THE DETERMINANTS OF BEHAVIORAL INTENTION AND USE BEHAVIOR OF QRIS AS DIGITAL PAYMENT METHOD USING EXTENDED UTAUT MODEL

Elvina Dian Paramita[*)1], Eko Ruddy Cahyadi[*)]

[*)]Department of Management, Faculty of Economics and Management, IPB University
Jl. Agatis, Campus IPB Dramaga Bogor 16680, Indonesia

Abstract: The development of QR code payment services by various fintech companies in Indonesia prompted Bank Indonesia to issue a Quick Response Indonesian Standard (QRIS) to support transactions that were safer, easier, faster, and more efficient. This study aimed to analyze the consumer preferences and factors that influenced their intention and use behavior when using QRIS in the Jabodetabek area. The extended Unified Theory of Acceptance and Use of Technology (UTAUT) model was employed to analyze these aspects. This research was conducted from March 2023 until May 2023. Online questionnaires were distributed to 198 respondents who were users of e-wallets or mobile banking and knew about the QRIS feature. Then, the collected data were analyzed using Structural Equation Modelling – Partial Least Square (SEM-PLS). The findings revealed that perceived risk, performance expectancy, social influence, and effort expectancy had a significant positive effect on the behavioral intention to use QRIS. Meanwhile, QRIS usage behavior was positively influenced by both behavioral intentions and facilitating conditions. The priority strategy that could be implemented to enhance the adoption of QRIS was by educating the role of QRIS in reducing payment risks.

Keywords: extended UTAUT, fintech adoption, QR code payment, QRIS, SEM-PLS

Abstrak: *Perkembangan layanan pembayaran kode QR oleh berbagai fintech di Indonesia menginisiasi Bank Indonesia untuk menerbitkan Quick Response Indonesian Standard (QRIS) guna mendukung transaksi yang lebih aman, mudah, cepat, dan efisien. Penelitian ini bertujuan untuk menganalisis preferensi dan faktor-faktor yang dapat mempengaruhi niat dan perilaku penggunaan QRIS dari perspektif konsumen di Jabodetabek menggunakan model ekspansi Unified Theory of Acceptance and Use of Technology (UTAUT). Penelitian ini dilakukan pada bulan Maret 2023 sampai Mei 2023. Penelitian ini meneliti sejumlah 198 responden di Jabodetabek yang merupakan pengguna e-wallet atau m-banking dan mengetahui fitur QRIS. Kuesioner disebarkan secara online dan hasilnya diolah dengan menggunakan Structural Equation Modelling – Partial Least Square (SEM-PLS). Hasil penelitian ini menunjukkan bahwa persepsi risiko, ekspektasi kinerja, pengaruh sosial, dan ekspektasi usaha berpengaruh positif signifikan terhadap niat perilaku menggunakan QRIS. Sedangkan perilaku penggunaan QRIS dipengaruhi secara positif signifikan oleh niat perilaku dan kondisi yang memfasilitasi. Strategi prioritas yang dapat diterapkan untuk meningkatkan adopsi teknologi QRIS adalah dengan mengedukasi peran QRIS dalam mengurangi risiko-risiko pembayaran.*

Kata kunci: *perluasan UTAUT, adopsi fintech, pembayaran QR Code, QRIS, SEM-PLS*

[1] Corresponding author:
  Email: elvinadian@apps.ipb.ac.id

INTRODUCTION

Over time, technology has been experiencing rapid global development. New technologies are constantly being discovered and developed. Indonesia is one of the countries greatly influenced by technology, and one technology that is currently thriving in Indonesia is digital payment technology. Indonesia, as an archipelago with the fourth largest population in the world (World Population Review, 2023), has a population of 275 million people (BPS, 2022). The number of internet users in Indonesia has reached 215.6 million, with a relatively high internet penetration rate of 78.19%, which increased by 1.17% compared to the previous year (APJII, 2023). The rate of internet penetration in Indonesia is expected to continue rising to meet the needs of the society, especially since the onset of the COVID pandemic in 2020. The growth of internet users in Indonesia also coincides with the development of various types of devices used to access the internet. According to Katadata (2020), the most frequently used devices for internet access are smartphone (98%), laptop/notebook/tablet (14%), desktop (5%), and smartwatch (0.35%).

According to Newzoo (2022), Indonesia ranked fourth in terms of the largest number of smartphone users in the world, following China, India, and the United States, with a total of 192.15 million smartphone users. The growth of smartphone users in Indonesia has transformed the lifestyle of the Indonesian population towards the digital realm, particularly in terms of conducting transactions using smartphones. Several barriers in payment activities, especially in the post-pandemic era where contactless transactions are preferred, have led to the emergence of fintech in Indonesia to alleviate these barriers. Some of these obstacles include difficulties faced by merchants in providing change to their customers, the circulation of counterfeit banknotes, and the development of a cashless society, particularly in the post-pandemic period in Indonesia.

The Fintech Association of Indonesia (AFTECH), established in 2015, has had a significant impact on the development of fintech and digital economy in Indonesia. Starting in 2016, various fintech companies emerged in sectors such as payment services, crowdfunding, aggregators, loans, investment management, risk management, financial planning, and others. The largest sector within the fintech industry is payment services, accounting for 39% of the total. Payment services currently support almost all transactional needs in the digital economy. It is projected that in the next 1–2 years, almost all types of fintech products will experience growth, such as digital payments (77%), digital fund transfers (71%), digital insurance (47%), digital loans (37%), and other services (Digital Merchant Survey 2021). This phenomenon is supported by data from Bank Indonesia (BI), which shows an increase in the value of electronic money transactions from Rp504.96 trillion in 2020 to Rp786.35 trillion in 2021, indicating a transaction value increase of Rp281.39 trillion (55.73%).

The use of fintech in Indonesia is growing rapidly in line with the growth of e-commerce for online buying and selling, as well as the shift in consumer shopping behavior from conventional to digital methods. Payment methods have also become more diverse due to technological advancements and changes in societal behavior. Initially, transactions were conducted through bartering, then transitioned to paper-based instruments such as promissory notes and checks. Later, card-based and electronic-based instruments such as ATM/debit cards, credit cards, e-money, and other forms of electronic currency based on chips, servers, or QR codes became prevalent.

The emergence of various e-commerce platforms, fintech services, and digital payment methods in Indonesia has also influenced the development of the Quick Response Indonesian Standard (QRIS) technology. QRIS was developed by the payment system industry in collaboration with Bank Indonesia to simplify, expedite, and enhance the security of transactions using QR codes. According to Bank Indonesia (BI) data as of December 2022, the number of QRIS users has reached 28.75 million. This represents an increase of 15.95 million users compared to the previous year. The majority of users are located in Java, with 20.59 million users. Sumatra follows with 4.75 million users, Kalimantan with 1.25 million users, and Sulawesi, Maluku, and Papua with 1.18 million users. Bali and West Nusa Tenggara have 979,788 users. BI aims to reach 45 million QRIS users by mid-2023.

Furthermore, Bank Indonesia has also recorded the total number of merchants that have adopted the QRIS payment system, which amounts to 22.7 million merchants out of 65 million micro, small, and medium enterprises (MSMEs) in Indonesia. This means that

the adoption rate is still at 34.92% of the total MSMEs in the country. BI states that QRIS is one of the new innovations developed by the central bank to create a digital ecosystem for the public and MSMEs, supporting economic and financial inclusion. By adopting QRIS as a payment method, MSMEs can elevate their business status. MSMEs play a crucial role in driving Indonesia's economic growth, contributing approximately 59% to the country's GDP and generating employment opportunities for about 97% of the workforce.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a widely recognized theory in the field of technology adoption and usage. UTAUT aims to explain and predict individuals' acceptance and usage of new technologies. It combines and extends several existing theories, including the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Innovation Diffusion Theory. The UTAUT framework identifies key constructs that influence technology adoption and use. Such as performance expectancy, effort expectancy, social influence, and facilitating conditions. Previous studies have investigated technology usage using UTAUT approach such as m-payment (Alkhowaiter 2022), student e-learning (Khoirunnisak et al. 2016), e-wallet (Hilmawan 2020), and QRIS (Kadim and Sunardi, 2021; Kosim and Legowo, 2021; Saibil et al. 2022; Tenggino and Mauritsius, 2022). Other studies have also examined perceived risk as the variables that could influence the behavioral intention and use behavior towards solar PV adoption (Tanveer et al. 2021), e-wallet usage (Aji et al. 2020), and fintech platform (Xie et al. 2021). However, those previous studies have some different results towards the factors that can influence the behavioral intention and use behavior towards QRIS payment services. Other than that, the influence of perceived risk specifically towards QRIS adoption is not discussed too much in the previous studies. Therefore, it needs a further research regarding the determinants of QRIS behavioral intention and use behavior to analyze the gaps. This study aims to investigates the user preferences for QRIS and the factors that influence the intention and behavior of using QRIS as a digital payment method from the customers' perspective in the Jabodetabek area, using an extended UTAUT approach with perceived risk as the extended variable. Therefore, this research can contribute to provide recommendations that can be utilized to increase the QRIS adoption and develop more effective and efficient sales and transaction strategies, as well as enhancing competitiveness in the market

METHODS

This research was conducted from March 2023 to May 2023 in the Jabodetabek area. This research used primary data. The primary data was collected by conducting an online survey to 198 respondents (193 are QRIS users and 5 are non-QRIS users).

The respondent criteria in this study are a mobile banking or e-wallet users in Jabodetabek area that knows about QRIS feature for making payment transactions. The sample was selected using the non-probability sampling method through the voluntary sampling method. The minimum samples in this study was determined using (Hair et al. 2021)the model imposes some daunting assumptions and restrictions (e.g. normality and relatively large sample sizes rules. Assuming a significance level of 5% and a minimum path coefficient of 0,2, the minimum sample size () is given by the following equation. This result needs to be rounded to the next integer, so the minimum sample size is 155.

This study was quantitative research with variables referring to the UTAUT variables such as performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), behavioral intention (BI), and use behavior (UB). The addition of the perceived risk variable to the UTAUT model was done to broaden the understanding of the factors influencing users' behavioral intentions and actual usage behavior towards QRIS. The extended UTAUT model was used in this research, as shown in Figure 1. The UTAUT model is highly effective and versatile, making it suitable for studying the adoption of various new technologies. It can be easily extended to accommodate additional factors as required. The model is robust, meaning it is reliable and resilient. It provides accurate predictions of usage behaviors and is applicable for evaluating an individual's perception of technology usage (Momani, 2020).

This research used seven latent variables and 32 manifest variables as follows: (1) performance expectancy (PE) consisting of five indicators: QRIS accelerates the transaction process (PE1), using QRIS can provide discounts or special offers (PE2), QRIS offers greater accuracy in payment transactions (PE3), QRIS enables automatic and accurate recording of expenses and income (PE4), scanning QR codes with QRIS is a quick and efficient process (PE5). These items were adopted from (Najib et al. 2021; Xie et al. 2021); (2) effort expectancy (EE) consisting of four indicators: QRIS features are user-friendly and easy to use (EE1), QRIS can make payments without the need to wait in long queues to withdraw cash (EE2), the QRIS interface is simple, making it easy to navigate (EE3), QRIS is convenient to use as it only requires a single smartphone with an e-wallet or mobile banking app (EE4). These items were adopted from (Hu et al. 2019; Lonardi dan Legowo, 2021; Puspitasari dan Salehudin, 2022); (3) social influence (SI) consisting of five indicators: offered by a friend or family member to use QRIS (SI1), received information from related institutions about the ease of using QRIS (SI2), friends and family members recommended and assisting in using QRIS (SI3), merchants at shopping places encouraged me to use QRIS (SI4), people around seemed to be faster and more convenient in conducting transactions (SI5). These items were adopted from (Soomro, 2019; Najib et al. 2021; Puspitasari and Salehudin, 2022); (4) facilitating conditions (FC) consisting of five indicators: QRIS is convenient to use in any condition, whether it's quiet or crowded (FC1), adequate resources (internet, network, and devices)

are always available nearby to use QRIS (FC2), QRIS is compatible with the electronic devices being used (FC3), merchants in the vicinity always provide QRIS payment facilities (FC4), QRIS customer service is always available, helpful, and responsive when needed (FC5). These items were adopted from (Najib et al. 2021; Alkhowaiter, 2022; Ridwan and Dharma, 2022); (5) Perceived risk (PR) consisting of five indicators: using QRIS is safer and helps prevent criminal activities (PR1), QRIS is considered the safest payment method compared to other methods (PR2), QRIS reduces the risk of money loss (PR3), QRIS helps avoid transaction errors (PR4), QRIS reduces the risk of receiving counterfeit or damaged change (PR5). These items were adopted from (Aji et al. 2020; Bureshaid et al. 2021); (6) behavioral intention (BI) consisting of four indicators: intend to continue using QRIS to pay for goods or services that I purchase (BI1), plan to use QRIS for payments wherever I go (BI2), intend to use QRIS every time when need to pay for goods or services (BI3), plan to inquire about the availability of QRIS payment feature whenever I make a transaction (BI4). These items were adopted from (Rosiana et al. 2020; Ridwan and Dharma, 2022; Bajunaied et al. 2023); (7) use behavior (UB) consisting of four indicators: always use QRIS for every transaction (UB1), always prefer using QRIS over other payment methods (UB2), always recommend the use of QRIS to people around (UB3), always inquire about the availability of QRIS payment whenever I make a transaction (UB4). These items were adopted from (Rosiana et al. 2020; Widianti et al. 2021; Lonardi and Legowo, 2021).
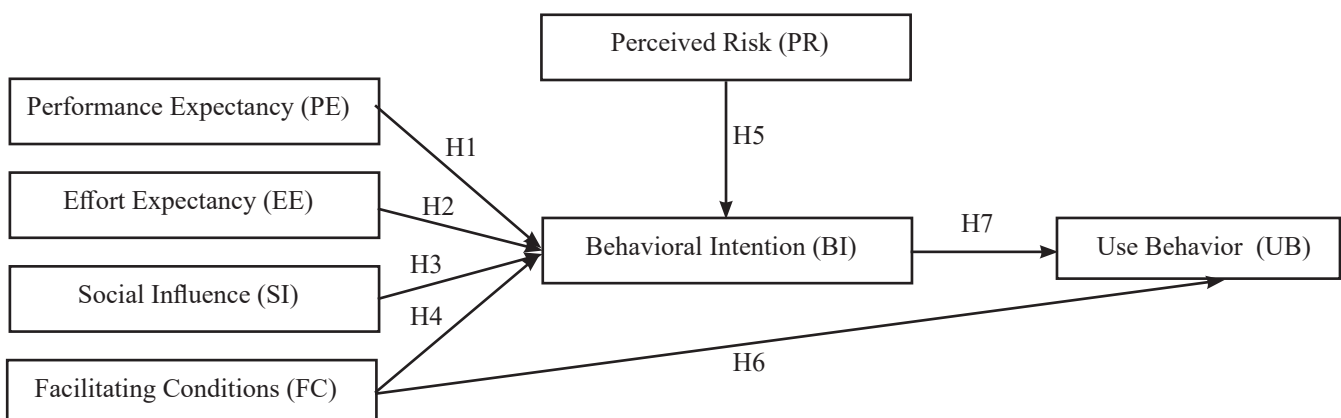

Figure 1. Theoretical framework

All the answer collected from the online survey was measured using five-points Likert scale, where a rating of 5 represented "strongly agree" and a rating of 1 represented "strongly disagree". SEM PLS involves two main stages. The initial step involves assessing the outer model, which aims to determine the connection between the latent variable and the manifest variable. The subsequent step involves evaluating the inner model, which focuses on establishing the relationship between latent variables based on substantive theory and conducting hypothesis testing.

The evaluation of the outer model involved assessing convergent validity, discriminant validity, and consistency reliability. Convergent validity was determined by examining the loading factor value of each indicator, which serves as a measure of the indicator's validity. An outer loading or loading factor value is considered valid if it correlates above 0.6 - 0.7 with the measured variable. Other than that, the Average Variance Extracted (AVE) value must be > 0.5 so it can be considered valid (Ghozali, 2014; Jogiyanto, 2011).

The evaluation of discriminant validity focused on determining the extent to which variables or attributes, as measured by the measuring instruments, aligned with theoretical concepts. Reflective discriminant validity was assessed through various measures, including cross loading and comparing the square root of the average variance extracted (AVE) value for each construct with the correlation between constructs and other constructs in the model. When the square root of the AVE value for each construct exceeded the correlation value between the construct and other constructs in the model, it indicated good discriminant validity. Discriminant validity was also evaluated by examining the cross-loading measurement with the construct, which aided in determining the relationship between variables and indicators. Internal consistency was quantified through composite reliability. The use of composite reliability provided an advantage over traditional reliability measures and was considered reliable if the value exceeded 0.7.

The evaluation of the inner model described the relationships between latent variables. It aimed to explore the relationships between constructs, the significance value, and the R-square value. The relationships between constructs were observed through path coefficient estimation, which estimated the values for the structural model's path relationships. Significance values were obtained by comparing the t-statistical values with the t-table (1.96). Hypotheses were accepted if the t-statistic exceeded 1.96. In the inner model evaluation, the percentage of variance represented by each variable was examined, indicating the model's explanatory capability for the variables utilized. During the assessment of the PLS model, the R-square value was initially examined to ascertain the impact of specific independent latent variables on dependent latent variables. The coefficient of determination (R-square) was employed to assess the extent to which the exogenous variable explained the variability of the dependent variable. The significance level provided insight into the strength or weakness of the relationship for each variable. In the hypothesis testing stage (bootstrapping), the t-statistic value, p-value, and original sample were analyzed.

The increasing use of QR transactions in various e-wallets prompted Bank Indonesia to develop the Quick Response Indonesian Standard (QRIS) in 2019 and officially launch it in Indonesia in early 2020. By mid-2023, Bank Indonesia also aims to achieve 45 million QRIS users. However, the current issue is that the number of users has not reached the optimal level, as it is only 63.8% of the target. Additionally, the adoption rate of QRIS among micro, small, and medium enterprises (MSMEs) is still only 34.92% of the total MSMEs in Indonesia. This adoption is faced with various challenges, such as socialization, information dissemination, infrastructure, security, performance, ease of use, and payment risks. To provide recommendations in addressing these challenges, this study analyzes the preferences of the community, the intention to use, and the habits of using QRIS in Jabodetabek. The research is conducted using the extended Unified Theory of Acceptance and Use of Technology (UTAUT) approach, with a focus on customers who have e-wallets or mobile banking and are aware of the QRIS feature, aiming to offer managerial implications to enhance QRIS adoption. The initial UTAUT model combined four factors influencing the intention to use technology such as performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to users' expectations of the benefits they can obtain from using a technology (Venkatesh et al. 2003). Effort expectancy, on the other hand, assesses the ease of using the technology (Venkatesh et al. 2003). These two factors, performance expectancy and

effort expectancy, are akin to the variables measured in TAM, namely perceived usefulness and perceived ease of use. Facilitating conditions encompass the necessary support required to carry out actions using the information system (Venkatesh et al. 2003). Social influence gauges the extent to which individuals value the social significance of adopting a technology, often influenced by observing others' usage patterns (Verma and Sinha, 2018). In this study, the UTAUT framework was extended by adding the perceived risk variable. Older studies had found that perceived risk are negatively influence the customer intention to use a technology (Ryu, 2018; Tanveer et al. 2021). But, in this study context, perceived risk refers to a customer's belief that using QRIS will help them to avoid the risk of using cash. Therefore, perceived risk is positively influencing the intention of customers to use QRIS.

Based on the application of the extended UTAUT model in research related to technology adoption, this research proposed the following hypotheses:

H1: There is a significant positive effect of performance expectancy on the behavioral intention to use QRIS. This research hypothesis is supported by (Lonardi and Legowo, 2021; Alkhowaiter, 2022).

H2: There is a significant positive effect of effort expectancy on the behavioral intention to use QRIS.This research hypothesis is supported by (Bajunaied et al. 2023).

H3: There is a significant positive effect of social influence on the behavioral intention to use QRIS. This research hypothesis is supported by (Puspitasari and Salehudin, 2022).

H4: There is a significant positive effect of facilitating conditions on the behavioral intention to use QRIS. This research hypothesis is supported by (Azzahroo and Estiningrum, 2021; Saibil et al. 2022).

H5: There is a significant positive effect of perceived risk on the behavioral intention to use QRIS. This research hypothesis is supported by (Aji et al. 2020)

H6: There is a significant positive effect of behavioral intention on the use behavior of QRIS. This research hypothesis is supported by (Thusi and Maduku, 2020)

H7: There is a significant positive effect of facilitating conditions on the behavioral intention to use QRIS. This research hypothesis is supported by (Khoirunnisak et al. 2016).

RESULTS

Characteristics of Respondents

The survey in this study was conducted on 198 respondents (193 are QRIS users and 5 are non-QRIS users) using an online questionnaire. The respondents' characteristics in this study were grouped by gender, age, mobile payment experience, domicile, education, marital status, occupation, income and outcome. The characteristics of the respondents that the researcher has collected were presented in Table 1. The majority of respondents in this study are scattered into SES A to SES E. Social Economic Status (SES) is a classification that maps a population based on their economic abilities and social status. In Indonesia, monthly expenditure is considered a more accurate benchmark for measuring SES. In this study, the majority of respondents (42.9%) had spending as much as Rp1,000,000 to Rp2,000,000 per month so belonged to the category SES C, then as many as 29.8% respondents with spending per month <Rp700,000 included in the category SES E, then 16.2% respondents with expenditure per month of Rp2,000,000 to Rp3,000,000 are SES B. Then as much as 11.1% of respondents with spending >Rp3,000,000 per month belonged to SES A.

Customer Preferences Towards QRIS

This study also analyzes several preferences in using QRIS. Majority of respondents with a percentage of 97.5% or 193 respondents, stated that they have used QRIS, while the remaining 2.5% or five respondents in this study mentioned that they have not used QRIS. All five respondents who have not used QRIS stated that their main reasons for not using QRIS were lack of understanding in using QRIS, unavailability of QRIS among the merchants around them, and their preference for other payment methods. On the other hand, among the respondents who have used QRIS, the most common challenge experienced by them was slow internet connectivity, as mentioned by 68.2% of the respondents. Furthermore, 86.4% of the respondents who have used QRIS mentioned that their main reasons for using QRIS were the ease and convenience of payment, followed by speed, as mentioned by 64.6% of the respondents, and a preference for avoiding cash transactions, as mentioned by 60.1% of the respondents.

Table 1. Characteristics of respondents

Characteristics	Classification	Total	Percentage
Gender	Woman	132	66.7%
	Men	66	33.3%
Age	Gen Z (17-26)	175	88.4%
	Gen Y (27-42)	11	5.6%
	Gen X (43-58)	9	4.5%
	Boomers (>58)	3	1.5%
Mobile Payment Experience	<1 year	18	9.1%
	1 year – 2 years	65	32.8%
	2 years - 5 years	105	53.0%
	5 years – 10 years	10	5.1%
Income per month	<Rp1 million	54	27.3%
	Rp1–Rp2.5 million	74	37.4%
	Rp2.5–Rp4 million	34	17.2%
	Rp4–Rp7.5 million	22	11.1%
	Rp7.5–Rp20 million	9	4.5%
	> 20 mils	5	2.5%
Outcome per month	<Rp1 million	59	29.8%
	Rp1–Rp2 million	85	42.9%
	Rp2–Rp3 million	32	16.2%
	Rp3–Rp7 million	12	6.1%
	Rp7–Rp15million	4	2%
	> Rp15 mil	6	3%
Marital Status	Unmarried	176	88.9%
	Married	22	11.1%
Education	Highschool	47	23.7%
	Diploma	9	4.5%
	Bachelor	135	68.2%
	Master	6	3%
Occupation	Student	162	81.8%
	Employee	14	7.1%
	Entrepreneur	6	3.0%

The most preferred payment method among the respondents was QR Code, with a voting percentage of 49.5%, followed by e-wallet transfers at 34.8%. Majority of respondents, with a percentage of 88.9%, had the Gopay application for using QRIS. However, the most frequently used application by the respondents for QRIS transactions was BCA Mobile, with a percentage of 18.2%. Gopay ranked second with a percentage of 14.6%, followed by Shopeepay at 13.6%. The reasons for using these applications when making QRIS payments were mostly chosen for their speed and convenience, as mentioned by 80.8% of the respondents, followed by easy-to-understand user interfaces at 34.8%, attractive promotions at 25.3%, and a sense of security at 20.7%.

QRIS was predominantly used in restaurants/canteens/ cafes, with a percentage of 78.3%, followed by malls at 67.2%, and minimarkets at 54%. This aligns with the types of products purchased using QRIS, which include food and beverages at 94.4%, fashion at 42.9%, and personal care and beauty products at 37.4%. Majority of respondents, with a percentage of 44.9%, mentioned that they use QRIS between 2 to 7 times per month. As for the duration of QRIS usage, 55.6% of respondents stated that they spend around 30 seconds to complete their payment transactions.

When asked whether they would leave a merchant that does not provide QRIS, 13.1% of the respondents answered "Yes," 38.4% answered "Maybe," and 48.5% answered "No." This indicates that a higher percentage

of respondents, at 51.5%, would leave a store if it does not offer QRIS. Regarding recommendations for using QRIS, 76.3% of the respondents answered "Yes." In terms of QRIS usage fees, 93.4% of the respondents felt that the fees were not expensive since they only required purchasing internet data quotas to use QRIS. Furthermore, 93.4% of the respondents stated that the transaction limit of Rp20 millions was sufficient, while 6.6% of the respondents mentioned that the limit was insufficient or too low. The majority of users (40.4%) spending around Rp50,000 to Rp100,000 per transaction using QRIS. As for monthly QRIS expenses, they ranged between Rp100,000 and Rp500,000.

Outer Model Evaluation SEM PLS

Based on Table 2, it can be concluded that all variables in this study are valid and reliable because the Average Variance Extracted (AVE) values are greater than 0.5 (Hair et al. 2019), and the Cronbach's alpha and composite reliability values are greater than 0.7 (Chin, 1998).

Table 2. Results of the outer model assessment

Variables	Indicators	Loading factor	AVE	Cronbach's alpha	Composite reliability
Performance Expectancy (PE)	PE1	0.757	0.764	0.735	0.834
	PE3	0.811			
	PE4	0.655			
	PE5	0.759			
Effort Expectancy (EE)	EE1	0.861	0.686	0.847	0.897
	EE2	0.822			
	EE3	0.839			
	EE4	0.789			
Facilitating Conditions (FC)	FC1	0.722	0.527	0.776	0.848
	FC2	0.746			
	FC3	0.696			
	FC4	0.777			
	FC5	0.688			
Social Influence (SI)	SI1	0.767	0.590	0.830	0.877
	SI2	0.775			
	SI3	0.837	0.590	0.830	0.877
	SI4	0.765			
	SI5	0.689			
Perceived Risk (PR)	PR1	0.806			
	PR2	0.804			
	PR3	0.826	0.628	0.851	0.894
	PR4	0.829			
	PR5	0.691	0.628	0.851	0.894
Behavioral Intention (BI)	BI1	0.835	0.764	0.897	0.928
	BI2	0.903			
	BI3	0.905			
	BI4	0.851			
Use Behavior (UB)	UB1	0.848	0.722	0.871	0.912
	UB2	0.901			
	UB3	0.814			
	UB4	0.835			

Inner Model Evaluation SEM PLS

The inner model evaluation was conducted to predict the relationships between variables as formulated in the hypotheses. R-Square or the coefficient of determination represents the ability to explain all dependent variables by independent variables and the influencing indicators. According to Chin (1998), the coefficient of determination can be categorized as strong (above 0.67), moderate (above 0.33 but below 0.67), and weak (above 0.19 but below 0.33). The result of coefficient of determination in this research are shown in Table 3.The calculation of the values for the behavioral intention (BI) variable resulted in a value of 0.501, while the use behavior (UB) variable had a value of 0.617. This indicates that the behavioral intention (BI) and use behavior (UB) variables fall under the moderate category. It means that the behavioral intention (BI) variable can be described by its independent variables, consisting of PE, EE, SI, PR, and FC, to the extent of 50.1%, while the remaining 49.9% is explained by other variables outside the scope of this study. Regarding the use behavior (UB) variable, its dependent variables, including BI and FC, explain 61.7% of the variability in UB, while the remaining 38.3% is explained by other variables outside the scope of this study.

Table 3. Result of the coefficient of determination

Independent Variables	R^2	Category
Behavioral Intention (BI)	0.501	Moderate
Use behavior (UB)	0.617	Moderate

Hypothesis Testing

In SEM-PLS, hypothesis testing is typically based on the comparison of p-values. The significance level, or the error rate, is set at 5% or α=0.05 in this study. A hypothesis is considered accepted if the p-value is smaller than the error rate (p-value < 0.05). In addition to p-values, hypothesis testing can also be conducted by comparing the t-statistic value with the critical t-value. The critical t-value used is 1.96 with a 5% error rate. A significant relationship between independent and dependent variables is indicated if the t-statistic is greater than 1.96 (t-statistic > 1.96). The original sample values indicate positive or negative relationships between variables. The original sample values range from -1 to 1. A value < 0 indicates a negative relationship, while a value > 0 indicates a

positive relationship in the path coefficients. The results of hypothesis testing through the bootstrapping process are shown in Table 4.

Based on Table 4, it can be concluded that the accepted hypotheses in this study are H1, H2, H3, H5, and H7. Looking at the original sample values, the variable that has the largest influence on behavioral intention is perceived risk, with an original sample value of 0.320. On the other hand, the variable that has the greatest influence on use behavior is behavioral intention.

Perceived risk has the highest influence on behavioral intention because consumers believe that QRIS can overcome the challenges and risks they faced before QRIS was introduced in the Jabodetabek area. Some of these risks include theft, loss of money, transaction errors due to human error, and the risk of receiving counterfeit or damaged change. Respondents in this study felt that QRIS can reduce transaction errors. This is supported by the calculation of the loading factor, where the PR4 indicator contributes the most to influencing behavioral intention. This indicates that the facilitating conditions variable does not have a significant influence on behavioral intention. The conclusions of the hypotheses obtained from the bootstrapping calculation using SmartPLS software can be summarized as follows:

H1: Performance expectancy has a significant positive effect on the behavioral intention of using QRIS in Jabodetabek

Based on Table 4, performance expectancy's t-statistic value for behavioral intention is 2.444 > 1.96, and the p-value is 0.015 > 0.05. Additionally, the original sample value for performance expectancy is 0.204. These results indicate that the performance expectancy variable significantly and positively influences the behavioral intention of using QRIS in Jabodetabek. Therefore, H1 is accepted. This suggests that the perceived performance and usefulness of QRIS technology influence users of e-wallets and mobile banking to intend to use QRIS for transactions. The greater the users' perceived performance expectancy of QRIS, the stronger their intention to use QRIS in transactions. The findings of this hypothesis align with the research conducted by (Lonardi and Legowo, 2021) which found that performance expectancy has a significant effect on behavioral intention and an

indirect influence on use behavior among QRIS users in DKI Jakarta. This finding is also consistent with the study conducted by Alkhowaiter (2022) which highlighted the importance of performance expectancy in influencing the behavioral intention of mobile payment users in Gulf countries.

H2: Effort expectancy has a significant positive effect on the behavioral intention of using QRIS in Jabodetabek

Based on Table 4, the t-statistic value for effort expectancy and behavioral intention is 2.199, which is greater than the critical value of 1.96, and the p-value is 0.028, which is less than the significance level of 0.05. Additionally, the original sample value for effort expectancy is 0.162. These findings indicate that effort expectancy has a significant positive influence on the behavioral intention to use QRIS in the Jabodetabek area. Therefore, H2 is accepted. This can be interpreted as the higher the users' expectation of the effort required to use QRIS, the greater their intention to use QRIS. This research finding is consistent with the study conducted by Bajunaied et al. (2023) which found a significant positive impact of effort expectancy on consumer behavioral intention towards fintech services in Saudi Arabia. 'Feeling that the QRIS feature is easy to use' (EE1) is the indicator that has the most influence on behavioral intention (see the loading factor results in Table 2). Therefore, a managerial implication that can be implemented is to enhance effective communication to the public regarding the ease of using QRIS. Ensure that the public understands how to use and utilize QRIS features optimally. If the public becomes more aware of the convenience provided by QRIS, their confidence in using it will increase.

H3: Social influence has a significant positive effect on the behavioral intention to use QRIS in Jabodetabek

Based on Table 4, the t-statistic value for social influence and behavioral intention is 3.061, which is greater than the critical value of 1.96, and the p-value is 0.002, which is less than the significance level of 0.05. Additionally, the original sample value for social influence is 0.203. These findings indicate that social influence has a significant positive influence on the behavioral intention to use QRIS in Jabodetabek. Therefore, H3 is accepted. This means that the greater the influence from the social environment to use QRIS, the stronger the customer's intention to use QRIS. This research finding is consistent with the study conducted by Puspitasari dan Salehudin (2022), which found that social influence has a positive effect on the behavioral intention to use QRIS in Indonesia. From Table 2, it can be concluded from the results of loading factors that the indicator that has the most influence on behavioral intention is 'friends and family's recommendation and assistance in using QRIS' (SI3). Therefore, a managerial implication that can be implemented is to educate offices, universities, schools, and residential areas about the benefits and procedures of using QRIS, so that more people will feel facilitated and recommend QRIS to their friends and family. Another approach is to implement a referral program to encourage more people to recommend the use of QRIS to their acquaintances and relatives.

Table 4. Hypothesis testing

Hypothesis	Original sample	Standard deviation	T statistics	P values	Significancy	Conclusion
H1: PE → BI	0.204	0.084	2.444	0.015	Significant positive	Accepted
H2: EE → BI	0.162	0.074	2.199	0.028	Significant positive	Accepted
H3: SI → BI	0.203	0.066	3.061	0.002	Significant positive	Accepted
H4: FC → BI	0.000	0.079	0.006	0.995	Significant positive	Declined
H5: PR→ BI	0.320	0.080	4.018	0.000	Significant positive	Accepted
H6: FC → UB	0.129	0.065	1.991	0.047	Significant positive	Accepted
H7: BI → UB	0.708	0.049	14.486	0.000	Significant positive	Accepted

Note: Performance expectancy (PE); behavioral intention (BI); Social influence (SI); Facilitating conditions (FC); Perceived risk (PR); use behavior (UB)

H4: Facilitating conditions have a significant positive effect on the behavioral intention to use QRIS in Jabodetabek

Based on Table 4, the p-value for facilitating conditions and behavioral intention is 0.995, and the t-statistic is 0.006. The t-statistic value is less than the critical value, and the p-value is greater than 0.05, indicating that facilitating conditions do not have a significant influence on the behavioral intention to use QRIS in Jabodetabek. Therefore, H4 is rejected. This means that whether there are facilitating conditions that support the use of QRIS in Jabodetabek or not, consumers still have a strong intention to use QRIS. The behavioral intention to use QRIS is not influenced by facilitating conditions but is influenced by other factors such as perceived risk, performance expectancy, social influence, and effort expectancy. This finding is consistent with the research conducted by Andrianto (2020) which found that facilitating conditions do not have a significant effect on behavioral intention.

H5: Perceived risk has a significant positive effect on the behavioral intention to use QRIS in Jabodetabek

Based on Table 4, perceived risk has a significant positive effect on behavioral intention because it has a t-statistic value (4.018) greater than the critical value (1.96), a p-value of 0.000, and an original sample value of 0.320. Therefore, H5 is accepted. These results indicate that the higher the perceived risk experienced by customers regarding alternative payment methods other than QRIS, the stronger their intention to use QRIS. Customers perceive QRIS as the safest method to avoid these risks. These findings are consistent with the research conducted by Aji et al. (2020), which found that perceived risk has a significant positive effect on the intention to use e-wallets during the COVID-19 pandemic. From Table 2, it can be concluded from the results of loading factors that the indicator that has the most influence on behavioral intention is 'QRIS can prevent errors in transactions' (PR4). QRIS can reduce errors caused by human error, such as providing an incorrect amount of change. Therefore, a managerial implication that can be done is to prioritize educating the public about the role of QRIS in reducing risks associated with payment methods other than QRIS.

H6: Facilitating conditions have a significant positive effect on the use behavior of QRIS in Jabodetabek

Based on Table 4, the research findings indicate that facilitating conditions have a significant positive effect on use behavior. However, the effect size is relatively small as the p-value is close to the significance level (0.05), specifically 0.047, the t-statistic is 1.991, and the original sample value is 0.129. Therefore, H6 is accepted. This means that the more adequate the facilities and conditions for using QRIS, the higher the likelihood of QRIS usage behavior in the area. These findings are supported by the research conducted by Thusi and Maduku (2020), which found similar results that facilitating conditions have a significant positive effect on the use behavior of retail online banking customers. From Table 2, it can be concluded from the loading factor results that the indicator that has the most influence on behavioral intention is 'merchant in the vicinity always providing QRIS payment facilities' (FC4). Therefore, a managerial implication that can be done is to increase cooperation with merchants to ensure that QRIS facilities are always available in those merchants. To increase the adoption of QRIS among merchants, it is important to conduct socialization activities targeting micro-entrepreneurs above the age of 40. Socialization can also explain the costs imposed on businesses while providing tricks to ensure that daily revenue is not reduced due to transaction settlements. The issue of network constraints needs to be coordinated with telecommunications companies to provide network expansion and signal strengthening to support micro-businesses in conducting digital payment transactions (Wardhani et al. 2023).

H7: Behavioral intention has a significant positive effect on the use behavior of QRIS in Jabodetabek

Based on Table 4, behavioral intention has the largest and significantly positive effect on use behavior. This is evident from the t-statistic value, which is greater than the critical value (1.96), specifically 14.486. The original sample value is 0.708, and the p-value is 0.000. Therefore, H7 is accepted. This means that the stronger someone's intention is to use QRIS, the more frequently they will use QRIS. These research findings are consistent with the study conducted by Khoirunnisak et al. (2016) which found a significant positive relationship between behavioral intention and use behavior.

Managerial Implication

Based on the obtained results in this study, it is found that performance expectancy, effort expectancy, social influence, and perceived risk have a significant positive effect on the intention to use QRIS technology in Jabodetabek. However, facilitating conditions do not have a significant impact on the intention to use QRIS but have a significant positive effect on use behavior. Based on the SEM analysis, the indicators with the highest outer loadings on behavioral intention for each variable are "QRIS reduces transaction error risks" (PR4), "friends and family recommend and assist in using QRIS" (SI3), "QRIS is more accurate" (PE3), and "easy to use" (EE1). Therefore, based on the research findings and observations of QRIS technology, some programs that can be implemented by relevant stakeholders to maintain and enhance the intention and usage behavior of QRIS as a digital payment method in Jabodetabek include: Educate the public about the role of QRIS in reducing payment risks compared to other payment methods; QRIS developers can enhance user security, improve the reliability of transaction data, and ensure accurate and transparent financial reporting of QRIS; Implement referral programs; Increase public awareness and provide guidelines on how to easily use QRIS; Offer rewards and cost incentives to merchants who adopt QRIS.

From the hypothesis testing it can be concluded that the perceived risk plays a crucial role in influencing behavioral intention. Adding the perceived risk to UTAUT model can enhance its predictive power and could lead more accurate insight into QRIS user behavior. Other than that, It can provide more valuable guidance for stakeholder, including the businesses and policymakers. Strategies can be developed to mitigate perceived risk and enhance the likelihood

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In this study, 97.5% of the mobile banking or e-wallet users who knows QRIS in Jabodetabek have used QRIS, while the remaining percentage has not used it due to reasons such as lack of knowledge on how to use it, being accustomed to other payment methods, and the unavailability of QRIS at the merchants around them. They prefer using QR Code to pay for food and beverages at restaurants, cafeterias, or cafes. The frequency of their QRIS usage per month ranges from 2 to 7 times. The typical duration of their QRIS transactions is around 30 seconds. The most common challenges they faced when using QRIS are slow internet connection and the unavailability of QRIS at nearby merchants. Therefore, merchants should provide QRIS payment in their stores to attract more customers. The factors influencing the intention to use QRIS, ranked from the most influential to the least, include perceived risk, performance expectancy, social influence, and effort expectancy. Furthermore, the use behavior variable is predominantly influenced by behavioral intention. While, facilitating conditions have a minimal impact on QRIS usage behavior in the Jabodetabek area. A prioritized strategy to enhance QRIS technology adoption is to educate users about the role of QRIS in reducing payment risks.

Recommendations

This research still has some limitations, as it only considers the customer perspective and is limited to the Jabodetabek region only. Other than that, the customer preferences towards QRIS have not been included in the framework. Therefore, some suggestions for further research are provided to address the limitations and improve the quality of this research:

1. Investigate other variables to examine their impact on behavioral intention and use behavior. For example, variables like price value, habit, and hedonic motivation can be explored. Additionally, age, experience, and gender can be included as moderating variables to strengthen the relationships between independent and dependent variables.

2. Compare the perspectives between customers and merchants in using QRIS. Understanding the viewpoints of both parties can provide valuable insights into the adoption and usage of QRIS from different angles.

3. Conduct research from the perspectives of merchants, Payment Service Providers (PSPs), and regulators to delve deeper into the field of QRIS technology. Further studies can explore the impact of QRIS adoption on financial performance and competitive advantage among merchants. Additionally, investigating the competition among PSPs in providing QRIS payment systems to merchants would be beneficial.

4. Research the expansion of QRIS adoption in cross-border transactions within the ASEAN

region, considering both customer and merchant perspectives. Exploring the challenges and opportunities of QRIS adoption across borders can provide valuable insights into the potential of QRIS in facilitating regional transactions.

5. Sharpen the analysis of QRIS preferences using the method of conjoint analysis.

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