QRIS does not vary extremely among individuals, in line with patterns of technology adoption in society. This can be seen in Figure 4:

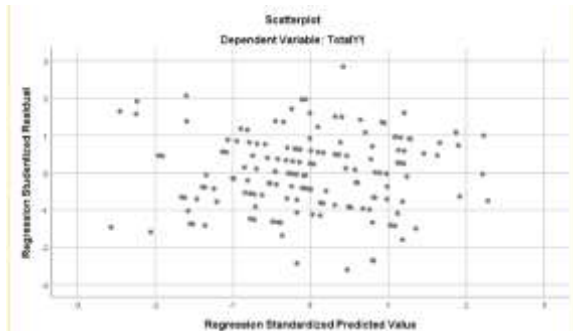


Figure 4: Heteroscedasticity Test

Source: Processed in SPSS, 2025

F Test (Simultaneous)

Conditions of the F Test:

- Used to test whether all independent variables (x1, x2, x3) simultaneously affect the dependent variable (y).
- The F Test result is significant if the sig. value is less than 0.05.

Because sig. equals 0.007, which is less than 0.05, h_0 is rejected. This means that totalx1, totalx2, and totalx3 simultaneously have a significant effect on totaly. The significant F Test result supports the TAM assumption that technology acceptance is not determined by a single factor, but by a combination of perceived usefulness, perceived ease of use, and other contextual factors (Davis, 1989). Thus, perceptions, ease of use, and barriers together still play a role in shaping QRIS usage. This can be seen in Table 5:

TABLE 5
F TEST

Source	SS	df	MS	F	Sig.
Regression	110.154	3	36.718	4.160	.007
Residual	1385.821	157	8.827	—	—
Total	1495.975	160	—	—	—

Source: Processed in SPSS, 2025

T Test (Parsial)

Decision Criteria:

- If the significance value (sig.) is less than 0.05, then h_0 is rejected.
- If the significance value (sig.) is greater than or equal to 0.05, then h_0 is accepted.

Hypotheses:

- H_0 : There was not found of the independent variable on the dependent variable.
- H_1 : There was found of the independent variable on the dependent variable.

Refer to Table 6 regarding the T Test below:

TABLE 6
T TEST (PARSIAL)

Variable	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constant	17.170	1.923	—	8.929	.000	—	—
TotalX1	.127	.068	.145	1.874	.063	.986	1.014
TotalX2	-.198	.073	-.210	-2.725	.007	.998	1.002
TotalX3	-.056	.070	-.061	-.794	.428	.987	1.013

Source: Processed in SPSS, 2025

The statistical outcomes reported in Table 6 can be interpreted as follows.

- Totalx1:
t value equals 1.939
sig. equals 0.054

Because sig. 0.054 is greater than 0.05, h_0 is accepted. This means that totalx1 does not have a significant partial effect on totaly1. The insignificance of perception can be explained by the findings of Arvitra & Hasibuan (2025) that the influence of perception is contextual and does not always determine the decision to use QRIS.

- Totalx2:
t value equals -2.695
sig. equals 0.008

Because sig. 0.008 is less than 0.05, h_0 is rejected. This means that totalx2 has a significant partial effect on totaly1. The significance of the ease-of-use variable is in line with the concept of perceived ease of use in TAM, which is often a key factor especially for users with limited digital literacy (Davis, 1989)

3. Totalx3:
t value equals -0.775
sig. equals 0.440

Because sig. 0.440 is greater than 0.05, H_0 is accepted. This means that totalx3 does not have a significant partial effect on totaly1. Meanwhile, the insignificance of barriers is in line with the findings of Pangestika et al. (2025) that security factors as a form of barrier do not always become the main consideration for some users.

Coefficient of Determination (R squared)

The R-squared value of 7.4 percent suggests that QRIS usage is largely explained by variables that were not included in the present model, such as facilitating conditions, infrastructure support, cooperative policies, and customer payment habits. This finding indicates that QRIS adoption is influenced not only by individual perceptions but also by external environmental and organizational factors, consistent with the findings of Muhammad et al. (2024).

Evaluation of QRIS Usage Level

However, the presence of barriers with an average score of 15.12 indicates that contextual factors, particularly limited network connectivity and technical support, continue to influence the experience of using QRIS, consistent with the findings of Muhammad et al. (2024). This explains why the level of QRIS usage, with an average score of 15.27, is not yet optimal, even though perceptions and ease of use are relatively good. These findings suggest that technology adoption is shaped not only by users' perceptions but also by external facilitating conditions within the usage environment (Arvitra & Hasibuan, 2025)

6. Conclusions and Recommendations

a. Conclusions

Based on the results of the analysis and discussion regarding the influence of perceptions, ease of use, and barriers on QRIS usage by conventional taxi drivers at Hang Nadim International Airport Batam, the following conclusions can be drawn:

1. Simultaneously, the variables of perceptions, ease of use, and barriers was found to influence QRIS usage by conventional taxi drivers at Hang Nadim International Airport Batam. The study demonstrates that QRIS utilization be explained by a single variable, as several interrelated aspects, namely perception, ease of use, and barriers, collectively contribute to its adoption.

2. Partially, the ease-of-use variable was found to influence QRIS usage. This finding confirms that the easier QRIS is to understand and use, the higher the tendency of taxi drivers to use it. This observation corresponds with the theoretical perspective of perceived ease of use within TAM.
3. The perception variable was not found to influence QRIS usage. This indicates that although some drivers have fairly good perceptions of QRIS, these perceptions are not strong enough to encourage consistent usage, possibly due to other factors such as customer payment habits or field experience.
4. The barrier variable also was not found to influence QRIS usage. This shows that although there are obstacles such as internet network issues, technical disruptions, or digital literacy, these barriers are not the main determinants of the decision to use QRIS for taxi drivers in this research context.
5. The relatively low coefficient of determination value of 7.4 percent indicates that there are still other factors outside the research model that influence QRIS usage, such as cooperative policies, infrastructure support, financial incentives, customer habits, and regulations from the airport and banking authorities.

Overall, this study shows that the implementation of QRIS among conventional taxi drivers at Hang Nadim Airport Batam has been running, but not yet optimal. Ease of use is the key factor, while perceptions and barriers are more contextual and require more targeted policy and educational approaches.

b. Recommendations

The results of this study point to several important considerations:

1. For Bank Indonesia and Banks
 - Increase more practical and applicable socialization and education regarding QRIS usage, especially for older and less educated taxi drivers.
 - Strengthen technical support and ensure the stability of the network and payment system so that the QRIS usage experience is more consistent.
 - Provide incentives or special programs for taxi drivers to encourage QRIS adoption, such as cashback or MDR fee reductions.

2. For Airport Management and Taxi Cooperatives
 - Integrate QRIS as one of the officially recommended payment methods in the airport environment.
 - Provide supporting facilities such as more stable network points in taxi queue areas.
 - Provide short regular training for taxi drivers regarding QRIS usage.
3. For Digital Payment Service Providers
 - Simplify application interfaces and QRIS transaction flows to make them easier for users with limited digital literacy.
 - Provide responsive help features or customer service for taxi drivers experiencing technical problems.
4. For Taxi Drivers
 - Be more open to the use of digital payment technology as part of improving service quality to passengers.
 - Utilize QRIS as an alternative payment method that can increase customer trust and convenience.
5. For Future Researchers
 - Future research is expected to extend the current model by incorporating variables beyond those examined in this study, particularly trust, institutional support, customer habits, and economic-related factors.
 - Expand the research scope by comparing taxi drivers at other airports or other transportation sectors.
 - Use mixed methods by adding in-depth interviews to obtain a more comprehensive understanding of the reasons behind QRIS usage or rejection.

Thus, it is expected that the implementation of QRIS in the transportation sector, particularly among conventional taxi drivers at Hang Nadim Airport Batam, can become more optimal, support the transformation of the digital payment system, and improve efficiency, security, and inclusivity of transactions in line with Bank Indonesia's objectives.

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