

The intention to use QR code payment in an emerging market – the role of “Attitude” as mediator

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ABSTRACT

As one of the applications of mobile banking, payment by scanning a QR code not only reduces the risks when paying via cards but also brings about more convenience than cash payment and more safety than other forms of payment, especially in the context of the current strong and complicated Covid-19 epidemic. However, the adoption of this payment technology seems to be left open in emerging markets, especially Vietnam. Within this context, this study conducted a survey on 441 customers about their intention to use QR code payment when shopping in Vietnam market. Research results show that personal innovation, perceived security and usefulness, perceived ease of use and facilitating conditions affect the attitudes towards intention to use the QR code payment service. In particular, perceived ease of use, perceived security and usefulness are the two factors that most strongly influence the intention to accept the use of QR code payment service though attitude mediator. The results of this research can assist managers with considerations in constructing development plan for new technological products and services in such an emerging market as Vietnam.

Keywords:

Mobile payments; QR code; Technology Adoption; Mobile Banking; Emerging market; Vietnam.

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I. Introduction

It can be said that science and technology is one of the fastest growing areas. Currently, the 4th scientific and technological revolution is taking place vigorously affecting all aspects of life in the society. More and more scientific and technological achievements are applied to life, bringing great benefits to people in many fields. Increased production values, improved quality of life, changing awareness and habits, etc. are the most visible impacts in today's society. Along with the development of e-commerce and information networks, it has facilitated the design of technology products and services to meet the needs of bringing convenience to consumers. The increasingly popular online shopping habit has led to increasingly diverse forms of payment. When making online shopping, consumers have a lot of payment options such as payment via card,

payment by e-wallet, cash payment upon delivery, payment via mobile devices. Credit card fraud or credit cards with stolen personal information are problematic for customers and banks, especially in the case of money transfers or online shopping. Moreover, with the development of the field of mobile information, payment via mobile devices is gradually becoming a new trend, and technologies such as QR codes, contact payments, contactless and digitized card information are on the increase. Payment by scanning a QR code is one of the applications of mobile banking. QR technology reduces the risk of card payments, is much more convenient than cash payments, and safer than other forms of payment. With such tremendous benefits; however, not any customer can easily accept the use of this new technology utility, especially when the shopping habit of paying by cash or credit card of consumers is still

very common in Vietnamese society. A number of studies have also mentioned the intention to use new QR code technology in different countries such as the research of Shin et al. (2012) in the Korean market, research of Liébana-Cabanillas et al. (2015) in Spain, Hossain et al., (2018) in China... These studies show the factors that influence customers' use of QR codes such as information quality, system quality, interoperability and subjective norms, usefulness, and ease of use, acceptability. However, previous studies have focused on the influence of these factors on the traditional use of QR codes without exploring the role of mediator variables as a new perspective. Moreover, different countries, different times with different cultures can greatly affect the development of the process of implementing QR code services of banks and the use of QR codes among different users in various ways. Therefore, determining which factors and the extent of influence that such factors have on the intention to accept the use of QR code payment when making purchases is an urgent issue in emerging markets like Vietnam.

II. Theoretical background

2.1 Concept of QR code and research context:

QR code is a matrix code, also known as two-dimensional barcode, built in 1994 by the Denso Wave Company (Japan) with an aim of fast matrix decoding at high speed. QR stands for Quick Response. This is a barcode matrix that can be read by barcode readers or smartphones that can take pictures with a specialized application to scan bar codes. (Denso Wave; 2020). Payment method by scanning QR code is done according to the process that customers will open their mobile banking application, use QR Pay payment feature to scan QR code on the invoice via camera of mobile phone and mobile banking application will notify the bank. After checking, the banking system will execute the order to transfer money from the customer's account to the account of the point of sale. The amount of the invoice will be deducted from the customer's account via the customer's mobile banking application. Most of

the current retail chain chains such as supermarkets and shopping centres are applying this form of payment.

Payment by QR code scanning started from Japan and has spread around the world. In Europe and North America, QR codes have been booming since the 2000s, with marketers and manufacturers putting QR codes in many brands of products and services, from wine brands to soap bottles, candy packages ... (Okazaki et al., 2012). In Asian countries such as India, Indonesia, Singapore, Vietnam ... QR code payment is becoming more and more popular as consumers switch from the habit of using cash to payment using technology applications. In Vietnam, it is not only until the last few years that QR codes have begun to blossom and promote the role of payment activities of consumers. It can be said that the popularity of smartphones in the technological age has brought a "golden opportunity" for QR codes to develop payment functions, when previously this function was still gloomy in Vietnam. The popularity of smartphones, mobile networks 3G, 4G facilitate a favourable condition for suppliers to develop new forms of products and services to meet the diverse needs of customers. According to data from the General Statistics Office (2017), it was during the first 3 months of 2017 when VND 20,000 billion was spent by the Vietnamese on buying smartphones. Among a population of more than 90 million people with mostly young people, approximately 50% of Vietnamese people get a lot of exposure to the internet and up to 70% of the population use smartphones. With this rate, Vietnam is hence ranked high in Asia - Pacific and the world in the use of the internet and smart phones. According to Vietnam E-commerce Association (2019), the scale of Vietnam e-commerce market in 2025 will rank third in Southeast Asia, after Indonesia (100 billion USD) and Thailand (43 billion USD). In addition, most of the current customers who use smartphones are young, knowledgeable and interested in experience. They always update new technology utilities, especially the forms of payment integrated in mobile applications, making payment

connection easy and convenient without using cash or different types of bank cards. Therefore, mobile payment is having many development opportunities in Vietnam.

2.2 Attitude towards intention to use QR code payment

Attitude reflects favorable or unfavorable feelings that people show through their behaviors (Fishbein, 1963). Loudon and Della Bitta (1993) define attitudes as how people perceive an object as positive or negative, something beneficial or harmful, or something that enhances pros or cons. The definition regards attitudes as a feeling or assessment on objects. Lian et al. (2014) suggest that an attitude is an internal intention of an individual towards a target audience and a source, a preparation for a behavior. Attitude is therefore a complex type of psychological process that includes cognitive, emotional and behavioral trends and has long-term and consistent characteristics (Zheng et al. 2018). Attitudes are important because they direct the people's thoughts (rational function), affect emotions (emotional function) and affect behaviors (action function). This is an important basis for marketers to deliver effective marketing strategy that influences decision-making and behavioral changes. Attitudes are important because they direct the people's thoughts (rational function), affect emotions (emotional function) and affect behaviors (action function).

Attitudes affect the decision to consume, accept or abandon something - this is the behavior of a person. The different models such as TAM, TRA, TPB show that attitudes play an important role in consumer decision-making as they are the best predictors of behaviors. A positive relationship between attitude and positive use has been highly

supported by many scholars (Meharia, 2012); (Hansen, Risborg and Steen, 2012); (Lee and Ryu, 2013).

2.3 Theory of Technology Acceptance Model (TAM)

Based on a theory developed from TRA and TPB, TAM was proposed by Davis and Richard Bagozzi (Bagozzi, 1992; Davis, 1989). Indeed, significant value of TAM in predicting technology acceptance among potential users has been evident (Ajzen 1991). TAM focuses on explaining behavior acceptance and use of consumer technology. The TAM states that perceived usefulness (PU) and perceived ease of use (PEoU), determine a person's decision to accept a new technology (Davis, 1989). PEoU refers to a concept that using a particular system is effortless or simply easy to do (Davis, 1989; Taylor & Todd, 1995) and PU refers to "the degree to which a consumer believes that online shopping will provide access to useful information, facilitate comparison of offers and enable a faster checkout" (Vijayasathya (2004, 748). This model is applied in many fields such as mobile phones (Ervasti and Helaakoski, 2010), mobile payment (Liébana-Cabanillas et al., 2014), mobile ticketing (Mallat et al., 2009). This article focuses on new applications for the market of mobile payment services, a market that is not yet widely known or widely used in the Vietnamese market. The proposed model is based on the classic model of David (1989), Liébana-Cabanillas et al. (2015), Shin et al. (2012), Ozkaya et al. (2015) and Hossain et al. (2018).

2.4 Studies related to payment by QR code

There have been some studies related to the form of QR code payment in the world shown in the following table:

Tab. 1 Summary of studies related to payment by QR code. Source: collected by the authors

Author (year)	Research Methods	Factors	Sample size	Result
Shin et al. (2012)	Quantitative research	Perceived usefulness and ease of use, information	329 valid responses	The proposed model combines perceived usefulness and ease of use as two factors that influence attitudes. Subjective norms are proposed as a

		quality, system quality, interactivity and subjective norms		factor influencing intent. Control of cognitive behavior is replaced by cognitive interaction because it is an integral part of describing the characteristics of QR codes.
Ozkaya et al. (2015)	Quantitative research using survey methods	The purpose of using QR codes, early adopters, ownership of electronics and updating knowledge of electronics, ratio of using QR codes	174 university students	The results indicate that the intention to use is significantly related to the QR code usage. Actual users use QR codes more than users experience and have a positive relationship between ownership of electronic devices and the use of QR codes. An early adopter has a negative relationship with the use of QR codes. In addition, perceived usefulness of QR codes and updating knowledge of electronic devices does not have a significant relationship with the speed of using QR codes.
Liébana-Cabanillas et al. (2015)	The authors conduct online research on the internet in Spain.	Attitude, innovativeness and subjective norms, compatibility, security, personal innovativeness and mobility.	168 surveys	The study of the authors analyzed the user's acceptance of payment systems using QR codes on mobile devices. The outcomes illustrate that opinions, change and subjectives standards are the decisive factors for the intention to use this technology in the future. In addition to the basic elements of the technology adoption model (TAM), the authors also identified new variables that affect the acceptability of using the mobile QR payment system as compatibility, security, personal innovativeness and mobility.
Hossain et al. (2018)	Quantitative research by online survey method	Usefulness Acceptability Feasibility Perceived flow	420 valid respondents who purchased a product online via QR code.	The research has shown that QR codes have a great influence on purchasing intent and customer satisfaction. The results of the paper also confirmed that QR codes affect the perception flow, the combination of factors affecting shoppers' satisfaction and ultimately the intention to buy.

Through the summary of these studies, it can be seen that there are many empirical studies on accepting new technologies of customers in the field of payment. In Vietnam, there have been many studies on accepting the use of new

technology in new banking industry such as Mobile banking, E-banking ..., but there has not been any official research project on using QR code payment in Vietnam. Therefore, it is highly necessary to study the intention to use QR code

payment method when buying goods in emerging markets like in Vietnam and it is a new trend in Vietnam. These studies will be the basis for proposing a research model to serve in the Vietnamese context.

III. Hypotheses and research model

With the popularity of smartphones, laptops, and tablets in payment operations as today, the deployment of QR code payment services is an indispensable trend. There are many different studies around the world in the field of electronic banking (E-banking) as well as mobile banking (mobile banking) or the intention to use new technologies such as studies by Venkatesh et al. (2003), Davis et al., (1992), Taylor and Todd (1995), Shin et al. (2012), Liébana-Cabanillas et al., (2015). There are differences in the selection of factors to measure the level of technology acceptance in these studies. However, it can be summarized into the following factors: perceived usefulness and perceived ease of use will affect the attitude and intentions that lead to the acceptance of technology use by the research subjects. In addition, a number of factors such as perceived security, subjective norms are factors emphasized by the authors in a number of studies in the field of accepting mobile banking services and payment services by QR code.

In short, it can be seen that the group of factors affecting the process of accepting QR code payment services on mobile phones will have appropriate variables such as perceived usefulness, perceived security, perceived ease of use, social norms are the factors that are suitable for the study on the intention to use QR code payment in mobile banking. These are independent variables that directly impact on the acceptance of using new technology services, or indirectly influence intention to use via mediator variable is "attitude". In Vietnam, this is also a new type of service, the customer experience of this service is not substantial. Within the payment via electronic banking, customers are more or less cautious of the safety and security. With the above characteristics, the authors choose perceived ease of use, perceived usefulness, social norms,

perceived security as the factors that influence the extent of adoption of QR code payment method, whether it is through mediator variable "attitude" or not. The research hypotheses are as follows:

* Perceived ease of use

"Perceived ease of use is the degree to which a person believes that using a particular system will save effort" (Davis, 1989, p.320). There are many studies that also use similar concepts as "perceived ease of use" such as "complexity" and "expected effort" (Venkatesh et al., 2003). An easy-to-use technology will stimulate potential users to increase their intention to use new technology and services. Studies of Venkatesh et al. (2003), Davis et al. (1992), Taylor and Todd (1995), Shin et al. (2012), also confirms and demonstrates that ease of use is a factor influencing the intention to adopt new technology and services. The higher customers' perceived ease of use on QR code service is, the easier it is for customers to accept the service. Therefore, the following hypothesis is proposed:

Hypothesis H1: Attitude is a mediator variable between perceived usefulness and intention to use QR code payment when making purchases.

* Perceived usefulness

Previous studies have shown a link between perceived usefulness and perceived ease of use, which influences attitudes and behaviors of adopting technology (David, 1989; Huarng, Yu and Huang 2010, Liébana-Cabanillas et al., 2014). A study in the field of accepting QR code payment technology in the world by Shin et al. (2012) also proved that this is one of the determinants of the customer's adoption of QR code technology. Therefore, the authors hypothesized:

Hypothesis H2: Attitude is a mediator variable between QR code intention to use and perceived usefulness when making purchases.

* Perceived security

Risk and safety assessment is a major concern in electronic payment systems (Ashrafi, 2008). New security mechanisms for new forms of electronic payment should be established to ensure the safety of customer transactions and create trust, thereby

improving their attitude towards new forms of payment. Risk is only one of the factors hindering the implementation of a new payment system (Lee, 2009). Therefore, perceived security of QR code payment systems must be under supervision (Schierz et al., (2010); (Meharia, 2012) for the success of using QR code in payment. The form of payment by scanning a QR code is normally connected to the customer's online account. Therefore, this factor plays an extremely important role in choosing the form of payment. Customers must feel the security, information security, accurate transaction process, account information and transactions are highly secure so as to decide to use this service. Therefore, the authors hypothesized:

Hypothesis H3: Attitude is a mediator variable between perceived security and intention to use QR code payment when making a purchase.

* Social norms

Social norms refers to the level of individuals' perception that reliable people think they should use an innovation (Venkatesh et al., 2003). It acts as a combination of subjective norms components in the TRA model (Ajzen, 1991) and social images in the model (Moore and Benbasat, 1991). In the study of Taylor and Todd (1995), the subjective norms was determined to include the effects of the opinions of other talented people known as reference groups, including colleagues, friends, supervisors, and technology experts. Research shows that pressure from reference groups to adopt an effective innovation as it contributes to reducing risk through association with awareness. One component related to "social influence" is the "social factor". "Social element" is the case in which individuals representing a certain group of people are behaving in certain ways by members of society. Venkatesh et al. (2003) believe that "social norms" can significantly influence user intention when users make a required innovation. In these cases, "social norms" may be important in the early stages of acceptance but is unlikely to be used in the long term (Venkatesh and Davis, 2000). In fact, users with mobile banking services often spread to their

colleagues, relatives, and partners. Therefore, the authors hypothesized:

Hypothesis H4: Attitude is a mediator variable between Social Norms and the intention to use QR code payment when making a purchase.

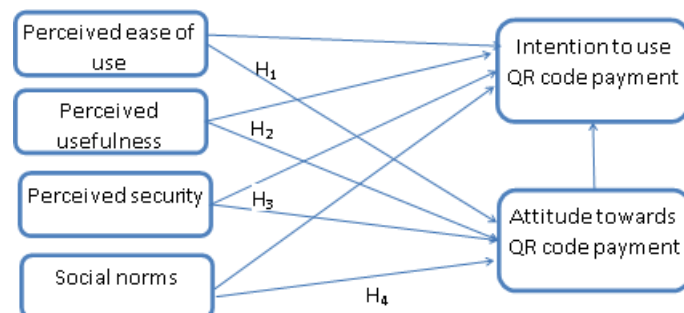


Figure 1. The proposed research model

IV. Methodology

The study was mainly conducted through qualitative and quantitative research to collect primary data with two stages as follows:

At the first phase, the authors conduct qualitative research to adjust the research scale and complete the questionnaire for official research. The method used was in-depth group interviews with a small number of 10 random customers and 5 experts knowledgeable about the field of mobile payment at banks and the field of technology. The interview took place with each person on a set of questions, especially open-ended questions used for people invited to the interview about issues related to the use of QR code payment in Vietnam. The results were brought into stop in 15 people because the information obtained was overlapped in some people and new information was not exploited.

The first objective of the in-depth interview is to examine and screen independent variables in the theory model proposed by the authors and to preliminarily determine the relationship between the independent and dependent variables. This in-depth interview will help the author identify the factors that are suitable for the characteristics of the QR code payment method in Vietnam and the factors affecting the acceptance of using QR code payment method when making a purchase. The next objective is to check the appropriateness of

the scales and absorb ideas to improve the sentence structure and words used in the future survey. All interviews were collected by the author group by taking notes to synthesize the comments and adjust the questionnaire accordingly. The results of qualitative research show that most of the participants in the interview were in agreement with the definition of the scale and indicators for measuring the scale. There are a number of suggestions for editing the style of writing to make it easier to understand.

At the second phase 2, quantitative research with data collection methods is a questionnaire developed in the Vietnamese market. The research model is expected to have 30 observed variables so the minimum number of samples needed is $30 * 5 = 150$ samples. Because according to Hoang Trong & Chu Nguyen Mong Ngoc (2008), to be able to analyze the exploratory factor, it is necessary to collect a data set with a sample size of at least 4 or 5 times the number of observed variables. To ensure the reliability of the data, the authors determined the sample size to be 500

people. The sample was selected as students and employees. The authors selected a convenient sampling method for undergraduate and graduate classes as well as handed out tickets directly at the counter at banks in Vietnam. A small number of samples were surveyed online in remote areas such as Hanoi, Vinh Phuc ... Quantitative research was conducted from May 2019 to January 2020 with interviews among customers who have used or have never used QR code payment. As a result, a total of 441 respondents answered the questionnaire completely. The data from 441 votes were encrypted, input, cleaned and conducted analyzed on SPSS 20.0 and 3.2.9 smartPLS software.

V. Results

5.1 Sample description statistics

The survey was conducted by convenient sampling in Viet Nam. Table 2 reports a sample of 441 respondents representing current and potential users of QR code in Vietnam and provide demographic characteristics of the respondents.

Tab. 2- Demographic Characteristics of participants. Source: own research

Percent of participants					
Characteristics of participants	Total	Overall Percent	Characteristics of participants	Total	Overall Percent
Gender	N=441	100.0	Career	N=441	100.0
Male	179	40.6	Student	215	48.8
Female	262	59.4	Officer	117	40.1
Age	N=441	100.0	Business	18	4.1
<30	318	72.1	Others	2	0.5
30-45	114	25.9	Income	N=441	100.0
≥ 45	9	2.0	< 5 millions	183	41.5
Education	N=441	100.0	5 -10 millions	221	50.1
Technical/ College	94	21.3	>10 millions	37	8.4
University	323	73.2	Region	N=441	100.0
Post Graduate	15	3.4	Central region	313	71%
Others	9	2	North region	128	29%

Survey results from 441 respondents showed that 2/3 of the respondents at young age (under 30 years old) accounted for 72%, the majority of whom got college and university education (accounting for more than 2/3 of the total sample). Half of the respondents are students (48.8%), whereas the rest are mostly employed with a monthly income. The main living area of the

interviewees is in Central region (71%), while the rest of the respondents are residents in the Northern provinces (making up for about 1/3 of the respondents).

5.2 Assessing the reliability of the scale with Cronbach's Alpha

Cronbach alpha analysis results for the variables are described in the following table:

Tab3- Cronbach alpha table of research concepts. Source: own research

Variable	Mean	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach Alpha if Item Deleted
1. Perceived Ease of Use, Cronbach's alpha = 0,900				
PEoU1	7,49	2,946	,814	,848
PEoU2	7,59	2,569	,829	,836
PEoU3	7,6	2,978	,770	,883
2. Perceived usefulness, Cronbach's alpha = 0,903				
PU1	11,42	5,485	,756	,884
PU2	11,46	5,399	,739	,891
PU3	11,37	5,414	,820	,863
PU4	11,45	5,093	,821	,861
3. Social Norms, Cronbach's alpha = 0,893				
SN1	6,53	3,000	,792	,845
SN2	6,36	3,013	,774	,860
SN3	6,58	2,840	,802	,836
4. Perceived Security, Cronbach's alpha = 0,927				
PS1	14,46	8,195	,829	,907
PS2	14,39	8,434	,859	,901
PS3	14,45	8,725	,816	,909
PS4	14,24	8,766	,797	,913
PS5	14,22	8,745	,749	,922
5. Attitude, Cronbach's alpha = 0,910				
ATT1	11,09	5,020	,783	,889
ATT2	11,11	4,824	,809	,880
ATT3	11,11	4,928	,806	,881
ATT4	11,09	4,929	,788	,887
6. Intention to use, Cronbach's alpha = 0,879				
ITU1	7,24	2,330	,723	,865
ITU2	7,38	2,285	,794	,806
ITU3	7,39	2,038	,787	,811

Cronbach's alpha analysis results show that there are two observed variables (items) of the "Perceived usefulness" scale with low correlation coefficient ($<.3$), that is PU5 variable (correlation

of total variable =,258) and PU6 variable (total correlation =,213). These observed variables do not contribute much, showing a low correlation coefficient (less than 0.3). Therefore, these two

variables are excluded. Keep running Cronbach's Alpha for the 2nd time for this concept.

As shown in table 3 above, all measurement concepts achieved Cronbach's Alpha coefficient of 0.60 or higher ranging from 0.831 to 0.927. What's more, all observed variables achieve a total correlation coefficient of over 0.30. As a result, the scales in the research model reach the required reliability, these observed variables are included in the next analysis.

5.3 Results of factor analysis of EFA

Discovery factor analysis is a quantitative analysis method used to shorten a set of many interdependent observation variables into a smaller set of variables (called factors) so that they are more meaningful but still contains most informative content of the original set (Hair & ctg 1998). Factor loading of less than 0.5 in EFA will be disqualified. Furthermore, a difference of no more than 0.3 between two factors loading (ie, a question uploading both factors) will be disqualified. The extraction method used is varimax rotation with principal components and varimax rotation stops when extracting elements with eigenvalue = 1. The scale proves to be reliable when the total variance is > 50% (Gerbing & Anderson, 1988), provided that the KMO index >= 0.5. KMO acts as a factor that determines the appropriateness of EFA, $0.5 \leq \text{KMO} \leq 1$, then factor analysis is suitable. The Bartlett's test considers the correlation between observed variables. If this test is statistically significant (Sig < 0.005), the observed variables are correlated with each other on the whole (Hoang Trong & Chu Nguyen Mong Ngoc, 2008).

For independent variables:

EFA analysis of 1st prefixes: KMO = .908, with the Signal of Bartlett's Test = 0.000 < 0.05 for the data found to parse. In eigenvalue = 1.035 > 1 with the bad method is 80.684 > 50% (satisfactory), then there are 4 factors extracted from 15 observed variables. This prefix is a decantation of 80,684% the data variable. However, in the rotation match, it shows that some observed variables have a weight (Factor loading) less than 0.5, moreover, there is a difference of not more than 0.3 between the two loading factors, so it will be disqualified, which is variable PU1. We continue to analyze EFA factor for the second time. However, some observed variables have a factor loading of less than 0.5 and there is a difference of not more than 0.3 between the two factor loading, so they will continue to be eliminated. The observed variables that are eliminated after the first and second EFA factor analysis include PU1, PU2, PU3, PU4.

In the third EFA factor analysis, KMO coefficient = .893, with significance level of Bartlett's Test = 0.000 < 0.05, showed that the data is suitable for factor analysis. At eigenvalue = 1.238, 3 factors were extracted with the total variance explained at 81,003% (> 50%). Thus, after the 3rd EFA analysis, these 11 observed variables ensure the EFA analysis standard (satisfactory) and they are included in the analysis of the PLS path model. Details of the analysis results are presented in the following table:

Tab. 4- Results of EFA. Source: own research

Variable	Factor		
	Perceived security	Perceived Ease of Use	Social norms
PS3	,849		
PS2	,847		
PS4	,811		
PS1	,786		
PS5	,764		

PEoU2		,900	
PEoU1		,858	
PEoU3		,811	
SN2			,868
SN3			,854
SN1			,830
Eigenvalues	6,258	1,414	1,238
Average variance (%)	56,892	69,749	81,003

For mediator variables "attitude" and "intention to use QR code payment" variable:

By performing a factor analysis with the "Attitude" variable, we have KMO (Kaiser-Meyer - Olkin) value of 0.845 and Bartlett test with Sig of $0.000 \leq 0.05$. Furthermore, there is a single factor with an eigenvalue greater than one with a total variance of 78,837% greater than 50%. As a result, the variable "Attitude" is measured by four observed variables: ATT1, ATT2, ATT3, ATT4.

Similarly for the variable "Intention to use", the KMO value is 0.734 and the Bartlett test has Sig of $0.000 \leq 0.05$. Value of the total variance explained = 80,648% > 50%: satisfactory; then it can be said that this factor explains 80,648% of data variation and one factor is "intention to use" is measured by 3 variables ITU1, ITU2, ITU3.

Through the results of reliability analysis and EFA analysis, the actual research model is different from the theoretical model. The new model consists of three independent variables (Perception of security, Perceived ease of use,

Social norms). The research hypothesis is proposed as follows:

Hypothesis H1: Attitude is a mediator variable between Perceived ease of use and Intention to accept payment of QR code when making a purchase.

Hypothesis H2: Attitude is a mediator variable between Perceived security and Intention to use of payment QR code when making a purchase.

Hypothesis H3: Attitude is a mediator variable between Social Norms and the Intention to use of QR code payment when making a purchase.

5.4 Analysis of PLS path model

The determination of reliability and convergence validity is essential. According to the Hair et al. (2017), internal consistency was assessed by two criteria: Cronbach's Alpha (CA) ≥ 0.7 ; and (2) Composite Reliability (CR) ≥ 0.70 , Average Variance Extracted (AVE) ≥ 0.50 .

Tab. 5- Results of Cronbach Alpha. Source: own research

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
ATT	0.910	0.937	0.788
ITU	0.880	0.926	0.806
PEoU	0.901	0.938	0.834
PS	0.928	0.945	0.776
SN	0.893	0.933	0.823

Note: Perceived ease of use (PEoU), Perceived Security (PS), Social Norms (SN), Attitude towards Intention to Use (ATT), Intention to Use (ITU)

Looking at the table above, we see that all factors are satisfactory (greater than 0.7), AVE values are greater than 0.5, so the convergence validity is determined.

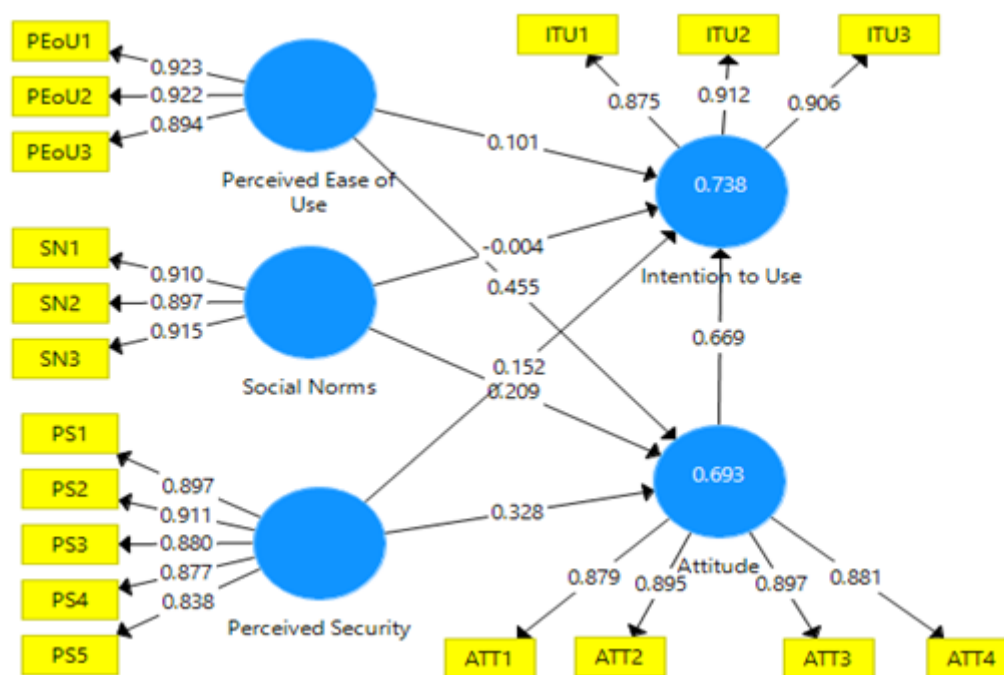


Fig. 2 – Results of the structural model testing. Source: own research

The coefficient of determination $R^2 = 0.738$ for the endogenous hidden variable «Intention to Use», in which factors affecting the attitude towards the intention to use of QR codes have the coefficient $R^2 = 0.693$, which means that factors explain 69.3% of «Intention to Use» through the variable «Attitude».

The internal model shows that Attitude has a great influence on Intention to Use (beta = 0.693), of which Perceived Ease of Use (beta coefficient = 0.455) and Perceived Security (beta coefficient = 0.332) are two factors that have a strong influence on «Attitude» and thereby Intention to Use. The results show that almost all customers highly appreciate the ease of use that QR code payment method brings. This can be explained by the fact that the most current banks supported the safety and convenience of QR code payment, people who are ready with smartphones and connected to the Internet will easily accept QR code payment. The results also show that social norms also has a significant influence on the attitude towards the intention to accept QR code payment (beta = 0.209), which is also easy to understand due to the fact that Vietnamese people have collective culture. Therefore, their use of

products, especially new ones, will also be easily influenced by people around them.

Mediation Effects of «Attitude» in PLS

The impact of multiple mediators is analysed using a mediation processes of a PLS described by Nitzl et al. (2016). This approach will simultaneously examine various external and internal factors (i.e., perceived ease of use, perceived security and social norms, intention to use) to provide a clear and comprehensive panorama of the relationship between external and internal factors, as well as the attitude and intention to use in the research model. This process consists of 2 steps: Step (1) Determining the significance of indirect effects, Step (2) Determining the type of effect and / or of mediation. In step 1, PLS researchers must start by testing the indirect impact of the two paths for significance. Alternatively, researchers should apply bootstrap routines to test the significance of the indirect effect $a \times b$.

SmartPLS can test the meaning of both internal and external models, using a process called bootstrapping. In this process, a large number of test samples (egg, 5000) are taken from the original sample with changes to create bootstrap

standard errors, which will give relative T-values for checking the significance of structure lines. Bootstrap results show the relative stability of the

data. The meaning of the indirect impact (axb) is shown in the table below:

Assessment of indirect effects:

Tab. 6- Results of indirect effect. Source: own research

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
PEoU -> ATT -> ITU	0.305	0.304	0.034	9.058	0.000
PS -> ATT->ITU	0.220	0.218	0.034	6.474	0.000
SN-> ATT-> ITU	0.140	0.140	0.027	5.148	0.000

As demonstrated in the table above, the indirect effect is significant ($p=0.000 < 0.05$). It can be asserted that "Attitude" is the mediator variable among PEoU, PS, SN and ITU. As a result, hypothesis H1, H2, H3 are all supported and confirmed.

In the subsequent step, with an aim to determining the impacts of mediator variable, the significance of

the direct effect must be assessed. If the direct effect is not significant, the impact will be "full mediation" and on the contrary, If the direct effect is significant, the impact will be "partial mediation" (Nitzl et al., 2016).

Assessment of the direct effects:

Tab. 7- Results of direct effect. Source: own research

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
ATT -> ITU	0.669	0.667	0.054	12.455	0.000
PEoU -> ATT	0.455	0.455	0.036	12.583	0.000
PEoU -> ITU	0.101	0.101	0.040	2.543	0.011
PS -> ATT	0.328	0.327	0.041	8.097	0.000
PS -> ITU	0.152	0.152	0.038	4.002	0.000
SN -> ATT	0.209	0.209	0.037	5.627	0.000
SN -> ITU	-0.004	-0.003	0.036	0.117	0.907

Statistical significance of p-value < 0.05 , shown in the effects of PEoU on ITU ($p = 0.011$) and PS's impact on ITU ($p = 0.000$), showing that these are the "Partial mediation" impacts. Particularly, the impact of SN on ITU is not significant ($p = 0.907$). As a result, the attitude is "full mediation" between Social norms and the intention to use of QR code payment method when making a purchase.

VI. DISCUSSIONS AND IMPLICATIONS

This paper aims to understand the role of mediator variable "attitudes" in identifying factors that may influence Vietnamese consumers' intention to use QR codes, to provide Proposals and valuable information for bank managers as well as entrepreneurs to facilitate customers in the payment process, contributing to make the shopping process quick and efficient.

Tab. 8- Results of mediator variable "attitudes". Source: own research

Hypothesis	Estimate (beta)	p-Value	Result	Type of mediation
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H1	PEoUxATT->ITU	0.305	0.000	Supported	Partial Mediation
	PEoU->ITU	0.455	0.011	Supported	
H2	PS x ATT->ITU	0.220	0.000	Supported	Partial Mediation
	PS->ITU	0.152	0.000	Supported	
H3	SN x ATT->ITU	0.140	0.000	Supported	Full Mediation
	SN->ITU	-0.004	0.907	Not supported	

The research results show that factors such as social norms, perceived ease of use, and perceived security all influence the attitude towards the intention to use QR code payment on customers' purchases. In particular, attitude plays a mediator role in the impact of these factors on Intention to Use. This also shows that creating a positive attitude towards the use of QR codes is essential, because it enables the enhancement of this form of consumer payment (beta = 0.693). Specifically, if Vietnamese consumers maintain a positive attitude with the intention to use QR codes, they will be more willing to engage in their QR code usage. This result can be particularly useful for bank managers or business people in general seeking to improve a positive review of QR codes. Moreover, the factors of Perceived Ease of Use (beta factor = 0.455) and Perceived Security (beta factor = 0.332) have the strongest impact. Therefore, in order to promote the form of QR code payment, increase familiarity with customers, firstly, banks need to coordinate with related parties to make the QR code payment process simple, easy to implement. Moreover, at the banks or transaction points, there should be a guide who can give clear explanation of the steps to install QR code payment application on smartphones, creating peace of mind, excitement, familiarity to the customer, helping customers to master new technology services, thereby increasing the intention to use this form of payment. Sometimes, the use of new payment services will make customers feel afraid. Therefore, in order to increase perceived security among customers, banks and transaction points need to perform accurately, clearly, conveniently and answer questions of customers quickly and promptly.

What's more,

it is a necessity for banks to ensure absolute safety of customer information when using and have regulations on risk prevention in payment transactions by scanning QR codes. The increase in points of acceptance of QR code payment, the establishment of a wide distribution network in provinces and cities all over the country, the enhancement of discount methods, and customer support can make contributions into facilitating the best conditions for customers in their application of QR code payment.

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