




# “QR-code-based payment. Does the consumer intend to adopt a retail buying transaction?”

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<b>ARTICLE INFO</b>	Widayat Widayat, Marsudi and Ilyas Masudin (2023). QR-code-based payment. Does the consumer intend to adopt a retail buying transaction?. <i>Banks and Bank Systems</i> , 18(3), 1-13. doi: <a href="https://doi.org/10.21511/bbs.18(3).2023.01">10.21511/bbs.18(3).2023.01</a>
<b>DOI</b>	<a href="http://dx.doi.org/10.21511/bbs.18(3).2023.01">http://dx.doi.org/10.21511/bbs.18(3).2023.01</a>
<b>RELEASED ON</b>	Friday, 30 June 2023
<b>RECEIVED ON</b>	Monday, 16 January 2023
<b>ACCEPTED ON</b>	Friday, 02 June 2023
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<b>JOURNAL</b>	"Banks and Bank Systems"
<b>ISSN PRINT</b>	1816-7403
<b>ISSN ONLINE</b>	1991-7074
<b>PUBLISHER</b>	LLC “Consulting Publishing Company “Business Perspectives”
<b>FOUNDER</b>	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

**42**



NUMBER OF FIGURES

**2**



NUMBER OF TABLES

**9**

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## BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"  
Hryhorii Skovoroda lane, 10,  
Sumy, 40022, Ukraine  
[www.businessperspectives.org](http://www.businessperspectives.org)

**Received on:** 16<sup>th</sup> of January, 2023

**Accepted on:** 2<sup>nd</sup> of June, 2023

**Published on:** 30<sup>th</sup> of June, 2023

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2023

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# QR-CODE-BASED PAYMENT. DOES THE CONSUMER INTEND TO ADOPT A RETAIL BUYING TRANSACTION?

## Abstract

The Quick Response (QR) code payment is a relatively new means of payment in Indonesia. Even though this strategy offers a great deal of use, not many people are familiar with it or use it. In this regard, it is fascinating to look at what makes people use the QR Code payment method. The quantitative study used a five-point Likert scale questionnaire to sample e-money users through social media groups. In addition, structural Equation Modeling (SEM), employee Smart-PLS 3.0, was used to examine the data. The results show that social factors affect how people feel about QR code payments, and facilitating support and performance expectations affect how likely they are to use it. Also, attitudes, a mediator of social impact, can change the effect of support performance expectations on adoption intentions. Because of this, people accepting QR code-based payments take a positive attitude. Also, the facilities and environment affected a positive attitude, expected performance, ease of operation, and social interactions. Based on the results, the recommendation for financial institutions and innovation is that the facility and social environment are critical to the success of financial innovation. So, if more people want to use QR code-based payments, financial institutions need to make it easy for them.

## Keywords

payment, quick response, financial technology,  
purchasing transaction, determinant

## JEL Classification

D15, D90, G21, G23

## INTRODUCTION

The banking industry has substantially grown in technological innovation in recent decades. One of the most important recent developments is the widespread adoption of digital currency for commercial transactions. Individuals are becoming more reliant on electronic money for their day-to-day financial dealings. Electronic currency is used for many transactions involving various essential commodities. In addition, the increasingly massive use of smartphones, supported by adequate infrastructure, has increased the use of electronic money (Humbani & Wiese, 2017; Selfira et al., 2019; Widayat et al., 2020). The advancement of payment technology coincides with the banking industry's expansion. The use of Quick Response (QR) code technology in transaction payments is one of the most important recent innovations (Ahmad et al., 2020; Suebtimrat & Vonguai, 2021; Suo et al., 2021; Yan et al., 2021). Using QR codes for conducting financial transactions is now standard across the banking sector in Indonesia. Various banks in Indonesia are now providing Quick Response codes (QR codes) as a payment option for use in retail transactions. However, it is fair to say that this applies to making payments and is still in its infancy.



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### Conflict of interest statement:

Author(s) reported no conflict of interest

Various parties deliberately propagated the benefits customers would receive with the QR code payment. Even though this payment method may benefit consumers, the community is still not that massive. Only some people are aware and willing to adopt the payments using fintech media based on QR Code. Therefore, adopting this payment system is relatively limited to certain circles of society, especially in several countries (Bradford et al., 2019). A prior study that uses a well-known basis is as having a relatively limited amount of proof. Several considerations affect QR code payment adoption. Therefore, this study examines performance expectancy, social factors, and facilitating conditions that affect the adoption intention of the QR code payment and the mediation role of attitude.

## 1. LITERATURE REVIEW AND HYPOTHESES

### 1.1. Quick response codes

Barcodes are used in a wide variety of commercial activities today. The barcode began as a straightforward rectangular block with one-dimensional, but it has since evolved to take on a more complex three-dimensional shape. Two-dimensional barcodes, or Quick Response (QR) Codes, are composed of a dot matrix that may be read by a dedicated QR scanner or the camera on a smartphone. When checking, the software on the device converts the matrix points into numeric characters or letters. A QR code is a machine-readable barcode consisting of black modules in a square grid on a white background. Information is mined from gridlike patterns both horizontally and vertically. Scan this square barcode (online or offline) to be taken to a specific page or to finish a particular transaction. Masahiro Hara originally developed it from the Denso Wave Corporation company in Japan in 1994 to carry out vehicle tracking and high-speed component scanning in the automotive industry. It then quickly spread outside the industry due to its fast readability and larger storage capacity than standard barcodes (Surekha et al., 2015). China is a country that uses QR codes a lot for payment transactions (Bradford et al., 2019). QR codes can be used for various purposes, including providing customers with information about a restaurant's menu, directing them to a specific location on a map, displaying product price lists, and inviting people to meetups. It is accepted as a payment method in commercial transactions conducted via mobile phones (Surekha et al., 2015; Fong et al., 2019; Yan et al., 2021).

### 1.2. Technology adoption framework

How widely QR codes are used in financial transactions is a form of research into how widely a given technology is used. The study of the adoption of technology is very thick with adoption theories. The universal approach to use of technology (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000) and the theory of planned behavior theories are relevant and widely used by researchers (Abu-Taieh et al., 2022; Friadi et al., 2018). A model was constructed to describe how new technology and its many intrinsic elements are accepted and employed. This paradigm has seen extensive implementation. According to this paradigm, users' acceptance of new technology depends on perceived utility. This term refers to the extent to which users believe that technology will assist in improving technological performance. The other component is what is known as "perceived ease of use," which refers to the degree to which people are at ease utilizing various technological capabilities. These elements ultimately determine the user's attitude toward the acceptance of technology. The perceived usefulness of the activity will also influence the behavioral intention to adopt it. Attitudes determine behavior, which in turn affects actual acceptance. This model has been widely applied in realizing phenomena in the economic and business fields that intersect with technology, such as fintech and e-money (Napitupulu et al., 2017; Fong et al., 2019; Friadi et al., 2018; Rahmath et al., 2013; Lee, 2018).

Venkatesh frameworks are broad, trendy, and widely used to influence behavioral intentions for technology adoption. That framework illustrates that performance and effort expectancy likely affect customer intentions to use or purchase (Musyaffi et al., 2021). They were besides, affected by social influence factors and conditions that facilitated (Abu-

Taieh et al., 2022; Alshehri, 2012; Chang, 2012; Gupta et al., 2019; Thomas et al., 2013; Venkatesh et al., 2016). Some of the modifications or adoptions of the concept mention several other factors. In that study, the authors included risk perceptions to rebuild the model in the Indonesian context. User expectations of technology performance influence their intention to adopt the technology. Previous research has shown evidence of the influence of perceived performance on behavioral intention to adopt mobile banking. One more piece of evidence demonstrates that the degree to which customers value the use of technology influences their decision regarding whether or not to embrace it. This model is determined by the user's impression of the delivery of promises connected to the utilization of a specific means of payment.

In addition to the Venkatesh framework, the TPB theory is another hypothesis frequently utilized to explain the phenomenon of technology adoption. For example, in the Theory of Planned Behavior, which Ajzen initiated, a person's attitude is the closest explanation of the intention to behave. Studies that lead to the relationship between the two variables based on the TPB theory have been carried out in many fields (Ajzen, 1991, 2012). However, several studies examined the variables influencing customers' attitudes or e-money users (Ayudya & Wibowo, 2018; Friadi et al., 2018; Widayat et al., 2020). Other findings show that attitudes influence intentions to use bank services (Hu et al., 2019) and attitudes toward a willingness to pay for extra QR code information (Lombardi et al., 2017). In addition, research conducted in some countries reveals the results of numerous investigations on the factors that influence consumers' propensity to make payments using QR codes (Ahmad et al., 2020; Derian et al., 2019; Gao et al., 2018; Suebtimrat & Vonguai, 2021; Suo et al., 2021). Figure 1 presents the conceptual representation of the hypothesized relationships between the hypotheses.

Numerous previous studies attempt to explain the phenomenon of new technology acceptance based on broadly accepted theoretical assumptions. Let us say Abdinoor et al. (2017) and Lee (2018); some researchers combine multiple approaches from Rahmath et al. (2013) and Salimon et al. (2018). Some studies focus on explaining the adoption or acceptance of electronic money platforms but

not on the issue of receiving QR code-based electronic money. Empirical evidence focusing on QR code payments is relatively limited. For example, a study by Wang and Kankham (2018) regarding the relationship between perceptions and attitudes towards marketing communication with QR-based payments, the relationship between using this system-based payment system and income (Herawatia & Rahmaan, 2019), studies regarding their use in the management of goods records in the warehouse (Nicolas, 2019), studies on the potential use of QR Payment (Krishna et al., 2016; Suo et al., 2021) and using QR to open toll road gates (Karthikayeni et al., 2018). In their study conducted in Cambodia, Do et al. (2020) show that perceived transaction speed (PTS), performance expectancy (PE), and social influence (SI) have no significant effect on the intention to use a QR-based payment system. On the other hand, a study by Yan et al. (2021) and Ahmad et al. (2020) found that attitude mediates the influence of perceived benefits, perceived ease of use, and perceived usefulness affected the acceptance of QR code payments. Similar to the study by Rosli et al. (2020) in Malaysia and Derian et al. (2019) in Jakarta, this relates to the determinant of intent to QR code payment.

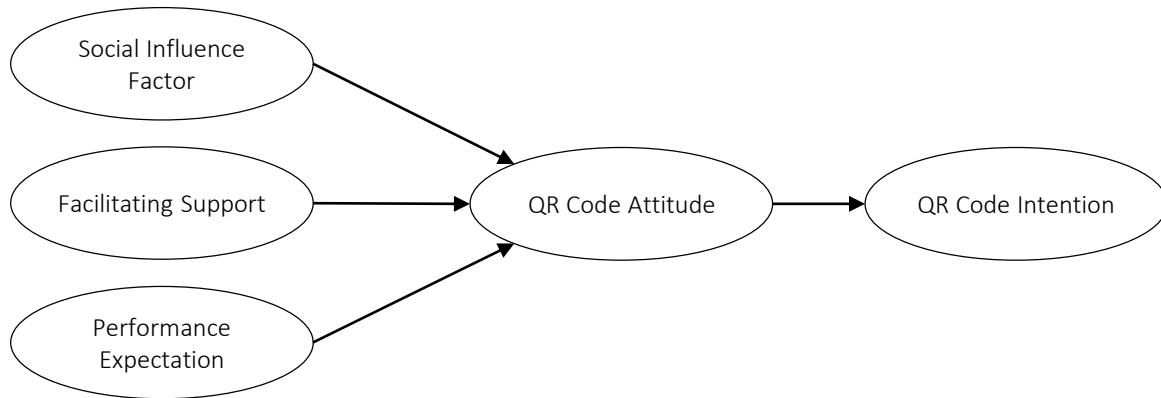
Most previous studies have used one Ajzen or Venkatesh framework to examine their variables. In addition, both Ajzen and Venkatesh's framework has been used in various studies. However, the findings from these investigations have fallen short of expectations. This study aims to analyze the attitude as a mediating variable between the independent variables (performance expectancy, social impact factors, and facilitating conditions) and the dependent variable (intention to adopt the QR code payment). This paper provided many hypotheses based on the empirical finding as a starting point.

$H_1$ : QR code attitude predicts QR code intention.

$H_2$ : Performance expectancy predicts QR code attitude.

$H_3$ : Social factors predict QR code attitude.

$H_4$ : Facilitating support predicts QR code attitude.



**Figure 1.** Conceptual framework

- H<sub>5</sub>: QR code attitude significantly mediated the influence of performance expectancy on QR code intention.*
- H<sub>6</sub>: QR code attitude significantly mediated the influence of social influence factors on QR code intention.*
- H<sub>7</sub>: QR code attitude significantly mediated the influence of facilitating support on QR code intention.*

in a closed-ended questionnaire. The T-statistics are compared to the T-critical (2.00), and the significance of the coefficient value is determined using the software Smart-PLS 3.0, which uses Partial Least Square-Structural Equation Modeling (PLS-SEM) to construct a model.

Meanwhile, testing the significance of the indicators forming construct variables is also carried out similarly. It will be significant if the T-statistic value is higher or equal to the T-critical or sig less than 5%. Meanwhile, the mediation test uses Sobel, calculated by the Sobel calculator web-based. The structural model illustrates the relationship between the social influence factor, performance expectation, facilitating condition, attitude toward QR-Code-based payment, and intention to adopt. The measurement model showed the validity of building latent variables composed of valuable indicators based on previous empirical studies (Gupta et al., 2019; Suebtimrat & Vonguai, 2021; Suo et al., 2021; Widayat et al., 2020). Table 1 shows indicators as a measure of each variable.

## 2. METHOD

A quantitative method examined e-money users adopting QR-Code in East Java Province, Indonesia. Before this study, a survey of people who use electronic money was done. The sample is then chosen from the list of people who use electronic money. From the pool of people who have used digital payment, 165 were randomly selected to fill out the survey. Mainly, a five-point Likert scale was utilized

**Table 1.** Variables and indicators

Variable	Indicators (Code)
Performance Expectation (P.E.)	QR-Code is an advantageous means of Payment (PE_1)
	Using a shopping QR-Code becomes more practical (PE_2)
	Using a faster QR-Code (PE_3)
	Using QR-Code is not complicated (PE_4)
	Make it easy for consumers (PE_5)
	Save time on shopping (PE_6)
Social Influence Factor (SF)	Friends suggest that you use QR-Code (SF_1)
	The family recommends that you use the QR-Code (SF_2)
	Neighbors suggested using QR-Code (SF_3)
	Mass media social media encourage using QR-Code (SF_4)
	Cashiers, shops, where you shop suggest using QR-Code (SF_5)
	Your agency, office, the campus is promoting to use of the QR-Code (SF_6)

**Table 1 (cont.).** Variables and indicators

Variable	Indicators (Code)
Facilitating Condition (FC)	Merchants, shops, or shopping places that you usually visit provide possible facilities (FC_1)
	You have the ability/knowledge about payment using QR Code (FC_4)
	You are skilled in using QR codes for your payment transactions (FC_5)
	Banks or financial institutions in your area support the use of QR-Code (FC_6)
Attitude toward QR-Code	is an excellent idea (A-Att1)
	fun in transactions (A-Att2)
	Worried about other parties will use your data (A-Att3)
	Have sufficient knowledge about the ins and outs of QR-Code (A-Att4)
	Transactions feel more modern, less old-fashioned (A-Att5)
Intention to Adopt QR-Code-Based Payment	Transacting feels like an upper-class society (A-Att6)
	Installing applications on smartphones shortly (QRInten-1)
	We will continue to use (QRInten-2)
	Shortly using (QRInten-3)
	Will not reinstall your Smartphone from the QR-Code system (QRInten-4)
	I will get used to using (QRInten-5)
	More Choosing Merchants with QR-Code facilities (QRInten-7)

### 3. RESULTS

#### 3.1. Characteristics of respondents

The respondents in this paper are people who use electronic money. Some of the characteristics regarding these respondents, related to gender, age group, and the latest education level, are detailed in Table 2 and Table 3. In Table 2, it can be explained that most respondents are female, up to 62.6 percent of the 163 people. This indicates that most electronic money users are women. Because women frequently shop online and offline, they reuse electronics for safety and practicality. According to the data presented in Table 3, the age demographic breakdown reveals that the vast majority of people (up to 85.9 percent) are in the 20-25-year age range. This fact indicates that young people mainly own technology-based electronic money. 88.3 percent as the oldest of them, 25 years old. A small proportion are over 25 years old, and some are over 50, but only one person. This means that even though a small part of the community is old because they are financially literate and use technology-based payments.

**Table 2.** Gender of people participated

Gender	Frequency	Percent	Valid Percent
Male	61	37.4	37.4
Female	102	62.6	62.6
Total	163	100.0	100.0

Regarding the level of education, it can be explained that the majority have passed upper sec-

ondary education, 66.3 percent. Unfortunately, this number does not represent a college or work. As many as 78.5 percent of them have graduated from high school until they are still students in tertiary institutions. Only a small proportion of respondents have graduated postgraduate. In more detail, the respondents' last education level is presented in Table 3.

**Table 3.** Grouped age and education level of respondents

Grouped Age	Frequency	Percent	Valid Percent	Cumulative Percent
Under 20	4	2.5	2.5	2.5
20-25	140	85.9	85.9	88.3
26-30	12	7.4	7.4	95.7
Higher than 30	7	3.7	3.7	99.4
Education Level				
Senior High School	108	66.3	66.3	66.3
Higher Education Student	20	12.3	12.3	78.5
Diploma	5	3.1	3.1	81.6
Undergraduate	24	14.7	14.7	96.3
Postgraduate	6	3.7	3.7	100.0
Total	163	100.0	100.0	

#### 3.2. The respondents' attitude and intention to use QR Code

Besides demographic aspects, it is interesting to explain the attitude of respondents and their intention to use QR Code payments (Table 4). Judging from the choice to use a QR code, with indicators

with a maximum value of 30 and a minimum of 12, the average intention size is 19.32, with a standard deviation of 4.52. People’s intention to use QR Code is still not high. Because even though there is much excitement about the benefits of using QR-Code, the facilities are still not very good, and the payment method is still very new. Meanwhile, from the attitude aspect, it is known that the maximum value is 30 and a minimum of 12, while the average is 20.26 and the standard deviation is 4.06.

**Table 4.** Respondents’ attitude and intention classification

Range	QR Code Attitude		QR-Code Intention	
	Quantity	%	Quantity	%
(Mean + 2Std)	9	0.05	12	0.07
(Mean + 1Std)	16	0.09	16	0.09
(Mean – 2Std)	119	0.73	122	0.75
(Mean – 1Std)	19	0.12	13	0.08
Total	163	1	163	1

### 3.3. Model evaluation

The initial part mentioned that an investigation aims to test the relationship model between attitude (QRC Attitude) and intention to adopt QR Codebase payment (QR-Code Intention). Besides, examine the relationship of latent variables, namely Performance Expectation, Social Factor, and Facilitating Condition to Attitude toward QR-Code using Structural Equation Modeling (S.E.M.). Valid and reliable indicators measured all latent variables, indicating a weighted loading factor higher than 0.70. The value of the loading indicator for Attitude (A-Att1, A-Att2, A-Att3, and A-Att5) indicates that the loading value is higher than 0.70. While Intention variables first level latent variables measured by QRInten-1, QRInten-2, QRInten-3, QRInten-4, and QRInten-5. Facilitating condition, measured by FacCond\_4, FacCond\_5, and FacCond\_6. Performance Expectation PerEx-1, PerEx-2, PerEx-3, PerEx-4, PerEx-5, and PerEx-6.

The outer model shows the relationship between the indicators’ intention, attitude, and other unobservable variables. In contrast, the inner model demonstrates the relationship between attitude to intention and other latent variables shown in the model. Before discussing the relationship between attitudes towards QR-Code, this study tested the outer model’s validity and reliability with several important indicators.

### 3.4. Outer model

The outer model is a measurement model of latent variables reflecting or formative at one or more levels. Table 5 shows the five value criteria of the latent variable’s reliability and validity: AVE, CR, Rho\_A, and Cronbach’s Alpha of unobservable variables, Attitudes towards the QR Code. Constructing the latent variable is an appropriate measurement if it meets all five validity requirements and the minimum acceptable value of 0.50.

Each model indicator’s cross-loading value is listed in Table 6. Compared to loadings on other latent variables, this one is significantly greater. Based on that, values indicate that the needle’s validity is a measurement of that latent variable. For example, the third to the sixth line and the first column (1) consist of a QRC attitude latent variable code indicator. The third (3) column shows that the loading factor for that variable (0.87, 0.86, 0.72, and 0.77) is higher than the value comparison (cross) with another column. This means that all QR Code attitude indicators are a right measurement and not valid for another variable. Using the same way, the cross-loading of all latent variables in this model can be explained. Therefore, it can be concluded that the outer model is suitable based on the cross-loading evaluation.

R-Square (Square multiple correlations) values for the endogenous latent variables of QRC attitude

**Table 5.** Indicator values of validity of construct latent variable indicators

Latent variables	Cronbach’s Alpha	Rho_A	Composite reliability	Average Variance Extracted (AVE)
Facilitating Support	0.85	0.85	0.91	0.76
Perform Exp.	0.87	0.88	0.91	0.61
QRC Attitude	0.82	0.83	0.88	0.65
QRCode Intention	0.86	0.87	0.90	0.65
Social Influence Factor	0.85	0.86	0.88	0.55

**Table 6.** Cross-loadings of indicators with latent variables

Indicator	Facilitating Support	Perform Exp.	QRC Attitude	QRC Intention	Social Influence Factor
(1)	(2)	(3)	(3)	(4)	(5)
A-Att1	0.58	0.59	0.87	0.60	0.48
A-Att2	0.55	0.59	0.86	0.62	0.49
A-Att4	0.47	0.35	0.72	0.60	0.51
A-Att5	0.42	0.44	0.77	0.59	0.41
FacCond_4	0.89	0.51	0.50	0.43	0.39
FacCond_5	0.90	0.50	0.59	0.51	0.43
FacCond_6	0.83	0.46	0.54	0.45	0.38
PerfEx_1	0.42	0.77	0.47	0.49	0.49
PerfEx_2	0.56	0.82	0.55	0.45	0.40
PerfEx_3	0.44	0.75	0.53	0.46	0.39
PerfEx_4	0.37	0.76	0.42	0.35	0.24
PerfEx_5	0.40	0.75	0.37	0.36	0.37
PerfEx_6	0.40	0.81	0.50	0.40	0.40
QRInten-1	0.39	0.47	0.68	0.79	0.49
QRInten-2	0.51	0.44	0.59	0.82	0.40
QRInten-3	0.38	0.42	0.53	0.84	0.45
QRInten-4	0.37	0.35	0.53	0.75	0.39
QRInten-5	0.51	0.49	0.64	0.83	0.45
SosFac_1	0.37	0.39	0.46	0.44	0.78
SosFac_2	0.20	0.17	0.29	0.32	0.74
SosFac_3	0.20	0.15	0.28	0.33	0.71
SosFac_4	0.48	0.57	0.59	0.48	0.71
SosFac_5	0.32	0.41	0.41	0.40	0.74
SosFac_6	0.32	0.29	0.42	0.39	0.78

(0.56) and QR code Intention (0.56) are pretty adequate (Table 7). At the same time, the R-square adjusted values are also equal to 0.55, respectively.

**Table 7.** R-Square dependent variable

Latent variable	R Square	R Square Adjusted
QRC Attitude	0.56	0.55
QR Code Intention	0.56	0.55

Regarding coefficient and significance, the influence of attitude toward QR Code Base Payment (QRC attitude) and Intention to adopt QR code (QR Code Intention) is set out in Table 8. In Table 8, the original beta sample path coefficient is 0.75, and the mean sample is also 0.75 with a standard deviation of 0.04. The p-value of 0.00 is beneath the 5% threshold, while the T-critical value of 1.96 is exceeded by the statistical value of 18.33. Each statistical T-value is larger than the critical value, indicating that the attitude variable significantly affects the intention to adopt the QR Code base payment on the other line, which connects the facilitating support, performance expectation, and social influence factor on QR. Code attitude (1.96), with a P-value of 0.00. These variables are significant explanations for QR

Code attitude. Supporting facilities, social factors, and expected performance determine consumers' attitudes toward QR code-based payments.

In turn, the formed attitude affects the intention to adopt the technology, indicated by the t-statistic value (18.33) that exceeds the critical limit (1.96). The p-value is less than alpha 5%. The relationship between attitudes towards objects, in this case, QR Code payment, is theoretically the embodiment of TPB and TRA. In both theories, the closest explanatory variable toward intention is attitude. Someone's intention to adopt something or specific behavior is determined by his attitude toward the object of that attitude. In this context, a customer wants to adopt QR-based payments, distinguished by his attitude to the QR.

This paper proposes several hypotheses (H). The premises are Attitude toward QR code payment predicts intention to its adoption (H1); Performance Expectancy indicates attitudes toward Q.R. Code (H2); Social factors predict attitudes toward QR code payment (H3); Facilitating condition predicts attitudes toward QR code pay-



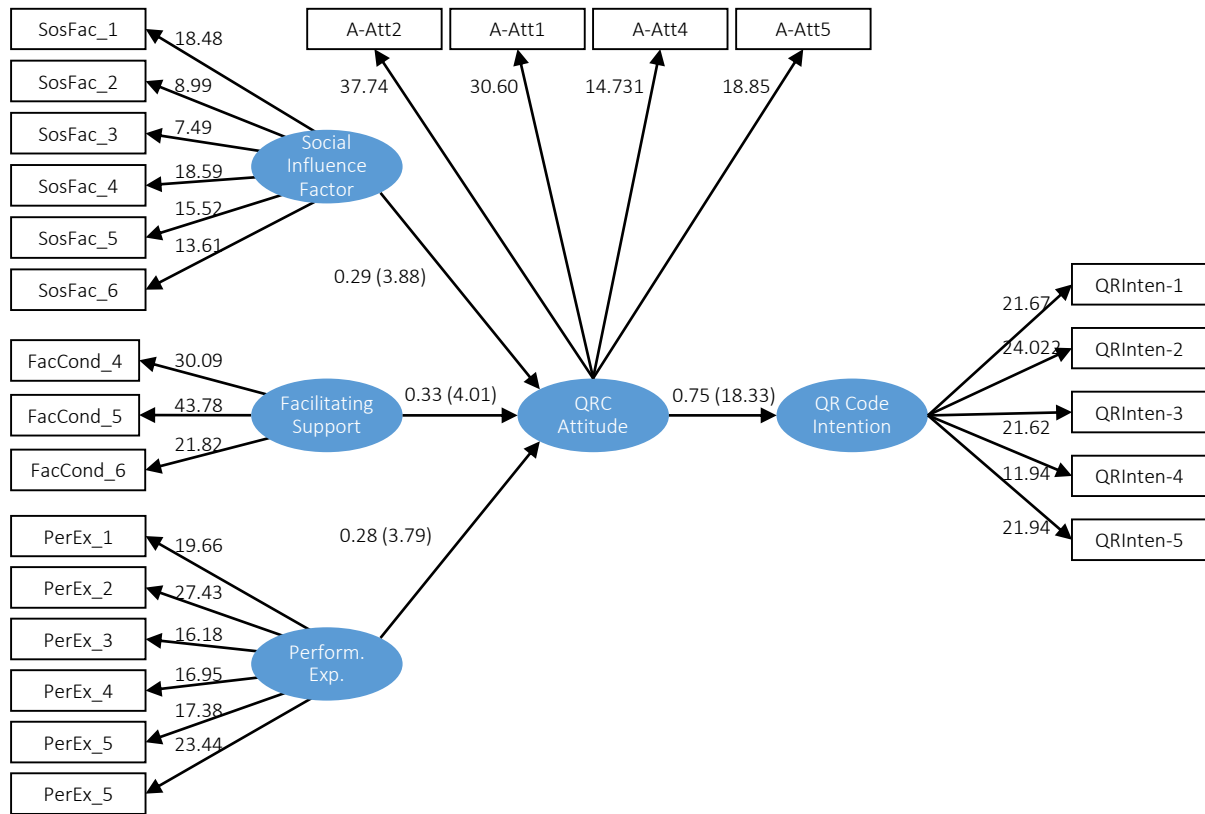


Figure 2. Model of QR code payment adoption

Table 8. Path coefficient of variables in the model

Path Relationship	Original sample (O)	Sample mean (M)	Standard deviation (S.T.D.E.V.)	T Statistics ( O/STDEV )	P values
Facilitating Support → QRC attitude	0.33	0.32	0.08	4.01	0.00
Performance Exp. → QRC. Attitude	0.28	0.29	0.08	3.79	0.00
Social Influence Factor → QRC attitude	0.29	0.31	0.08	3.88	0.00
QRC attitude → QRCode_intention_	0.75	0.75	0.04	18.33	0.00

ment (H4). Moreover, attitude significantly mediated the influence of performance expectancy, social factors, and reducing requirements toward intent to QR code payment adoption (H5-7). They test each hypothesis by comparing T-statistics with T-critical or p-value (sig) with alpha ( $\alpha = 5\%$ ). This hypothesis is accepted if the T-statistic is equal to the T-critical or the p-value is below the  $\alpha = (5\%)$ . The t-statistic and p-value for each synthesized pathway are shown in Table 8 and Figure 2. This table can explain all paths where the T-statistic is higher than t-critical (1.96) and, when viewed from the p-value, overall, less than 5%. It can be stated that all alternative hypotheses are accepted based on the T-value and P-value. The attitude toward QR codes statistically affects the intention to use QR base code payment.

### 3.5. The mediating role of attitude

This study assumes that attitudes mediate the relationship variables of facilitating conditions, performance expectancy, and social factors on the intention to adopt QR code payment. Table 9 shows the statistical Sobel of the attitude variable in mediating the relationship between the independent variable and the employee for QR-Code payment adoption. The path of the independent variable relationship, which consists of facilitating support, performance expectancy, and social influence factors to the intention to adopt a QR code payment, shows that attitude plays a mediating role. Furthermore, that indicated by a Sobel value (3.93, 3.13, and 3.78) is higher than the critical value (1.96) and the p-value less than 0.05.

**Table 9.** Mediation variable test

Path Relationship	Original Sample (O)	Standard Deviation (S.T.D.E.V.)	Statistics Sobel	P Values
Facilitating Support → Q-R.C. Attitude → intent to adopt Q.R. Code	0.33	0.08	3.93	0.00
Perform Exp. → Q.R.C. Attitude → intent to adopt QR. Code	0.28	0.08	3.13	0.00
Social Influence Factor → QR.C. Attitude → intent to adopt QR. Code	0.29	0.08	3.78	0.00

The significance of the mediating role of attitude in the relationship between independent and dependent variables can be interpreted. The likelihood of adopting QR codes as a payment method is influenced indirectly by factors like the availability of enabling assistance, expectations of performance, and the weight of social influence. Before the option to employ QR codes as a payment medium presents itself, the three independent factors come together to generate a cheerful disposition. This situation gives the buyer the impression that they are engaging in a cutting-edge, sophisticated transaction.

## 4. DISCUSSION

The results show how people feel happy or not about QR-Code base payment (QRC attitude) affects how likely they are to use QR-Code (QR Code Intention). The intention to use QR Code-based payments is affected by how people feel about QR Code-based payments. The path coefficient between the two variables is positive, meaning that the change patterns for both variables coincide. The theory of planned behavior conforms perfectly with these results (Ajzen, 1991), which are widely applied in various research fields, on the other line, which connects the Facilitating Support, Performance Expectation, and Social influence factor on QR.C. attitude. These variables are significant explanations for QRC attitude. Supporting facilities, social factors, and expected performance determine consumers' attitudes toward QR-based payments. Previous relevant studies have tried to link the three latent variables above using the basic theory of UTAUT and TAM in different contexts.

This study's findings are consistent and mutually supportive if we look at research based on previous models (Nugraha & Rachmawati, 2019). That is, the significance of the relationship between the variables being tested is fit to the existing basic

theory. Previous research on the relationship or influence of attitudes on intention has shown the same results. Therefore, it can be stated that the results of this study strengthen or support previous studies (Do et al., 2020; Ahmad et al., 2020; Salimon et al., 2018). The intention to adopt a QR-Code payment system is determined by putting it on a personally owned smartphone, continuing to use it, and short using it. Apart from not reinstalling, get accustomed to using it when transacting and selecting merchants that accept this payment method. The user's attitude toward the system predicts all composite or individual indicators. The philosophy regarding the payment system is pleasant, and the transaction feels modern, making it like the upper-class society, supported by adequate knowledge, causing someone to intend to adopt it. A positive attitude is a composite character that creates an intention to adopt the payment system when viewed individually for each indicator. Using the logic of if-then thinking, for example, if someone feels modern, being in a high-class society is fun in making transactions, he will install a QR-based payment system on his Smartphone or another payment device. They would use it shortly, not erase it and even get used to it later. The impact in every transaction. They prefer merchants who provide these payment facilities.

This study found that attitudes towards QR-Code, are statistically significantly influenced by Performance Expectancy, Social factors, and Facilitating Conditions relevant to the investigation (Ahmad, 2014; Alshehri, 2012; Chang, 2012; Do et al., 2020; Gupta et al., 2019; Ahmad et al., 2020; Hsiu-Yuan & Shwu-Huey, 2010; Rahmath et al., 2013; Rosli et al., 2020; Lee, 2018). Attitudes underlying intention in this study are determined by three variables: social factors, facilitating conditions, and expected performance. Consumers feel happy in transactions, modern, and like upper-class society. It can be formed if there are adequate facilities when making transactions. In addition, due to the encouragement of the surround-

ing community, such as friends, relatives, or coworkers. Support for social factors, strengthened by adequate facilities, will form a positive attitude towards a relatively new payment system.

Moreover, in developing countries such as Indonesia, the technology payment system is still relatively new and not yet widespread, so the influence of social and environmental factors is powerful. Every part of Indonesia does not reliably have access to the internet. In addition, not all stores or retailers offer payment options that are based on the use of QR codes. Customers intending to use or embrace QR payments are experiencing difficulties due to this issue. The availability of facilities and ease of use determines the public's desire to use the QR code in payments of retail transactions. Ownership of sophisticated devices and smartphones also makes people ready to adopt a QR-code-based payment system. This study's findings align with research conducted by Derian et al. (2019) in Jakarta and Gao et al. (2018) in China. Besides, this finding supports some previous studies in several countries, for instance, those conducted by Ahmad et al. (2020) in Pakistan, Suebtimrat and Vonguai (2021) in Thailand, and by Suo et al. (2021) in the cities of Kuching, Sibul, Miri and Bintulu, Malaysia.

Social influence and the performance that will be obtained if supported by adequate facilities and

infrastructure have an impact on the emergence of a sense of pleasure, feeling modern and sophisticated in the user, which in the end appears to be the intention to use payment facilities based on QR-Code. The findings of this study do not contradict and even support the results of previous studies and existing theoretical models, for example, Ahmad et al. (2020) and Derian et al. (2019), and at the same time add to the explanatory support for the findings of Rosli et al. (2020). Their studies show that only several factors significantly affect consumer intention to use QR-code-based payments, namely performance expectancy and effort expectancy. Liébana-Cabanillas et al. (2015) found that users' choices to use E-payment are driven by the reliability and credibility of the information technology provided, including QR codes by e-payment providers. The findings of this study indicate that QR code is a payment basis that the public would use massively. From the perspective of developing countries, where the use of e-payment technology is still relatively new, the perception of ease of use and security of transactions using e-payment technology should be improved. Stakeholders involved in providing e-payment technology including QR codes such as QR codes technology providers and banking institutions should socialize the use of e-payment technology to users continuously. It is necessary to ensure that new users continue to get important information related to the correct use of e-payment.

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## CONCLUSION

The results of this study led to the conclusion that the attitude of consumers will play a role in determining whether or not they are prepared to accept payments made using QR Codes, including installing the codes on their smartphones. Their closest environment influences their attitudes, including their family, friends, and others. The conditions facilitate supporting facilities and infrastructure in which they transact, such as connectivity to the internet, the availability of supporters at the merchants where they transact, the ease of use, and the practicality of use also contribute to adoption. Good facilities and infrastructure are needed to encourage QR codes in transactions, forming a positive attitude toward potential users. Therefore, banking practitioners increase customers' interest by using QR code-based payment methods to strengthen customer attitudes and provide adequate facilities. For example, supporting in various areas, there is an internet network. Consumers will use the QR-based payment system and vice versa if the merchant's supporting facilities are available. The findings have implications for financial institutions that initiate and require QR codes in making payment transactions and financial technology innovators. Financial institutions such as banks, e-payment providers, and financial services authorities play a vital role in making QR codes acceptable to users.

## AUTHOR CONTRIBUTIONS

Conceptualization: Widayat, Marsudi, Ilyas Masudin.  
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## ACKNOWLEDGMENT

The author would like to thank the Rector, Vice-Rector of the University of Muhammadiyah Malang. Furthermore, the author sincerely thanks the University of Muhammadiyah Malang's Dean of Business and Economics Faculty. A University of Muhammadiyah Malang's School of Economics and Business member supported finishing this paper.

## REFERENCES

1. Abdinoor, A., Mbamba, U. O. L., & Ardino, L. (2017). Factors Influencing Consumers' Adoption of Mobile Financial Services in Tanzania. *Cogent Business & Management*, 4(1), 1392273. <https://doi.org/10.1080/23311975.2017.1392273>
2. Abu-Taieh, E. M., Alhadid, I., Abu-Tayeh, S., Masa'adeh, R., Alkhalwaldeh, R. S., Khwaldeh, S., & Alrowwad, A. A. (2022). Continued Intention to Use M-Banking in Jordan by Integrating UTAUT, TPB, TAM, And Service Quality with ML. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 120. <https://doi.org/10.3390/joitmc8030120>
3. Ahmad, H., Asghar, S., Khan, H., & Khan, M. S. (2020). Consumers and QR Code Payment Method: A Case of Pakistani Retail Environment. *RMC Journal of Social Sciences and Humanities*, 1(2), 1-15.
4. Ahmad, M. I. (2014). Unified Theory of Acceptance and Use of Technology (UTAUT) A Decade of Validation and Development. Paper Presented at *The Fourth International Conference On ICT in Our Lives 2014*. Alexandria University, Egypt. Retrieved from [https://www.academia.edu/9973205/Unified\\_Theory\\_of\\_Acceptance\\_and\\_Use\\_of\\_Technology\\_UTAUT\\_A\\_Decade\\_of\\_Validation\\_and\\_Development](https://www.academia.edu/9973205/Unified_Theory_of_Acceptance_and_Use_of_Technology_UTAUT_A_Decade_of_Validation_and_Development)
5. Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
6. Alshehri, M. A. (2012). *Using The UTAUT Model to Determine Factors Affecting Acceptance and Use of E-Government Services in the Kingdom of Saudi Arabia* (Ph.D. Thesis). <https://doi.org/10.25904/1912/1770>
7. Ayudya, A. C., & Wibowo, A. (2018). The Intention to Use E-Money Using Theory of Planned Behavior and Locus of Control. *Jurnal Keuangan Dan Perbankan*, 22(2), 335-349. <https://doi.org/10.26905/jkdp.v22i2.1691>
8. Bradford, T., Hayashi, F., & Toh, Y. L. (2019). *Developments of QR Code-Based Mobile Payments in East Asia*. Payment System Research Briefing. Retrieved from <https://www.kansascityfed.org/research/payments-system-research-briefings/developments-qr-code-based-mobile-payments-east-asia/>
9. Chang, A. (2012). UTAUT and UTAUT 2: A Review and Agenda for Future Research. *Journal The Winners*, 13(2), 106-114. Retrieved from <https://media.neliti.com/media/publications/27041-EN-utaut-and-utaut-2-a-review-and-agenda-for-future-research.pdf>
10. Derian, K., Marciella, J., & Mariani, M. (2019). Customer Acceptance of QR Technology Used in Mobile Payment: A Study of Three Generation Cohorts in Jakarta. *IJournals: International Journal of Social Relevance & Concern*, 7(1), 47-52. Retrieved from <https://ijournals.in/wp-content/uploads/2019/01/8.7114-Kennard-compressed.pdf>

11. Do, N. H., Tham, J., Azam, S. M. F., & Khatibia, A. A. (2020). Analysis of Customer Behavioral Intentions Towards Mobile Payment: Cambodian Consumer's Perspective. *Accounting*, 6, 1391-1402. <https://doi.org/10.5267/j.ac.2020.8.010>
12. Fong, S. L., Yung, D. C. W., Ahmed, F. Y. H., & Jamal, A. (2019). Smart City Bus Application with Quick Response (QR) Code Payment. *Proceedings of the 2019 8th International Conference on Software and Computer Applications*. <https://doi.org/10.1145/3316615.3316718>
13. Friadi, H., Sumarwan, U., & Kirbrandoko. (2018). Integration of Technology Acceptance Model and Theory of Planned Behaviour of Intention to Use Electronic Money. *International Journal of Science and Research (IJSR)*, 7(2), 711-716. Retrieved from <https://www.ijsr.net/archive/v7i2/ART201890.pdf>
14. Gao, S., Yang, X., Guo, H., & Jing, J. (2018). An Empirical Study On Users' Continuous Usage Intention of QR Code Mobile Payment Services in China. *International Journal of E-Adoption*, 10(1), 18-33. <https://doi.org/10.4018/ijea.2018010102>
15. Gupta, K. P., Manrai, R., & Goel, U. (2019). Factors Influencing Adoption of Payments Banks by Indian Customers: Extending UTAUT with Perceived Credibility. *Journal of Asia Business Studies*, 13(2), 173-195. <https://doi.org/10.1108/jabs-07-2017-0111>
16. Herawatia, S. D., & Rahman, A. (2019). Payment System Analysis Using Features Quick Response Code (QR Code) In Increasing Income. *International Journal of Innovation, Creativity, And Change*, 10(6), 1-9. Retrieved from [https://www.ijicc.net/images/Vol6Iss6/6601\\_Herwati\\_2019\\_E\\_R.pdf](https://www.ijicc.net/images/Vol6Iss6/6601_Herwati_2019_E_R.pdf)
17. Hsiu-Yuan, W., & Shwu-Huey, W. (2010). User Acceptance of Mobile Internet Based on the Unified Theory of Acceptance and Use of Technology: Investigating the Determinants and Gender Differences. *Social Behavior and Personality: An International Journal*, 38(3), 415-426. <https://doi.org/10.2224/sbp.2010.38.3.415>
18. Hu, Z., Ding, S., Li, S., Chen, L., & Yang, S. (2019). Adoption Intention of Fintech Services for Bank Users: An Empirical Examination with an Extended Technology Acceptance Model. *Symmetry*, 11(3), 340. <https://doi.org/10.3390/sym11030340>
19. Humbani, M., & Wiese, M. (2017). A Cashless Society for All: Determining Consumers' Readiness to Adopt Mobile Payment Services. *Journal of African Business*, 19(3), 409-429. <https://doi.org/10.1080/15228916.2017.1396792>
20. Karthikayeni, R., Keerthikabala, P., & Vignesh, K. (2018). Toll Plaza Payment Using Qr Code. *International Research Journal of Engineering and Technology (IRJET)*, 5(4), 687-690. Retrieved from <https://www.irjet.net/archives/V5/i4/IRJET-V5I4151.pdf>
21. Krishna, T. A., Pattara, F. A., Joy, J. V., & Xavier, J. M. (2016). FLIPAY – QR Code-Based Payment System. *International Journal of Science Technology & Engineering*, 2(11), 148-151. Retrieved from [https://www.academia.edu/28656608/FLIPAY\\_QR\\_Code\\_Based\\_Payment\\_System](https://www.academia.edu/28656608/FLIPAY_QR_Code_Based_Payment_System)
22. Lee, W.-J. (2018). Understanding Consumer Acceptance Of Fintech Service: An Extension Of The Tam Model To Understand Bitcoin. *IOSR Journal of Business and Management (IOSR-JBM)*, 20(7), 34-37. Retrieved from <https://www.semanticscholar.org/paper/Understanding-Consumer-Acceptance-of-Fintech-%3A-An-Won-jun/eb522c342fdff71a4a3cf76df03a3f043b5014c4>
23. Liébana-Cabanillas, F., De Luna, I. R., & Montoro-Ríos, F. J. (2015). User Behavior in Qr Mobile Payment System: The Qr Payment Acceptance Model. *Technology Analysis & Strategic Management*, 27(9), 1031-1049. <https://doi.org/10.1080/09537325.2015.1047757>
24. Lombardi, A., Carfora, V., Cicia, G., Del Giudice, T., Lombardi, P., & Panico, T. (2017). Exploring Willingness to Pay for QR Code Labeled Extra-Virgin Olive Oil: An Application of the Theory of Planned Behavior. *International Journal Food System Dynamics*, 8(1), 14-31. <https://doi.org/10.18461/ijfsd.V8i1.812>
25. Musyaffi, A. M., Johari, R. J., Rosnidah, I., Sari, D. A. P., Amal, M. I., Tasyrifania, I., Ayu Pertiwi, S., & Sutanti, F. D. (2021). Digital Payment During Pandemic: An Extension of the Unified Model of QR Code. *Academic Journal of Interdisciplinary Studies*, 10(6), 213. <https://doi.org/10.36941/ajis-2021-0166>
26. Napitupulu, D., Kadar, J. A., & Jati, R. K. (2017). Validity Testing of Technology Acceptance Model Based on Factor Analysis Approach. *Indonesian Journal of Electrical Engineering and Computer Science*, 5(3). <https://doi.org/10.11591/ijeecs.v5.i3.pp697-704>
27. Nicolas, C. A. (2019). Quick Response (QR) Code Image Pattern Recognition: Time Utilization Tracking Application. *Southeast Asian Journal of Science and Technology*, 4(1), 42-49. Retrieved from <https://www.sajst.org/online/index.php/sajst/article/view/89>
28. Nugraha, A., & Rachmawati, I. (2019). The Use of Modified Unified Theory of Acceptance and Use of Technology 2 Model to Analyse Factors Influencing Behavioural Intentions (A Study on Bukalapak Mobile App Indonesia). *International Journal of Business and Management Invention (IJBMI)*, 8(4), 80-84. Retrieved from <https://www.semanticscholar.org/paper/The-Use-of-Modified-Unified-Theory-of-Acceptance-of-Nugraha/7e4284b67e08a0df5f553380894e89857b00d638>
29. Rahmath, S., Hema, D., Nisar, H., & Abdullah, K. (2013). Combination of TAM and TPB in Internet Banking Adoption. *International Journal of Computer Theory and Engineering*, 5(1), 146-150. <https://doi.org/10.7763/ijcte.2013.v5.665>

30. Rosli, N. F. A., Ibrahim, R., Yahya, Y., Zainuddin, N. M. M., Yaacob, S., & Yusoff, R. C. M. (2020). Consumers' Intention to Use Mobile Payment: A Case of Quick Response (QR) Code Applications. *Mathematical Sciences and Informatics Journal*, 1(1), 20-34. Retrieved from <https://ir.uitm.edu.my/id/eprint/38913/1/38913.pdf>
31. Salimon, M. G., Gorondutse, A. H., & Haim Hilman Abdullah. (2018). User Adoption of Smart Homes Technology in Malaysia: Integration TAM 3, TPB, UTAUT 2 and Extension of Their Constructs for A Better Prediction. *IOSR Journal of Business and Management (IOSR-JBM)*, 20(4), 60-69. Retrieved from [https://www.academia.edu/65666419/User\\_adoption\\_of\\_Smart\\_Homes\\_Technology\\_in\\_Malaysia\\_Integration\\_TAM\\_3\\_TPBUAUT\\_2\\_and\\_extension\\_of\\_their\\_constructs\\_for\\_a\\_better\\_prediction\\_](https://www.academia.edu/65666419/User_adoption_of_Smart_Homes_Technology_in_Malaysia_Integration_TAM_3_TPBUAUT_2_and_extension_of_their_constructs_for_a_better_prediction_)
32. Selfira, Abdillah, G., Harahap, W., & Muda, I. (2019). Future Electronics Payment System Model. *Journal of Physics: Conference Series*, 1230(1). <https://doi.org/10.1088/1742-6596/1230/1/012068>
33. Suebtimrat, P., & Vonguai, R. (2021). An Investigation of Behavioral Intention Towards QR Code Payment in Bangkok, Thailand. *Journal of Asian Finance, Economics, and Business*, 8(1), 939-950. <https://doi.org/10.13106/jafeb.2021.vol8.no1.939>
34. Suo, W.-J., Goi, C.-L., Goi, M.-T., & Sim, A. K. S. (2021). Factors Influencing Behavioural Intention to Adopt the QR-Code Payment. *International Journal of Asian Business and Information Management*, 13(2), 1-22. <https://doi.org/10.4018/ijabim.20220701.oa8>
35. Surekha, A., Anand, R., & Indu, I. (2015). E-Payment Transactions Using Encrypted QR Codes. *International Journal of Applied Engineering Research*, 10(77), 460-464.
36. Thomas, T. D., Singh, L., & Gaffar, K. (2013). The Utility of the UTAUT Model in Explaining Mobile Learning Adoption in Higher Education in Guyana. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, 9(3), 71-85. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1071379.pdf>
37. Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186-204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
38. Venkatesh, V., & Morris, M. G. (2000). Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. *MIS Quarterly*, 24(1), 115-139. <http://dx.doi.org/10.2307/3250981>
39. Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified Theory of Acceptance and Use of Technology: A Synthesis and The Road Ahead. *Journal of the Association for Information Systems*, 17(5), 328-376. <http://dx.doi.org/10.17705/1jais.00428>
40. Wang, S.-L., & Kankham, S. (2018). Study of Marketing Communications and Attitude Toward QR Code Payment: A Comparison Between Thailand and Taiwan. *International Journal of Arts and Commerce*, 7(5). Retrieved from <https://ijac.org.uk/images/frontImages/gallery/Vol.7No.5/9.88-99.pdf>
41. Widayat, W., Masudin, I., & Satiti, N. R. (2020). E-Money Payment: Customers' Adopting Factors and the Implication for Open Innovation. *Journal of Open Innovation: Technology, Market, And Complexity*, 6(3), 57. <https://doi.org/10.3390/joitmc6030057>
42. Yan, L.-Y., Tan, G. W.-H., Loh, X.-M., Hew, J.-J., & Ooi, K.-B. (2021). QR Code and Mobile Payment: The Disruptive Forces in Retail. *Journal of Retailing and Consumer Services*, 58, 102300. <https://doi.org/10.1016/j.jretconser.2020.102300>