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THE INNOVATIVENESS AND VALUE OF QUICK RESPONSE CODE PAYMENT FOR MSMEs: THE INFLUENCE OF SECURITY- RELATED FACTOR⁷

The implementation of QR code technology aims to make it easier for MSMEs and consumers to create a cashless society. However, many MSMEs still need to implement digital payment methods over time. This research aims to evaluate the acceptance of QR codes for MSMEs, especially regarding the role of innovativeness, security, and ease of use. This research targets MSMEs in Indonesia that have used the QR Code as a tool for making transactions. Questionnaires were distributed via Google form online, totalling 489 respondents who filled out. After the data is obtained, it is analyzed using a partial least square using smart-pls 4.0. Behaviour intention (BIQ) is the most influential construct on user behaviour (UBQ). The other most significant factors are convenience (PEUQ) and security (PSQ) for users. Meanwhile, other variables such as Personal innovativeness (PI), PEUQ, PSQ, and perceived usefulness (PUQ) can increase the positive impact on Perceived value (PVQ). Several factors, such as PEUQ and PSQ, can positively influence PUQ. However, there is a construct with few results: Perceived usefulness on intention to use. This is because MSMEs are more oriented toward consumer needs to buy products and services. So these findings provide insight for the government and service providers to improve security, convenience, and necessary QR code features that support MSME business activities.

Keywords: Innovativeness; perceived value; QR Code Payment; security; technology adoption

JEL: B26; D91; F65; G41; M21

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⁷ This paper should be cited as: Musyaffi, A. M., Johari, R. J., Wolor, C. W., Jamal, A. A. A., Santika, A. Z., Arifi, M. A. (2023). The Innovativeness and Value of Quick Response Code Payment for MSMEs: The Influence of Security-Related Factor. – *Economic Studies (Ikonicheski Izsledvania)*, 32(6), pp. 89-107.

1. Introduction

Since COVID-19, everyone has had new habits because of the social restriction policy. The existence of restrictions makes social conditions also change. Both society and industry are affected by COVID-19. This can increase the use of technology to become increasingly rapid. In addition, the rapid penetration of mobile devices also influences digital payments by the public. Users are slowly changing traditional payment methods with paper money towards cashless payments due to the emergence of situations and increasing digital financial technology (Augsburg, Hedman, 2014). The adoption of digital payments has significantly increased since the arrival of COVID-19.

One of the digital payment models is mobile banking. E-banking can carry out banking transactions quickly and at low costs compared to transactions at branch offices (Abdulla, Al-Hassani, 2022; Samsudeen et al., 2020). However, complaints from e-banking users must be registered by the bank first and must transact via a smartphone with a SIM card (Musyaffi, Johari, et al., 2022). Another example of using digital payments is near-field communication (NFC), which can make payments without physical contact. However, the drawback of NFC is that it has to be near the device and requires certain devices that support the NFC feature (Jain, Dahiya, 2015; Tew et al., 2022). So other digital payment alternatives appear to overcome existing problems, one of which is using the QR Code. QR codes for payment can realize technology integration with everyday life by providing fast access via smartphones (Ashrafi, Easmin, 2023; Lou et al., 2017). The easier the information system is to use, the greater the tendency to continue using this technology (Musyaffi, Septiawan, et al., 2022). Therefore, the QR code payment method is widely used to attract customers for ease of payment, speed up transactions, reduce other costs (for example, using receipts), and reduce other operational costs (Hossain et al., 2018).

QR code is one of the popular trends to be used by consumers and sellers to get convenience and benefits in everyday life (Cheng, Huang, 2013; Musyaffi et al., 2021). Based on a survey conducted by Master card, Malaysia is the most significant number of e-wallet users, with a proportion of 40%. In contrast, by 64%, the use of cash transactions drastically reduced during the pandemic (Boon, 2020). The Philippines followed them at 36% and Thailand at 27%. Beck et al. found that using QR codes in financial services that use technology significantly impacts bank credit (Beck et al., 2022). Small businesses with no point-of-sale machine can carry out digital transactions using a QR code (Beck et al., 2022), so the QR code's role for small businesses is vital. Musyaffi, et al.'s research revealed that implementing digital payments for traders could significantly improve their business performance (Musyaffi, Gurendrawati, et al., 2022).

Indonesia has encouraged MSMEs to "go digital in 2020" since 2018 to become the most significant digital economy actor in Southeast Asia (Najib, Fahma, 2020). This ambition was realized long ago in 2015 when Indonesia published the Non-Cash National Movement (GNNT) program. As a result of this policy, a Digital Payment System (SPI) blueprint was created until 2025 to implement a cashless society by encouraging business actors, banks, the government, and the public to increase the frequency of digital payments. One of them is by applying the QR Code payment method. In Indonesia, the use of QR codes for payment

purposes has been regulated by Bank Indonesia to protect security in conducting transactions through the Quick Response Code Indonesia Standard (QRIS). The Indonesian government has implemented QRIS since 2020, where all parties utilizing the QR code payment mechanism are required to interface with QRIS. Even since 2021, the growth of using the QR Code for payment has increased sharply to 150% (Xendit, 2022).

However, there needs to be more knowledge of using the QR Code, resulting in differences in acceptance of QR Code technology by mobile (Ahmed, Damodharan, 2022; Alamoudi, 2022). This incident is due to the many cases of data abuse in Indonesia and globally. As many as 22% of digital payment users complained about cyber-attacks such as spam and data misuse. Research from Visa shows an essential connection between consumers and MSMEs when using digital payments, where as many as 80% of consumers are motivated by digital payments (Visa, 2020). Meanwhile, 54% of MSMEs have experienced an increase (15%) since using digital payments (Visa, 2020). However, as payment technology increases, risks arise when it cannot be appropriately managed (Mikkelsen et al., 2022). This can be seen during a pandemic where the risk of digital crime, including fraud and data misuse, is increasing (Mikkelsen et al., 2022). So, all stakeholders need to increase the digitization of MSMEs, primarily through implementing QR Code payments.

QR codes can also be used for visitors based on the relative benefit, observability, and compatibility aspects to measure visitors' attitudes toward using QR Code payments (Lou et al., 2017). The main factor that causes users to accept technology adoption is the ease of use and usefulness (Davis, 1989). These two factors support increasing the frequency of continuous use (Marakarkandy et al., 2017; Musyaffi et al., 2021; Shanmugavel, Micheal, 2022). In Thailand, QR code payments are used for retail transactions using the UTAUT and TAM model approach to measure acceptance of QR Code payments. Several studies have been conducted by other researchers regarding the acceptance of QR code payments in various fields, for example, mobile banking (Lin and Wu, 2021; Suebtimrat and Vonguai, 2021), mobile payment (Ashrafi, Easmin, 2023; Liébana-Cabanillas et al., 2015; Yan et al., 2021; Zhong, Moon, 2022), web-based (Rotsios et al., 2022), e-wallet (Osman et al., 2021; Senali et al., 2022), Transportation (Chen et al., 2020; Cheng, Huang, 2013), Retail (Rafferty, Fajar, 2022), and restaurant (Vuksanović et al., 2020). Based on the explanation above, this study aims to identify the factors influencing the acceptance of using QR Code payments through the TAM extension with the integration of Personal innovativeness, perceived value and security.

2. Literature Review

The successful implementation of technology has proven successful for both consumers and MSMEs when the users themselves accept the technology (Hanif, Lallie, 2021; Mohammadi, 2015; Musyaffi et al., 2021). Therefore, TAM is present to see users' acceptance level for using technology. PUQ shows that technology is free from strenuous effort (Alassafi, 2022). In other words, an indication of someone who has a high perception of the usefulness of technology is when they can use technology according to their needs. In comparison, PEOUQ shows the level of user perception in viewing technology as easier to use when it benefits

users, especially its features and functions that support everyday life (Ahmed, Damodharan, 2022; Musyaffi, Johari, et al., 2022).

The perceived value point of view is based on evaluating the costs and benefits offered (Sun, Qu, 2011; Zhong, Moon, 2022). Perceived value is also based on the customer's assessment, including the quality of services offered, features, brands, and prices. In the context of using the QR Code, this technology can offer value to users, especially contactless payments, which can be used quickly. In the case of use, security plays an essential role in increasing the value of technology for users (Ashrafi, Easmin, 2023). So that the safer the technology, the tendency of users to view technology as having higher value (Zhong, Moon, 2022). However, when using the QR Code is quite complex and complicated, it will affect the user's perception of the technology (Barbu et al., 2021; Yusof et al., 2021). So, it is imperative to simplify the technology for the users. This fact is supported by previous literature, which reveals substantial evidence of a positive relationship between PEUQ and PUQ with PVQ (Zhong, Moon, 2022). Based on this explanation, hypotheses 1, 2, 3, and 4, namely.

H₁: PI has a substantial positive influence on PVQ.

H₂: PEUQ has a substantial positive influence on PVQ.

H₃: PSQ has a substantial positive influence on PVQ.

H₄: PUQ has a substantial positive influence on PVQ.

Apart from making it easier for users to make transactions, using a QR code also requires transferring personal data. This causes vulnerabilities in data security, especially data misuse for specific purposes (Oliveira et al., 2016; Türker et al., 2022). So that users become worried, especially when they see a security risk. The impact users will think it is not very easy, so the process of use for these users takes work. Meanwhile, Lin & Kim (2016) state that there is a considerable association between security and anxiety toward PEUQ. So, the H₅ of this study is:

H₅: PSQ has a substantial positive influence on PEUQ.

A critical factor in continuously making someone adopt technology is its usefulness, especially inadequate features, and facilities. Venkatesh et al. (2012) revealed that the easier it is to use technology, the greater the possibility of experiencing the benefits and features received. While many researchers also support this statement, it is revealed that PEUQ is the most important antecedent in influencing PUQ (Joo, Sang, 2013; Kim et al., 2010; Türker et al., 2022). The same goes for the technology security factor. The safer, the greater the tendency to assume feature enhancements. At the same time, Türker et al. (2022) revealed that the more secure the data, the greater benefits of the product. The same thing was expressed by several researchers where PI was an essential factor in increasing user PUQ (Cheng, Huang, 2013; Liébana-Cabanillas et al., 2015).

H₆: PI has a substantial positive influence on PUQ.

H₇: PEUQ has a substantial positive influence on PUQ.

H₈: PSQ has a substantial positive influence on PUQ.

The more useful the technology used, the user will tend to continue using technology, especially QR Code technology (Ahmed, Damodharan, 2022; Musyaffi et al., 2021). Essential features such as the accessibility of the QR code without the help of tools such as point of sale (POS) allow users to use the QR code comfortably. They were, moreover, supported by ease of use. Users only need to scan the bar code on their respective smartphones to make transactions. The easier the technology is used, the user will tend to adopt the technology more frequently (Kejela, Porath, 2022; Yan et al., 2021). Some previous literature also supports this question where ease of use and usability can increase the potential of users to continue using technology (Abu-Taieh et al., 2022; Alshurideh et al., 2021; Hanif, Lallie, 2021; Tamilmani et al., 2021).

Previous literature proves that perceived security is an essential element that has a positive impact on users to continue using technology (Alshurideh et al., 2021; Mostafa, 2020; Senali et al., 2022). User perceptions of commercial product or service transactions increase sharply when they need time to evaluate the benefits of these products (Ashrafi, Easmin, 2023; Hanif, Lallie, 2021). Thus, making the acceptance process of the product depend on the value offering of the product. The existence of a high PVQ makes the intensity of the use of technology even higher (Gordon et al., 2018). In comparison, other researchers revealed that an increase in PSQ can make BIQ bigger (Chatterjee et al., 2020; Chopdar, 2022; Ibrahim et al., 2019; Semerikova, 2020) so that the critical role of the value offered in a product and service becomes an essential component.

PI is the desire of users to try new technologies (Suebtimrat, Vonguai, 2021). Generally, users are curious about new technology, so they want to try it. This fact was confirmed by Kim et al where users with high innovation generally tend to use technology (Kim et al., 2010). While various previous studies also found there is a positive impact of PI on BIQ (Liébana-Cabanillas et al., 2015; Shanmugavel, Micheal, 2022; Suebtimrat, Vonguai, 2021; Thakur et al., 2016), especially in the context of continuous adoption of QR Codes (Ahmed, Damodharan, 2022). Based on this explanation, hypotheses 9, 10, 11, 12, and 13 are:

H₉: PI has a substantial positive influence on BIQ.

H₁₀: PEUQ has a substantial positive influence on BIQ.

H₁₁: PUQ has a substantial positive influence on BIQ.

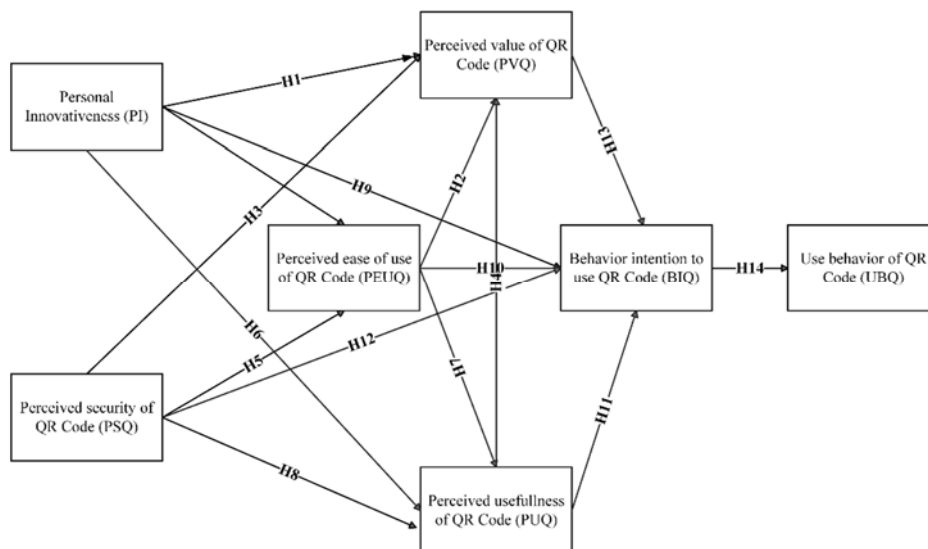
H₁₂: PSQ has a substantial positive influence on BIQ.

H₁₃: PVQ has a substantial positive influence on BIQ.

One indication of users adopting technology is the frequency to use it continuously. Users who use it regularly are satisfied with the technology. Previous studies have proven that the intention to use mobile payment with QR consistently increases the intensity of use (Ahmed, Damodharan, 2022; Martinez, McAndrews, 2022; Musyaffi, Johari, et al., 2022). So this intention point is crucial to maintain consistency in using technology (Venkatesh et al., 2012). From this presentation, the 14th hypothesis can be identified, namely:

H₁₄: BIQ has a substantial positive influence on UBQ.

Figure 1. Research model of QR Code



3. Material and Method

To conclude the results of the hypothesis more accurately, we must go through the proper methods and measuring instruments. This research targets users who use QR codes as payment methods when making transactions. A non-probability sampling method called convenience sampling was used to select respondents. The method was chosen because it follows the broad characteristics of the respondents. Researchers distributed questionnaires to SMEs that use the QR code payment instrument as one of their business transactions in various regions in Indonesia. In addition, the questionnaire was also made online and then distributed on social media to get a broader range of respondents. Researchers also disseminate online through the entrepreneur community so that targets according to the criteria can be collected. As a result, 512 respondents filled out the questionnaire. However, only 489 respondents filled out the entirely and according to the criteria. The selected sample is determined based on the sampling method of 5% resulting in a minimum sampling of 400 respondents. The researchers used this method because it followed the PLS-SEM method, which required a minimum sample. Therefore, this study also uses the G*power method in determining the minimum sample size. The sample size for this study was 0.95 (5%) larger than the minimum sample required, namely 0.8 or 111 respondents (Hair et al., 2019). Thus, the sample in this study met the minimum required criteria. The questionnaire consists of 28 questions, each of which has five answers. The author uses a Likert scale with a criterion value of 1 to 5. Respondents strongly disagree with a value of 1 to 5, which is very good. Meanwhile, based on the adapted questionnaire items, the researcher prepared question items based on previous researchers as shown in table 1 below.

Table 1. Measurement research

Variable	Item	Question	References
Personal Innovativeness to QR Code (PI)	PI1	I am always interested in updating the technology I use	(Kim et al., 2010; Liébana-Cabanillas et al., 2015; Lu et al., 2005)
	PI2	I want to know about various technologies related to my business.	
	PI3	I want to try new technologies that are interesting for developing my business.	
	PI4	I am one around my circle to exploit new technology.	
Perceived Security of QR Code (PSQ)	PSQ1	There is a low risk of third parties accessing my data	(Schierz et al., 2010; Türker et al., 2022)
	PSQ2	Using the QR Code carries no risk of data abuse (e.g., business partner name and payment information)	
	PSQ3	The risk of being billed is low (e.g., bank account data and credit card information) when using a QR code as a means of payment.	
	PSQ4	Use QR codes for secure transactions.	
Perceived Value of QR Code (PVQ)	PVQ1	I have good experience when using QR code because it provides good value	(Mou et al., 2019; Zhong and Moon, 2022)
	PVQ2	Experience using QR Code was worth the money	
	PVQ3	QR Code service providers provide a better service. I used it for payment.	
	PVQ4	Overall, I am delighted with all the value the QR Code payment method offers.	
Perceived Usefulness (PUQ)	PUQ1	Transactions using QR codes are easier to handle	(Musyaffi, Septiawan, et al., 2022; Schierz et al., 2010; Türker et al., 2022)
	PUQ2	The payment method using a QR code is helpful for my business.	
	PUQ3	Using QR codes as a means of payment makes me more flexible.	
	PUQ4	Using a QR code, I can quickly make transactions in my business.	
Perceived Ease of Use (PEUQ)	PEUQ1	The QR Code payment mechanism is effortless to use.	(Ha and Im, 2014; Michael Musyaffi et al., 2022; Zhong and Moon, 2022)
	PEUQ2	The QR Code payment mechanism is clear and simple to understand	
	PEUQ3	It is simple to learn how to pay using a QR Code	
	PEUQ4	Using QR codes to make a payment needs less work.	
Behaviour Intention to use QR Code (BIQ)	BIQ 1	I prefer to use QR codes in future	(Musyaffi, Septiawan, et al., 2022; Schierz et al., 2010; Türker et al., 2022)
	BIQ 2	I recommend using a QR code over other methods.	
	BIQ 3	I will implement QR codes in my business	
	BIQ 4	I want to continue to use QR Code as my mode of payment	
Use Behavior of QR Code (UBQ)	UBQ1	I have used the QR Code several times in my business transactions	(Ericaska et al., 2022)
	UBQ2	I often use QR codes	
	UBQ3	I explore QR codes more often.	
	UBQ4	I use QR codes more often than other payment systems.	

This study uses SEM-PLS to test the hypotheses using Smart-PLS 4.0 software. The PLS-SEM stage consists of several stages: the evaluation of measurement models and structural models (Hair, Alamer, 2022; Musyaffi, Gurendrawati, et al., 2022). At the Measurement model stage, it was tested using construct validity to evaluate data (Average Variance Extracted (AVE) and outer loading) and internal consistency reliability (Cronbach's alpha (CA) and composite reliability (CR)). The aim is to measure the reliability of the data in each construct. In addition to measuring validity, the SEM-PLS also evaluates the discriminant

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model through the Fornell-locker, Heterotrait-Monotrait Ratio (HTMT), and Cross-loading. The second stage is to evaluate the Structural model by evaluating R square (R²), Predictive relevance (Q²), path coefficient (to measure the relationship between constructs), and collinearity issue (VIF<5). The final step is to test the hypothesis by p-value to the error rate (five percent).

4. Result

4.1. Measurement Model

The initial stages of analysis using PLS must be carried out in the measurement model to test the validity with outer loading and AVE. Then proceed with measuring reliability by testing CA and CR.

Table 2. PLS algorithm results in evaluating QR Code payments

Item	Outer loading	VIF (<5)	CA	CR	AVE
Personal Innovativeness (PI)			0.850	0.897	0.686
PI1	0.807	2.092			
PI2	0.858	2.449			
PI3	0.799	1.981			
PI4	0.846	1.770			
Perceived Security of QR Code (PSQ)			0.849	0.898	0.688
PSQ1	0.825	1.804			
PSQ2	0.875	2.231			
PSQ3	0.820	2.001			
PSQ4	0.795	1.828			
Perceived Value of QR Code (PVQ)			0.828	0.886	0.660
PVQ1	0.835	2.053			
PVQ2	0.820	1.760			
PVQ3	0.834	2.040			
PVQ4	0.759	1.512			
Perceived Usefulness (PUQ)			0.879	0.917	0.735
PUQ1	0.882	2.789			
PUQ2	0.881	2.880			
PUQ3	0.884	2.639			
PUQ4	0.778	1.599			
Perceived Ease of Use (PEUQ)			0.799	0.866	0.618
PEUQ1	0.750	3.115			
PEUQ2	0.755	3.153			
PEUQ3	0.838	2.136			
PEUQ4	0.799	1.982			
Behavior Intention to use (BIQ)			0.840	0.893	0.676
BIQ 1	0.830	1.993			
BIQ 2	0.821	1.935			
BIQ 3	0.818	1.836			
BIQ 4	0.820	1.787			
Use Behavior of QR Code (UBQ)			0.776	0.858	0.615
UBQ1	0.868	2.000			
UBQ2	0.890	2.479			
UBQ3	0.752	1.110			
UBQ4	0.842	2.003			

The first step in conducting an analysis using SEM-PLS is to test validity (Hair and Alamer, 2022). The validity test evaluates the AVE and outer loading with a minimum recommended value of 0.5 and 0.7, respectively. If the value above is recommended, it means that each construct in this study meets the elements of good validity. Based on Table 1 above, the smallest outer loading value is 0.750 in the PEUQ1. The enormous outer loading value is in the UBQ2 construct (0.890). From the point of view of evaluating outer loading, all constructs in this study have above 0.7 (most minor 0.750). So the constructs in this study are valid. However, an AVE evaluation also needs to be carried out to strengthen this. The smallest AVE value is 0.615 in UBQ.

In comparison, the highest AVE value is in the PUQ construct (AVE value = 0.735). Thus, based on the evaluation of outer loading and AVE from all items meet the criteria for good validation. The next is to evaluate the reliability of each construct through CR and CA more than 0.7 (Hair and Alamer, 2022). The lowest CR value based on Table 1 above is 0.858 (CR). At the same time, the highest value of CR is in the PUQ (0.917). So based on the size of the CR parameters, it meets the reliability of the data. Then in the CA category, the highest score was 0.879 (PUQ), and the lowest score was 0.776 (UBQ). So that the construct in this study fulfils the CA aspect, based on this explanation, it caches constructs in this study fulfil the elements of good data reliability.

Table 3. Fornell-lercker of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI	UBQ
BIQ	0.822						
PSQ	0.584	0.829					
PUQ	0.196	0.110	0.857				
PVQ	0.568	0.578	0.259	0.812			
PEUQ	0.393	0.336	0.652	0.373	0.786		
PI	0.256	0.259	0.051	0.248	0.125	0.828	
UBQ	0.739	0.632	0.317	0.589	0.475	0.254	0.784

The next step in carrying out the measurement model is to analyze discriminant validity through fornell-lercker evaluation. Table 3 above shows the output results from SmartPLS 4 regarding fornell-lercker. To fulfill discriminant validity, the AVE square root value between the same constructs must exceed the value of the construct with other different constructs. For example, the fornell-lercker value BIQ – BIQ (0.822) must have a more excellent value than PSQ – BIQ (0.584), PUQ-BIQ (0.196), PVQ-BIQ (0.568), PEUQ-BIQ (0.393), PI – BIQ (0.256), UBQ-BIQ (0.739). The valuation of BIQ – Compared to other constructions, BIQ is the most valuable. Based on the description in Table 3, the construct values are PSQ – PSQ (0.829), PUQ – PUQ (0.857), PVQ – PVQ (0.812), PEUQ – PEUQ (0.786), PI – PI (0.828), and UBQ – UBQ (0.784) exceed the value of each construct with other constructs. Hence, all constructs in this study passed the Fornell-Lercker test of discriminant validity.

Table 4. Cross Loading of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI	UBQ
BIQ1	0.830	0.462	0.282	0.435	0.486	0.241	0.572
BIQ2	0.821	0.437	0.195	0.438	0.366	0.165	0.595
BIQ3	0.818	0.515	0.057	0.481	0.212	0.198	0.597
BIQ4	0.820	0.502	0.116	0.511	0.237	0.235	0.664
PEUQ1	0.029	0.052	0.676	0.162	0.750	0.010	0.171
PEUQ2	0.034	0.061	0.696	0.160	0.755	0.007	0.164
PEUQ3	0.463	0.388	0.439	0.361	0.838	0.152	0.493
PEUQ4	0.562	0.446	0.344	0.422	0.799	0.187	0.560
PI1	0.144	0.147	0.152	0.153	0.159	0.807	0.194
PI2	0.231	0.188	0.103	0.193	0.126	0.858	0.205
PI3	0.163	0.234	0.048	0.157	0.028	0.799	0.151
PI4	0.268	0.269	0.021	0.278	0.098	0.846	0.263
PSQ1	0.541	0.825	0.112	0.502	0.321	0.297	0.573
PSQ2	0.513	0.875	0.137	0.540	0.333	0.239	0.582
PSQ3	0.459	0.820	0.041	0.395	0.227	0.139	0.471
PSQ4	0.406	0.795	0.059	0.464	0.212	0.159	0.448
PUQ1	0.197	0.119	0.882	0.228	0.543	0.073	0.337
PUQ2	0.183	0.111	0.881	0.233	0.532	0.035	0.319
PUQ3	0.108	0.026	0.884	0.197	0.594	0.002	0.220
PUQ4	0.186	0.125	0.778	0.231	0.560	0.067	0.215
PVQ1	0.460	0.464	0.246	0.835	0.301	0.213	0.455
PVQ2	0.520	0.481	0.216	0.820	0.305	0.147	0.514
PVQ3	0.400	0.443	0.297	0.834	0.363	0.217	0.457
PVQ4	0.459	0.489	0.083	0.759	0.243	0.233	0.483
UBQ1	0.709	0.559	0.245	0.524	0.404	0.220	0.868
UBQ2	0.630	0.554	0.195	0.491	0.333	0.235	0.890
UBQ3	0.283	0.200	0.541	0.285	0.512	0.084	0.452
UBQ4	0.597	0.569	0.207	0.507	0.364	0.222	0.842

Next is to ensure the correlation between items has measurements with other items through cross-loading evaluation. When each item's cross-loading value against the construct exceeds the cross-loading value, the item meets good discriminant validity criteria through cross-loading evaluation. For example, based on Table 4, the BIQ construct values for items BIQ1 (0.830), BIQ2 (0.821), BIQ3 (0.818), and BIQ4 (0.830) are as follows: (0.820). While the value of BIQ1, BIQ2, BIQ3, and BIQ4 items against several constructs such as PSQ (0.462, 0.437, 0.515, 0.502), PUQ (0.282, 0.195, 0.057, 0.116), PVQ (0.435, 0.438, 0.481, 0.511), PEUQ (0.486, 0.366, 0.212, 0.237), PI (0.241, 0.165, 0.198, 0.235) and UBQ (0.572, 0.595, 0.597, 0.664) are more significant than BIQ. Meanwhile, the other constructs have a more excellent value than the other constructs. Thus, all items in this study meet the cross-loading criteria.

Table 5. Heterotrait-Monotrait Ratio (HTMT) of QR Code

	BIQ	PSQ	PUQ	PVQ	PEUQ	PI
PSQ	0.683					
PUQ	0.234	0.128				
PVQ	0.678	0.682	0.305			
PEUQ	0.467	0.362	0.814	0.431		
PI	0.286	0.288	0.113	0.282	0.188	
UBQ	0.886	0.739	0.466	0.727	0.623	0.293

Evaluation of the HTMT criteria serves to measure hetero-trait criteria with mono-traits. A good HTMT must have a value below 0.9 so that no correlation occurs (Henseler *et al.*, 2015). Based on Table 5 above, the range of HTMT values ranges from the smallest of 0.113 (PI – PUQ) to the largest with a value of 0.886 (UBQ – BIQ). The HTMT value in Table 5 is below 0.9. Hence, it may be argued that none of the constructs correlate.

Next is to evaluate the collinearity of a construct. A construct is free from collinearity when its VIF value is below 5 (Hair and Alamer, 2022). Based on Table 2 above, VIF values are in the range of 1.110 – 3.153, with the smallest VIF value in the UBQ3 item (VIF=1.110, <5) and the immense VIF value in the PEUQ2 item (VIF=3.153, <5). All constructs are free from collinearity because all items have a VIF value below 5.

4.2 Structural Model

The structural model serves to evaluate the model framework that has been made. Notes for predicting the model are through Predictive Relevance (Q2) and R Square (R2).

Table 6. Q2 and R2 evaluation

Construct	Q ²	R ²	Decision
BIQ	0.293	0.449	Moderate
PUQ	0.314	0.438	Moderate
PVQ	0.249	0.388	Moderate
PEUQ	0.058	0.113	Weak
UBQ	0.326	0.547	Moderate

The most of R2 squares in this construct are in the moderate category. While there is only 1 R2 that is categorized as weak, namely in the PEUQ construct (R2 = 0.113), there is only an 11.3% joint effect on the PEUQ construct. The most significant joint effect in this study was found in UBQ, with an R square value of 0.547. that is, there is a mutual influence between the BIQ and UBQ constructs of 54.7% based on the formula R2. At the same time, the other most enormous R2 value is at BIQ (R2=0.449). Thus, the PEUQ, PUQ, PSQ, and PVQ constructs influence BIQ by 44.9%. After evaluating R2, the next step is to conduct Q² to predict the model framework that has been built with a recommended value above 0 (Henseler *et al.*, 2015). Table 6 above shows the smallest value in PEUQ (Q2 = 0.058). While other construct values such as BIQ, PUQ, PVQ, and UBQ have a suitable model framework with a value range of 0.249 – 0.326.

4.3 Hypothesis testing

This section discusses the determination of the hypothesis that has been proposed following the output results from smart-pls according to the details in Table 7.

Table 7. Hypothesis result

Hypothesis		Path	P Values	Decision
H1	PI -> PVQ	0.098	0.002	Accepted
H2	PEUQ -> PVQ	0.108	0.020	Accepted
H3	PSQ ->PVQ	0.503	0.000	Accepted
H4	PUQ -> PVQ	0.128	0.003	Accepted
H5	PSQ -> PEUQ	0.336	0.000	Accepted
H6	PI -> PUQ	-0.004	0.457	Rejected
H7	PEUQ -> PUQ	0.693	0.000	Accepted
H8	PSQ -> PUQ	-0.121	0.001	Accepted
H9	PI -> BIQ	0.074	0.014	Accepted
H10	PEUQ -> BIQ	0.190	0.001	Accepted
H11	PUQ -> BIQ	-0.046	0.196	Rejected
H12	PSQ -> BIQ	0.333	0.000	Accepted
H13	PVQ -> BIQ	0.299	0.000	Accepted
H14	BIQ -> UBQ	0.739	0.000	Accepted

Based on the table above, there are 14 hypotheses proposed. However, there are 2 hypotheses that are rejected, namely H11 concerning PUQ with BIQ (0.196) and H6 concerning PI – PUQ (0.457). This is because the two hypotheses do not meet the criteria set out in determining the hypothesis; the p-value (0.05) must be smaller when compared to the p-value. H1, H2, H3, and H4 significantly positively affect PVQ. This is because the PI (0.002), PEUQ (0.020), PSQ (0.000), and PUQ (0.003) have a p-value below 0.5. So, it can be concluded that the fourth hypothesis is accepted. Next is the evaluation on H5 regarding PSQ with PEUQ. The p-value for hypothesis H5 is less than 5% (0.000), suggesting PSQ has a strong positive effect on PEUQ. The seventh and eighth hypotheses regarding the impact of PEUQ (0.000) and PSQ (0.001) on PUQ have a p-value below 5%. So it can be concluded that the seventh and eighth hypotheses, namely PEUQ and PSQ, have a positive impact on PUQ, likewise with hypotheses 9, 10, 12, and 13 regarding the relationship of several constructs such as PI, PEUQ, PSQ, and PVQ with BIQ. Based on the output of Table 7 above, the p-value at PI (0.014), PEUQ (0.001), PSQ (0.000) and PVQ (0.000) with BIQ have a value below 5% so that the four hypotheses are accepted-finally, the 14th hypothesis regarding the impact of BIQ on UBQ. The p-value on H14 (0.000) is below the specified error rate (5%), so it can be concluded that BIQ significantly impacts UBQ.

The highest path coefficient value is 0.739 in the 14th hypothesis (BIQ à UBQ). The BIQ construct has a significant positive relationship of 73.9% to UBQ. At the same time, the second largest relationship is in the second hypothesis regarding PEUQ -> PUQ, with a significance value of 69.3% (path=0.693). Another most considerable value is in the 3rd hypothesis regarding PSQ to PVQ with a significance level of 50.3% (path=0.503). At the same time, some other hypothetical relationship coefficients have coefficient values between 9.8% – 33.6%, for example, PI -> PVQ (path=0.098), PEUQ -> PVQ (path=0.108), PUQ ->

PVQ (path=0.128), PSQ → PEUQ (path=0.336), PSQ → PUQ (path=-0.121), PI → BIQ (path=0.074), PEUQ → BIQ (path=0.190), PSQ → BIQ (path=0.333), and PVQ → BIQ (path=0.299). Thus, it can be concluded that of the 14 hypotheses, 1 hypothesis (H8, PSQ → PUQ) has a negative effect, and two hypotheses do not have a significant effect (H11 and H6). in contrast. The rest had a significant positive impact.

5. Discussion

This study is extending the technology acceptance model by identifying other characteristics that influence QR Code adoption, notably PI, PSQ, and PCQ. The existence of the extended variable contributor is proven to strengthen TAM to measure technology adoption. BIQ is proven to be the variable that has the most positive effect on UBC at 73.9%. This shows that MSMEs are aware that the use of the QR Code can be beneficial for the sustainability of their business. Venkatesh stated that the main factor in making users use technology is their desire to use it (Venkatesh *et al.*, 2012). The higher the intention of MSMEs, the greater the likelihood of continuing to use QR Code payments. This is also proven by previous research where the intention to use can continuously increase the use (Ahmed and Damodharan, 2022; Martinez and McAndrews, 2022).

This study demonstrates that the user's purpose to utilize QR code technology can improve the frequency of ongoing use. This is supported by other researchers, where the most significant factor for users when using the QR code intensely is when they plan to use the QR code application (Martinez and McAndrews, 2022). This fact is backed by other study findings indicating that the important element in embracing technology is the convenience and functionality of the technology to assist daily living (Hanif and Lallie, 2021; Musyaffi *et al.*, 2021; Tamilmani *et al.*, 2021). Users are optimistic that using QR codes can attract consumers to buy. Especially when there are transactions and consumers. Users experience a positive experience using the QR code because it is accessible and valuable. Users also feel that using the QR Code payment method is a good and convenient idea, thereby increasing usage behaviour on an ongoing basis. This study's findings do not support the perceived usefulness of QR Code technology on technology adoption. This is due to the role of MSMEs who view the use of the QR code to attract customers to come. Most MSMEs agree that the QR Code also has good features, but if there is no impact on sales or an increase in their brand, then MSMEs may not be interested in adopting the QR Code payment method. This fact also supports several other studies where PUQ did not produce a positive impact on BIQ (Osman *et al.*, 2021; Rafferty and Fajar, 2022).

In addition to the convenience factor and technological benefits users feel, another factor that has increased the adoption of the QR Code is PI. PI is a critical factor that can make someone continue to use QR technology in using payment methods (Ahmed and Damodharan, 2022; Ding, 2019; Lu *et al.*, 2005). Based on research (Li *et al.*, 2021), PI is an essential factor that forms the basis for the continued application of information technology. The higher the user's innovation, the more continuous application will be maintained. Some previous researchers even recommended more investigations regarding PI to BIQ because it is synonymous with continuous system implementation (Acuti *et al.*, 2022; Alamoudi, 2022; Suebtimrat and

Vonguai, 2021; Suo et al., 2022). Users with high innovation are identical to accepting the technology (Liébana-Cabanillas *et al.*, 2015). Although the results of this study also produce things different from this hypothesis, where PI does not have a significant effect on PUQ. This is because the PI initiative does not see PUQ increasing technological innovation based on adopting QR codes. Lin & Wu [22] also supported the results of this research, where PI is not a reason for someone to increase PUQ.

This research also proves that the value contained in QR code technology is significant for MSMEs. Research from Zhong & Moon (Zhong and Moon, 2022) proves that convenience can increase the quality and value of the technology used. When the QR Code used by MSMEs has various convenient features, they view the QR Code as valuable and worth using. One of the conveniences experienced by MSMEs to operate QR Code is fast, and there is no need to bother making transactions because it has a self-service nature. Consumers can carry out their transactions by scanning barcodes so that it does not require much effort. Previous research also revealed that when many features are available according to needs, these users tend to perceive the technology used to be more valuable (Alnemer, 2022; Ashrafi and Easmin, 2023).

In addition, the security factor is also essential to maximize MSME acceptance of the use of the QR code. Maintaining data security, especially those related to MSME finance, is an essential factor that makes users feel safe. Users who make transactions using a QR code certainly have concerns about whether the money sent reaches their account. Moreover, there is a risk of data and password misuse so that it can break into user accounts. However, until now, QR code service providers have excellent service as call centres when users need help with QR codes. In addition, service providers also have QRIS as a more protected payment standard in Indonesia. This makes users confident that their data and transactions are guaranteed security. This was directly confirmed by Lin & Kim (Lin and Kim, 2016), where a strong relationship exists between security and privacy in increasing or decreasing one's perception of convenience. Previous literature proves that PSQ has an influence on BIQ, especially in adopting technology (Akinuwesi et al., 2022; Alshurideh et al., 2021; Chang et al., 2022; Rafferty and Fajar, 2022).

6. Conclusion and Implication

Significant findings in this study indicate increased QR Code usage in SMEs. The most significant factor influencing this increase in usage is based on the intention to use the MSMEs themselves. The findings also show that the TAM model is developing with other constructs, such as personal innovativeness, perceived security, and perceived value, which are proven to strengthen the model. QR Code offers a fast payment process. In addition, the QR code has great value concerning the sustainability of MSME businesses. Consumers can process payments via QR Code in a self-service manner, using a smartphone to scan the barcode. So that MSMEs make a small effort. The results of this study show that the QR code's benefits do not influence the intention to use the QR code. This is because a more significant focus for MSMEs is business sustainability. MSMEs consider the QR code

payment model modern and up-to-date to attract consumers to buy MSME products and services. The security of the QR code is also strong evidence that can motivate and consider the QR Code valuable. An intrinsic factor is attached to the QR Code that can be controlled and accounted for. So MSMEs tend to recommend the QR Code payment method to consumers and other MSME partners.

The findings of this investigation show personal innovativeness has a considerable impact on QR Code adoption. Even though the most extensive construct comes from the MSMEs' intention, the encouragement of innovativeness to use the QR Code is also essential. Therefore, the role of socialization and technological literacy is needed for MSMEs to increase QR Code adoption. The impact of the results of this research on QR Code service providers is more towards adjusting features and layouts appropriate for MSME types with sufficient or limited technological literacy. Service providers can also provide various attractive features for MSMEs, such as discounts and point offer to attract consumers using the QR Code payment method. Another important thing is the guarantee of data security. The establishment of a QR code standard by the Indonesian government certainly increases user trust. However, the majority of MSMEs are still worried, especially about the in and out of transactions. So it is very important to develop several notification features that transactions have been entered. MSMEs also need a responsive call centre or simple guidance when there are problems using the QR Code. This research can be helpful for regulators such as the government to develop policies, especially regarding user safety. So that the government can create a cashless payment climate for sellers can accept, consumers, and digital payment managers who use the QR Code.

This research only targeted respondents who are given only include QR Code users in MSMEs. Suggestions for previous research should be to compare QR code users and those who are not users. So, it will be clear how the impact will occur. Then, in the context of the QR code, this research only focuses on MSMEs. So that only MSMEs or entrepreneurs can be generalized.

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