ISSN 1816-6075 (Print), 1818-0523 (Online)
Journal of System and Management Sciences
Vol. 13 (2023) No. 4, pp. 165-183
DOI:10.33168/JSMS.2023.0410

The Role of Customer Perception and Variety-Seeking in the Intention Using Internet of Things Technology: A Case Study of Quick Response Code Payments

Minh Pham[1], Anh Mai Thi Pham[2], Anh Truc Thi Phan[2],

Chau Minh Thi Nguyen[2], Nhu Thanh Thi Hoang[2], Truc Phuong Ngoc Dang[2]

[1] Faculty of Business Administration, Ho Chi Minh City Open University, Vietnam

[2] School of Advanced Study, Ho Chi Minh City Open University, Vietnam

minh.p@ou.edu.vn (c*orresponding author)*

Abstract. The development of the industrial revolution 4.0 has led to many technologies being born, especially the Internet of Things (IoT) technology. IoT is prevalent in many fields (health, transportation, manufacturing, etc.), but this trend still receives little attention from people in emerging markets. In developing countries like Vietnam, IoT is especially prominent in the payment field, especially electronic payment by QR code. Quick response (QR) code is a commonly used IoT technology to change and improve the customer experience. However, people's awareness of the benefits of QR codes as well as IoT technology in emerging markets like Vietnam is still unclear. Therefore, this study aims to evaluate the impact of cognitive factors on the intention to use QR codes in electronic payments, thus evaluating its use. In addition, the study also assesses the regulatory ability of variety seeking because today, there are many payment methods for users to choose from, and their search and experience needs will increase. With 409 samples collected in Ho Chi Minh City, Vietnam, from September to October 2022, the study uses quantitative research by analysing the PLS-SEM method through SmartPLS 4 to test the research hypotheses. The analysis found that ease of use strongly influences attitudes towards QR code usage behaviour. In particular, the finding that the variety seeks moderates the relationship between perceived ease of use and perceived risk to attitude is also demonstrated in this study. The study implied that business managers could determine the influence of each factor on the intention to use QR codes in electronic payments, as well as consider the increase in using IoT technology in financial transactions.

Keywords: IoT, Internet of Things, QR code, e-payment, variety seeking

1. Introduction

The industrial revolution 4.0 has brought many valuable applications, such as big data analysis, robotisation, virtual reality, and artificial intelligence. It is impossible not to mention the significant role of the Internet of Things (IoT). IoT is the convergence of the physical and digital worlds through the interconnection of physical tools using the Internet (Chanal and Kakkasageri, 2020). IoT is also the most prominent emerging trend in technology and has kicked off an unprecedented information revolution (Nord et al., 2019). Some examples of IoT used in life are smart homes, intelligent transportation systems, smart healthcare systems (e-health), etc.

E-health is healthcare services using the Internet and technologies such as connected devices, computers, mobile phones, websites and applications (Lepore et al., 2018). From the foundation of connected devices and smartphones, various IoT-based technologies are born that help modifies and upgrade the traditional healthcare system to become more innovative and customisable (Farahani et al., 2018; Mital et al., 2018; Tuli et al., 2020). Moreover, this advanced technology can help ensure patient monitoring and observation (Arfi et al., 2021). Research on healthcare using the IoT is as diverse as doctors' intention to use IoT devices in healthcare (Alhasan et al., 2022), intention to continue using IoT wearable devices in healthcare (Kang and Hwang, 2022), QR code application in e-health (Ramalho et al., 2022).

Next, another application of IoT technology is the smart home. A smart home consists of four components: smart devices, home network, home gateway and service platform, in which all devices' home appliances are connected to the Internet (Yoon et al., 2015). Smart home services are all controlled remotely by just one device, which can handle all devices installed in the house, including home appliances, appliances such as air conditioners, refrigerators, and TVs (Alam et al., 2012). Mobile devices such as smartphones and tablets can control innovative home services (Park et al., 2018). Smart home technology is seen as a way to improve the quality of life for users (Amiribesheli et al., 2015). Some representative topics of intelligent home research in recent times, such as the adoption of smart homes through the TAM mode (Park et al., 2018), the adoption and popularity of smart homes (Shin et al., 2018), the role of a smart home for the elderly (Sokullu et al., 2020), the intention to adopt eco-friendly intelligent home service (Zhang and Liu, 2022).

Xu et al.(2022) mentioned that electronic payment is one of the major applications of IoT technology. QR code is a typical electronic payment method (Chang et al., 2021). Especially after the Covid-19 epidemic, there is a tendency to use electronic payment methods to avoid person-to-person contact to help reduce the risk of disease transmission (Zhong and Moon, 2022). Therefore, QR codes play a critical role in electronic payments. Research on the intention to use mobile payment via QR code is also interesting to many scientists (Baskoro et al., 2020; Chang et al., 2021; Türker et al., 2022). However, there has not been much research on IoT in this area.

A QR code is a storage system using a dot matrix or two-dimensional barcode developed in 1994 (Kang and Choi, 2019), which can contain different product content, such as URLs, images and videos (Sang Ryu and Murdock, 2013). This code can be printed on multiple promotional products and media. Consumers can access it using any smartphone or mobile phone with a built-in camera and QR code reader software (Sang Ryu and Murdock, 2013). Many studies and practices have also been conducted on IoT technologies, including applying QR codes to achieve food traceability and ensure food safety in supply chain management (Li et al., 2017).

QR codes are used because of their properties, such as the ability to store data and the flexibility associated with quick and simplified access to information (Ramalho et al., 2019). Electronic payment services using QR codes are accepted faster, easier and safer than other electronic payments, so they are widely used today (Liu et al., 2021; Sun et al., 2021). Thus, it is unsurprising that most famous service providers in Vietnam, such as VNpay, Viettel, and Zalo, have implemented QR codes to perform online financial transactions (Le, 2022). In particular, QR code payments will reduce cash circulation

and operating costs, allowing banks to direct these funds towards research and development activities for new products (Eren, 2022). As a result, customers will be able to encounter new products that add value to their lives faster (Eren, 2022).

Among the theories of new technology acceptance, the technology acceptance model (TAM) is probably one of the discovery models widely used by information science researchers (King and He, 2006; Dhagarra et al., 2020). TAM is the most popular and influential theory because it has modelled how users accept and use technology (Chang et al., 2010). TAM proposes that two crucial factors influence users' decisions to use technology based on human perception: perceived ease of use and perceived usefulness (Kim et al., 2019). Researchers have verified and validated TAM as suitable as a theoretical foundation for technology adoption (Cho & Sagynov, 2015).

However, perceived usefulness and perceived ease of use do not accurately reflect the motivation to use online applications when users face security threats, where the perceived risk is an important factor in this case (Lu et al., 2005). According to Forsythe and Shi (2003), perceived risk is a customer's subjective expectation of possible losses when making an online shopping decision. Tan (1999) argues that online transactions require a higher risk perception than traditional and face-to-face transactions. Consumers are reluctant to complete online payments (Hoffman et al., 1999), mainly because of risk aversion (Pavlou, 2001). Therefore the perceived risk is seen as a typical barrier to consumers' acceptance of online payments (Lee, 2009). Thus, perceived usefulness and perceived ease of use address the positives of electronic payments, while perceived risk describes the negatives. Combining the above three factors makes explaining technology acceptance behaviour more comprehensive.

Variety seeking is the desire to use a service (or product) different from the service (or product) that consumers are currently using or have used in the past without being satisfied (Hou et al., 2011). In the electronic payment market, there are many types of payment, not only via QR code but also via transfer applications (app banking) and payment via card. That is why users can easily switch payment methods when there are many choices, but understanding its impact on behaviour has not been well studied (Yuan et al., 2020).

Although there has been much previous research on IoT or QR code payment, as mentioned above, no research combines IoT and QR codes in electronic payment. People's awareness of the benefits of these two technologies is still low, especially in emerging markets like Vietnam. For the above reasons, it is necessary to carry out this study to learn about users' perceptions of accepting and using IoT technology. Thereby, this study helps to understand the causes affecting the intention to get QR codes and provides scientific arguments to help businesses develop electronic payment applications combined with IoT technology.

Defining the research questions is crucial to conducting a good article. For example, suppose the article wants to explain or understand a specific phenomenon, such as the intention to use QR codes in electronic payments. In that case, it is essential to identify the topic's questions. These questions help the research focus on analyzing the factors affecting the behaviour of using QR codes, thereby providing solutions or recommendations to improve and enhance this behaviour. This study was conducted to answer the following questions:

RQ1 What factors *influence the behaviour of using QR codes?*

RQ2 How does variety-*seeking influence the behaviour of using QR codes?*

This article has been structured into five sections. First, part 1 introduces relevant issues and the current research topic's situation. Next, section 2 clarifies the concepts and highlights the theoretical basis of this research, which makes appropriate hypotheses and proposes a research model. Section 3 presents the study's methodology to obtain the results. Part 4 is the research's results through the research method. Finally, section 5 defines the study's results and outlines limitations for future research.

2. Literature Review and Hypothesis Development

2.1. Internet of things

The Internet of Things (IoT) includes sensors, routers, communication devices, and a cloud-based application. Alternatively, IoT is a smooth combination of three components: interaction between people, the interaction between people and things, and the interaction between things and things through the Internet (Chatterjee et al., 2018). IoT is also the most significant emerging trend in technology and has kicked off an unprecedented information revolution (Nord et al., 2019). Many always-on, easily accessible, information-rich, and interactive means of communication and interaction enable connectivity between almost anything in extending the IoT to the Internet of Everything (IoE) (Fredette et al., 2012). As a result, IoT can present opportunities for attention. Still, the risk level of devices connected to the network can increase, so it is essential to know what motivates consumers to use this technology (Pinochet et al., 2018).

2.2. Quick response code

The quick response (QR) code was created to enhance automated tracking. QR code is developed from the traditional barcode. Their first function is to track or control the inventory of vehicle parts in manufactured automobiles (Pillai et al., 2017; Rouillard, 2008). Recently, new types of QR codes have been proposed with better appearance and higher capacity (Cai et al., 2019). QR codes allow users to extract data in three modes: online, offline or a combination of methods; for example, users can use QR codes to connect to websites, send emails or read SMS, save contacts, find map coordinates, listen to audio, or watch videos, ... (Aktaş, 2017).

Conversely, retailers also experience the benefits of QR code labelling and advertising on products that integrate with other media or print media to reduce costs and instantly communicate with their customers (Shin, Jung and Chang, 2012). QR codes can be integrated into users' smartphone applications to scan and decode product information provided by QR codes (Sang Ryu et al., 2013). In addition to advertising, businesses can better understand the QR code payment consumer market, and it also encourages more purchases because of easy and fast payment (Chang et al., 2021). Thus, in order to use QR codes in mobile payment services, users need to have a mobile application that can scan and generate QR codes on their mobile devices (Gao et al., 2018). The user can then open the app to scan the QR code the merchant displays, enter the payable amount, and complete the payment (Gao et al., 2018).

2.3. Perceived risk

Perceived risk is the nature and degree of risk a consumer perceives when purchasing (Cox and Rich, 1964). Risk perception explains how consumers perceive risk and try to avoid negative outcomes from their decisions (Bauer, 1960). Since consumers are more likely to prevent or reduce negative results than to maximise benefits by accepting some risk, it is crucial to study perceived risk to understand their behaviour (Im et al., 2008). Forsythe and Shi (2003) define perceived risk as a customer's subjective expectation of possible losses when making an online shopping decision.

Many studies have tested the effect of perceived risk on further innovation adoption, such as internet shopping (Forsythe and Shi, 2003), mobile payment (Jin and Lim, 2021), e-services (Featherman and Pavlou, 2003) and e-business (Kim et al., 2008a). In general, individuals often perceive significant risks in the decision-making process (i.e. purchase decision) (Holak and Lehmann, 1990). So, perceived risk is the risk of discomfort and uncertainty that may be unavoidable when using new technology due to the unpredictability and objectivity of innovative applications (Pavlou, 2003). Furthermore, Featherman and Pavlou (2003) classified risks into seven categories: performance risk, financial risk, timing risk, psychological risk, social risk, privacy risk and overall risk. The QR code payment system is mainly associated with financial and privacy risks (Srisawatsakul et al., 2020).

Low-risk perception contributes to positive attitudes of individuals towards electronic payments using QR codes (Chang et al., 2021). The contactless feature of QR code payments makes users question their concerns about risk and security (Chang et al., 2021). Furthermore, perceived risk has a decisive impact on users' trust in electronic payment systems (Srivastava et al., 2010), thereby reducing intention to use (Yang et al., 2012). Perceived financial risk refers to the consumer's perception of possible monetary loss due to electronic payments (Featherman and Pavlou, 2003). Transferring funds between accounts in electronic payments can raise significant concerns about financial information, such as stolen accounts and passwords, and the risk of subsequent loss of funds (Yang et al., 2015).

The perceived risk of using IoT services is even higher due to the unique characteristics of IoT technologies and high levels of information technology participation (AlHogail et al., 2019). Perceived privacy risks are uncertainties associated with the possible adverse disclosure of personal information when using an IoT system (Featherman and Pavlou, 2003). As a result, IoT systems are connected via the Internet, and users' personal information may be exposed (Dong et al., 2017). Using an IoT system may reveal consumers' personal information, which may also bring an adverse effect (Ohkubo et al., 2005).

In an online environment where there is a possibility of negative outcomes or high uncertainty, consumers' perception of risk increases (Bashir & Madhavaiah, 2015). Furthermore, Hu et al. (2019) stated that perceived risk refers to the financial and privacy risks users perceive when choosing technology services. Bashir and Madhavaiah (2015) concluded that perceived risk negatively affects consumers' attitudes toward e-banking services. In particular, the higher the perceived risk, the less favourable attitudes towards a specific technological product (Huei et al., 2018). In other words, perceived risk determines an individual's attitude towards technology products and services (Huei et al., 2018).

H1: Perceived *risk has a negative effect on consumer attitudes*.

2.4. Technology acceptance model

Mathieson (1991) argues that the technology acceptance model (TAM) captures user perception in a general way, provides specific information, and therefore predicts human behaviour well. TAM has been confirmed to be a robust and suitable model for predicting individual information system adoption (Davis et al., 1989). It is used to explain customer behaviour in many contexts, for example, in online banking (Tan and Teo, 2000), online shopping (Ha and Stoel, 2009), social networking (Pinho and Soares, 2011), … According to TAM's proposition, their behavioural intention directly determines individuals' use of new technology. In addition, Davis (1989) further argued that behavioural intention is a function of attitudes and two specific beliefs: perceived usefulness and perceived ease of use.

Perceived usefulness is the degree to which individuals believe using a particular technology will enhance their performance (Kim et al., 2008b; Lee et al., 2005). In an online environment, perceived usefulness is based on the idea that a particular technology can be helpful for someone to achieve a specific outcome (Liébana-Cabanillas et al., 2015). Previous e-banking studies have provided empirical evidence of a significant positive effect of usefulness on consumer attitudes (Celik, 2008; Chau and Ngai, 2010; Cheng et al., 2006; Chiou and Shen, 2012; Lee, 2009). TAM proposes that perceived usefulness is the primary antecedent of attitude towards intended use (Davis, 1989) and has been verified in many studies (Huarng et al., 2010; Shin and Shin, 2011; Muñoz-Leiva et al., 2012; Daim et al., 2013; Liébana-Cabanillas et al., 2014).

H2: Perceived *usefulness positively affects consumer attitudes*.

Perceived ease of use by an individual using a particular system is easy and straightforward (Davis, 1989; Taylor and Todd, 1995). Therefore, this is considered one of the most influential attributes in adopting new technology (Moore and Benbasat, 1991). Many studies have experimentally determined that perceived ease of use affects individuals' attitudes toward using information systems (Davis et al.,

1989; Venkatesh, 2000). Moreover, various studies have confirmed similar results regarding online application adoption (Celik, 2008; Chau and Ngai, 2010; Chiou and Shen, 2012; Giovanis et al., 2012; Lee, 2009).

H3: Perceived *ease of use positively affects consumer attitudes.*

In addition, attitude is also a determinant of behavioural intention in TAM. It refers to an individual's view (positive or negative) towards a particular behaviour. According to Bailey et al. (2017), attitude is an essential predictor of user adoption of technology (Crespo et al., 2013; Sun and Chi, 2018). In addition, Song et al. (2021) also argue that the TAM model has acknowledged that attitude is the primary determinant in predicting users' intention to use new technology. Moreover, many previous studies have shown that attitude towards a particular technology positively impacts the intention to use technology (Davis et al., 1989; Gefen et al., 2003; Liu et al., 2016).

H4: *Attitude towards using QR codes positively affects consumers' intention.*

2.5. Variety seeking

Variety-seeking is part of human nature (Lee et al., 2020). Hou et al. (2011) argued that variety-seeking is the desire to change services/products to seek satisfaction. Variety-seeking behaviour explains customer satisfaction with attributes of an alternative product/service, leading to a change in purchasing decisions (McAlister, 1982). Behaviour change helps eliminate boredom and stimulate customer satisfaction (Derinalp Çanakçı & Birdir, 2020). This behaviour benefits consumers but harms businesses (Woratschek and Horbel, 2006).

Kim et al. (2017) demonstrated that variety-seeking moderates the relationship between components of individuals' perceptions. Additionally, variety-seeking relates to consumers' attitudes (Chien-Huang and Hung-Chou, 2012). Aaker and Joachimsthaler (2000) used variety-seeking to explain the relationship between consumer perception and attitude, and variety-seeking plays a critical moderating role in this relationship.

H5a: Variety-*seeking moderates the relationship between perceived risk and consumer attitudes*.

H5b: Variety-*seeking moderates the relationship between perceived usefulness and consumer attitudes*.

H5c: Variety-*seeking moderates the relationship between perceived ease of use and consumer attitudes*.

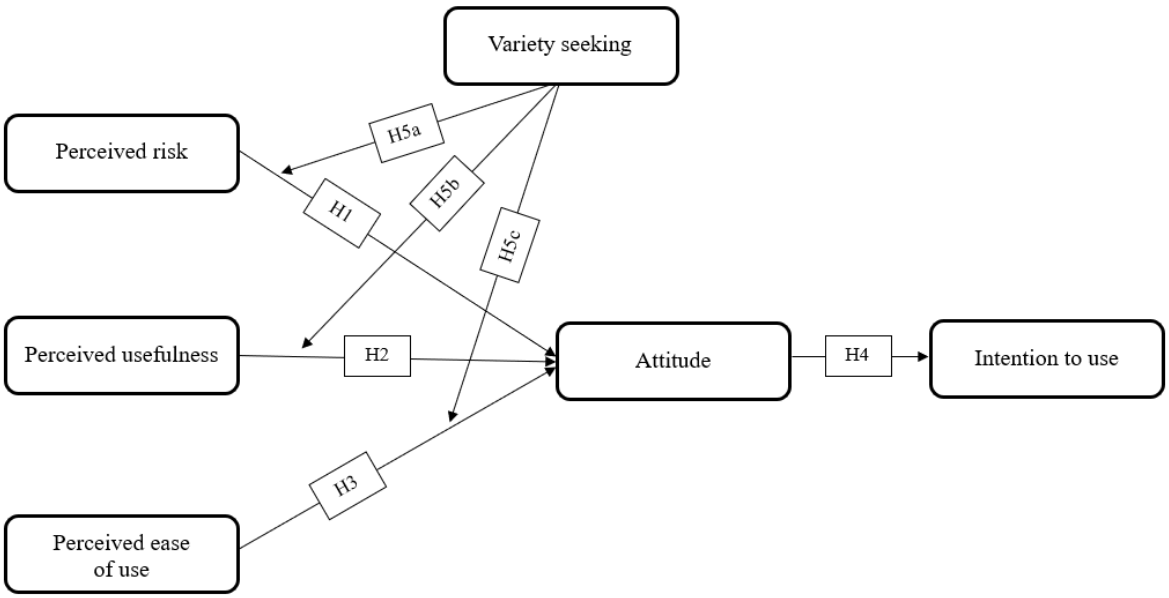

Fig.1: Conceptual framework

3. Methodology

The article used the convenience sampling method to collect data. This study was conducted randomly to survey GenZ generations in Ho Chi Minh City, Vietnam, for electronic payment by QR code from September 2022 to October 2022. The survey site is a big city and the economic centre of Vietnam, where technology is most developed in Vietnam, so the application of QR codes in Ho Chi Minh City has become the focus of this survey. The survey is designed with six scales with 33 variables with a 5-point Likert scale for observed variables (1 - Strongly disagree, 2 - Disagree, 3 - Normal, 4 - Agree, 5 - Strongly agree). Specifically, the scale includes perceived risk (PR), perceived usefulness (PU), perceived ease of use (PEU), attitude (ATT), intention to use (BI) and variety seeking (VS). These scales are all inherited from previous studies (See Table 1). Finally, the study collected a total of 409 valid samples.

This study uses the quantitative research method and partial least squares structural equation modelling (PLS-SEM) analysis by SmartPLS to test the hypotheses in the model. In the first stage, the research tests the measurement model (reliability, convergent and discriminant validity). The scale's reliability was tested by analysing Cronbach's α (CA) and composite reliability (CR). The convergent validity was checked by analysing the average variance extracted (AVE) and outer loadings. The discriminant validity was assessed by analysing Fornell - Larcker criterion and the HTMT index (heterotrait - monotrait ratio).

The next is to assess the structural model (evaluate multicollinearity, the model's and predictive power) and hypothesis. Testing the phenomenon of multicollinearity through analysis of variance inflation factor (VIF), the explanatory power through the study of the coefficient R^2 and the predictive accuracy through the analysis of the coefficient Q^2. Evaluation of research hypothesis by bootstrapping technique with sample size 5000 to determine the path coefficients and statistical significance (Hair et al., 2019).

4. Results and Discussions

4.1. Descriptive statistics

Out of 409 valid survey samples, females accounted for 66.5%, higher than males only accounted for 33.5%. Regarding education level, people with university or college degrees accounted for the highest rate at 91.7%. Most participants live mainly in the central area of HCMC, 65.8%, and the east area accounts for 10.5%. In comparison, the southern and the northern regions have 8.6% and 8.8%, respectively, and the lowest proportion is the western area of Ho Chi Minh City, with only 6.4%. Not only that, but the survey sample also shows that 56% of people who sometimes pay with QR codes account for the highest percentage, but those who always use QR code payments are the lowest, with only 5.6%.

4.2. Measurement model assessment

Table 1: The data validity

Concepts	Items	CA	CR	AVE	Outer loadings
Attitude (Suh and Han, 2002; Shih and Fang, 2004)	5	0.913	0.935	0.743	0.825-0.895
Intention to use	5	0.906	0.930	0.727	0.835-0.860

(Walker and Johnson, 2006; Al-Sukkar, 2005)					
Perceived ease of use (Aldás-Manzano et al., 2009)	5	0.911	0.933	0.737	0.819-0.875
Perceived risk (Zhao et al., 2008; Grabner-Kräuter and Faullant, 2008)	3	0.833	0.900	0.749	0.857-0.879
Perceived usefulness (Sutanonpaiboon and Mastor, 2010)	6	0.894	0.919	0.653	0.778-0.855
Variety seeking (Van Trijp and Steenkamp, 1992)	5	0.880	0.913	0.677	0.756-0.867

According to Hair et al. (2019), the scale has high reliability when Cronbach's α (CA) and composite reliability (CR) have values greater than 0.7. Based on Table 1, the scale of concepts in the research model has high reliability because the values are more significant than 0.7. Specifically, the minimum CR value is 0.900, and the minimum CA value is 0.833. In addition, the outer loadings are all greater than 0.7 (Götz et al., 2009).

Table 2: Fornell-Larcker criterion

Concepts	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Attitude (1)	0.862					
Intention to use (2)	0.771	0.853				
Perceived ease of use (3)	0.665	0.600	0.858			
Perceived risk (4)	-0.317	-0.290	-0.338	0.866		
Perceived usefulness (5)	0.575	0.588	0.625	-0.272	0.808	
Variety seeking (6)	0.512	0.562	0.413	-0.102	0.350	0.823

The scale also achieves convergent validity when all scales have AVE values greater than 0.5 (Hair et al., 2019). Besides, the results in Table 2 and Table 3 show that the square root of the AVE of a concept is greater than the inter-correlation coefficients with other concepts (Fornell & Larcker, 1981), and all HTMT values are below the threshold of 0.85 (Ringle et al., 2015). Thus, the structures in this study all have discriminant validity.

Table 3: Heterotrait-monotrait ratio (HTMT)

Concepts	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Attitude (1)						
Intention to use (2)	0.845					
Perceived ease of use (3)	0.726	0.659				
Perceived risk (4)	0.359	0.331	0.386			

Perceived usefulness (5)	0.633	0.649	0.690	0.313		
Variety seeking (6)	0.570	0.630	0.460	0.120	0.392	

4.3. Structural model assessment

The VIF index of the variables all meet the standard of less than 5, so multicollinearity does not significantly impact the analysis results (Hair et al., 2019). In addition, the adjusted R^2 of the attitude of 0.556 proves that the variables explain 55.6% of the variation in attitude. Similar to intention to use, the independent variable defines 59.4% of the interpretation of this factor. In addition, the attitude with a Q^2 value of 0.536 indicates a high level of forecast accuracy when $Q^2 > 0.5$ (Hair et al., 2019). Meanwhile, this value of intention to use is 0.495 in the range of 0.25 to 0.5, so the accuracy of the forecast is average (Hair et al., 2019).

According to Table 4, most hypotheses are accepted at the significance level of 0.01, 0.05, or 0.1, except for hypothesis H5c, which was rejected because of its high p-value (0.561). The analysis also found that perceived ease of use strongly impacts attitude with $\beta = 0.431$. Meanwhile, perceived risk has a negative effect on attitude ($\beta = -0.102$), but the level of influence is much lower than perceived ease of use and perceived usefulness ($\beta = 0.196$). In addition, this study also demonstrates the moderating role of variety seeking between perceived risk, perceived ease of use and attitude. Thus, variety-seeking has a positive effect on strengthening these relationships.

Table 4: The hypothesis testing

Hypothesis	Relationships	β	P-values	Results
H1	PR→ATT	-0.102	0.006	Accepted
H2	PU→ATT	0.196	0.002	Accepted
H3	PEU→ATT	0.431	0.000	Accepted
H4	ATT→BI	0.771	0.000	Accepted
H5a	VS x PR→ATT	0.077	0.021	Accepted
H5b	VS x PEU→ATT	0.119	0.023	Accepted
H5c	VS x PU→ATT	-0.035	0.561	Rejected

Perceived usefulness and perceived ease of use are confirmed to be two factors that significantly influence users' attitudes (Wang et al., 2018; De Luna et al., 2019; Liu et al., 2019). Similar to previous studies, the analysis results of this study once again confirm that perceived usefulness (β=0.196, $p<0.005$) and perceived ease of use (β=0.431, $p<0.001$) have a positive impact on attitude. Bashir and Madhavaiah (2015) showed that perceived usefulness has the most decisive impact among the three factors directly affecting attitude. The findings in this study are in stark contrast to the results above. Perceived ease of use is the factor with the most substantial impact on attitude. It means that when customers are interested in IoT technology, they want the product to be easy to use first. This result shows that if there are many technology choices in the same field, customers prefer technology that is easy to use over ones with many advanced features. For GenZ, the generation born and raised with the Internet, some people still did not know how to use a new technology when it first appeared. So, they have to spend time studying and learning to use it fluently. It will become a hindrance for them, and from there, for new technologies, they will pay less attention to them. Therefore, ease of use will be an essential factor in attracting people.

The results also show that variety-seeking positively moderates the relationship between perceived risk and attitude. This finding is entirely different from Kim et al. (2017). Kim et al. (2017) suggest that variety-seeking has no moderating role in the relationship between perceived risk and attitude. Meanwhile, this study demonstrated that variety-seeking enhances this relationship, offering that this finding continues and complements the understanding of its role. Variety-seeking is part of people's behaviour and influences decision-making (Palalic et al., 2021). It involves switching usage between normal functions (Koschate-Fischer et al., 2018). Therefore, people who seek variety will increase their awareness of the possible risks of each type of utility of IoT technology. Thus, an individual who understands many risks (such as poor security, easily stolen information or using QR codes to defraud assets) will always be wary and hesitant when making electronic payments via QR codes.

Meanwhile, variety-seeking positively moderates the relationship between perceived risk and attitude, meaning that as persons experience different forms of payment or learn more information, this relationship is even more pessimistic. Specifically, when users know through various payment methods, making them collect more information, they will be aware of many risks when making electronic payments. Therefore, they are more worried and insecure when facing security and safety issues in online transactions. This result is also similar to the relationship between perceived ease of use and attitude of variety-seeking. Customers better understand their different payment methods and become more familiar with them. Since then, they have found using payment methods more straightforward and accessible. From there, it helps to improve their attitudes towards the behaviour of using IoT technologies such as QR codes.

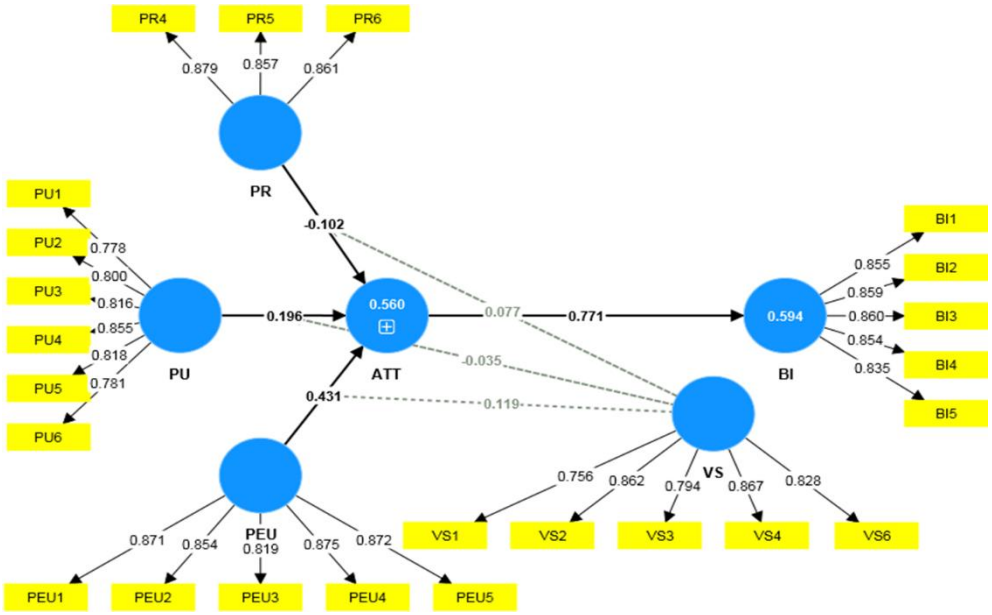

Fig.2: The analysis results

5. Conclusion

This study shows that ease of use substantially impacts customer attitudes towards IoT technology usage more than perceived risk and usefulness. From there, it shows the importance of ease of use to an individual's attitude when using QR codes for payment. This result implies that a product does not need to be overly complicated but should focus on its ease of use. Consumers tend to be attracted by the ease of understanding and use of new payment methods in e-payment (Abrazhevich, 2001). This finding helps businesses use online payment systems via QR codes to understand customer needs. From there, companies will improve their services to be as simple as possible. Not only payment by QR code, but businesses can also apply this in the other payment field, such as near-field communications and Internet banking, or expand in other areas.

Another finding is that customer variety seeking positively moderated the relationship between perceived risk, perceived ease of use and their attitudes towards IoT technology usage. Thus, customers tend to look for more and more products to replace online payments via QR, so their perceived risk and ease of use for this technology will increase. When a new technology is released or launched, people attracted by it will try to thoroughly learn about its form, functionality, and benefits (Keni et al., 2020). From there, their knowledge will be enhanced. Therefore, they will understand the risks they face and know how to use many different technologies. However, they will benefit from other technologies when they know too much about technology. As a result, their perception of the usefulness of that technology diminishes. Instead, they will enjoy the features and benefits of newer technologies. Through this, businesses can apply these to the design of the following product or innovate and upgrade to the latest version instead of the old ones. Instead, they must create a product that is easy to use and has high security, even integrating more and more new features.

New technologies will gradually replace old ones, so businesses must constantly change themselves to adapt to the digital technology revolution. The study's findings help companies to understand users' wants and requirements when using new technology like IoT. For example, they need to integrate many functions in the QR code to make it easier for customers to pay and reduce the risk of changing many applications. For example, instead of paying according to the previous processes, businesses can always integrate the necessary information into the QR code to make it easier for customers to pay. For example, by deploying the multifunctional QR code, companies will bring users closer to online payment services with QR codes.

The article has some limitations which further studies can improve. Firstly, the survey is based on the convenience sampling method. Also, the respondents are mainly GenZ, and there is a lack of equality among other age groups, so it is necessary to expand the survey subjects. Secondly, the survey was only conducted in Ho Chi Minh City, Vietnam, so the results do not represent all cases. Third, IoT has many fields, but this research only focuses on electronic payment via QR code and has not expanded to other areas. As mentioned above, this study will be a premise for future studies to exploit more about QR code usage in IoT technology such as NFC, home banking, and banking apps on wearable devices (e.g. Apple smartwatch). Also, if possible, the following research should expand the scope of the survey to make the results more widely disseminated and more authentic. The number of smartphone users and the need to search for information is increasing. Therefore, further studies should evaluate other roles of variety-seeking and make comparisons to confirm the results or find new findings and add new knowledge.

References

Aaker, D. A., & Joachimsthaler, E. (2000). The brand relationship spectrum: The key to the brand architecture challenge. *California management review*, *42*(4), 8-23.

Abrazhevich, D. (2001). Electronic payment systems: issues of user acceptance. In *eBusiness and eWork conference 2001* (pp. 354-360). IOS Press.

Aktaş, C. (2017). *The Evolution and Emergence of QR Codes*. Cambridge Scholars Publishing.

Alam, M. R., Reaz, M. B. I., & Ali, M. A. M. (2012). A review of smart homes—Past, present, and future. *IEEE transactions on systems, man, and cybernetics, part C (applications and reviews)*, *42*(6), 1190-1203.

Aldás-Manzano, J., Lassala-Navarré, C., Ruiz-Mafé, C., & Sanz-Blas, S. (2009). Key drivers of internet banking services use. *Online Information Review*, *33*(4), 672-695.

Alhasan, A., Audah, L., Ibrahim, I., Al-Sharaa, A., Al-Ogaili, A. S., & M. Mohammed, J. (2022). A case-study to examine doctors' intentions to use IoT healthcare devices in Iraq during COVID-19 pandemic. *International Journal of Pervasive Computing and Communications*, *18*(5), 527-547.

AlHogail, A., & AlShahrani, M. (2019). Building consumer trust to improve Internet of Things (IoT) technology adoption. In *Advances in Neuroergonomics and Cognitive Engineering: Proceedings of the AHFE 2018 International Conference on Neuroergonomics and Cognitive Engineering, July 21–25, 2018, Loews Sapphire Falls Resort at Universal Studios, Orlando, Florida USA 9* (pp. 325-334). Springer International Publishing.

Al-Sukkar, A. S. (2005). The application of information systems in the Jordanian banking sector: a study of the acceptance of the internet.

Amiribesheli, M., Benmansour, A., & Bouchachia, A. (2015). A review of smart homes in healthcare. *Journal of Ambient Intelligence and Humanized Computing*, *6*, 495-517.

Arfi, W. B., Nasr, I. B., Kondrateva, G., & Hikkerova, L. (2021). The role of trust in intention to use the IoT in eHealth: Application of the modified UTAUT in a consumer context. *Technological Forecasting and Social Change*, *167*, 120688.

Bailey, A. A., Pentina, I., Mishra, A. S., & Ben Mimoun, M. S. (2017). Mobile payments adoption by US consumers: an extended TAM. *International Journal of Retail & Distribution Management*, *45*(6), 626-640.

Bashir, I., & Madhavaiah, C. (2015). Consumer attitude and behavioural intention towards Internet banking adoption in India. *Journal of Indian Business Research*, *7*(1), 67-102.

Baskoro, H. A., & Amini, A. (2020). Analysis of factors influencing consumer intention toward Indonesia QR mobile payment. In *Understanding Digital Industry* (pp. 112-116). Routledge.

Bauer, R. A. (1960). Consumer behavior as risk taking. In *Proceedings of the 43rd National Conference of the American Marketing Assocation, June 15, 16, 17, Chicago, Illinois, 1960*. American Marketing Association.

Cai, H. L., Yan, B., Chen, N., Pan, J. S., & Yang, H. M. (2019). Beautified QR code with high storage capacity using sequential module modulation. Multimedia Tools and Applications, 78, 22575-22599.

Çelik, H. (2008). What determines Turkish customers' acceptance of internet banking?. *The International Journal of Bank Marketing*, *26*(5), 353-370.

Chanal, P. M., & Kakkasageri, M. S. (2020). Security and privacy in IOT: a survey. *Wireless Personal Communications*, *115*, 1667-1693.

Chang, S. H., Chou, C. H., & Yang, J. M. (2010). The literature review of technology acceptance model: A study of the bibliometric distributions.

Chang, V., Chen, W., Xu, Q. A., & Xiong, C. (2021). Towards the customers' intention to use QR codes in mobile payments. *Journal of Global Information Management (JGIM)*, *29*(6), 1-21.

Chatterjee, S., Kar, A. K., & Gupta, M. P. (2018). Success of IoT in smart cities of India: An empirical analysis. *Government Information Quarterly*, *35*(3), 349-361.

Chau, V. S., & Ngai, L. W. (2010). The Youth Market for Internet Banking Services: Perceptions, Attitude and Behaviour. *Journal of Services Marketing*, *24*(1), 42-60.

Cheng, T. E., Lam, D. Y., & Yeung, A. C. (2006). Adoption of internet banking: an empirical study in Hong Kong. *Decision support systems*, *42*(3), 1558-1572.

Chien-Huang, L., & Hung-Chou, L. (2012). Effects of mood states on variety seeking: The moderating roles of personality. *Psychology & Marketing*, *29*(3), 157-166.

Chiou, J. S., & Shen, C. C. (2012). The antecedents of online financial service adoption: the impact of physical banking services on Internet banking acceptance. *Behaviour & Information Technology*, *31*(9), 859-871.

Cho, Y. C., & Sagynov, E. (2015). Exploring factors that affect usefulness, ease of use, trust, and purchase intention in the online environment. *International journal of management & information systems*, *19*(1), 21-36.

Cox, D. F., & Rich, S. U. (1964). Perceived risk and consumer decision-making—the case of telephone shopping. *Journal of marketing research*, *1*(4), 32-39.

Crespo, Á. H., de los Salmones Sánchez, M. M. G., & del Bosque, I. R. (2013). Influence of users' perceived compatibility and their prior experience on B2C e-commerce acceptance. *Electronic Business and Marketing: New Trends on its Process and Applications*, 103-123.

Daim, T. U., Basoglu, N., & Topacan, U. (2013). Adoption of health information technologies: the case of a wireless monitor for diabetes and obesity patients. *Technology Analysis & Strategic Management*, *25*(8), 923-938.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, *35*(8), 982-1003.

De Luna, I. R., Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. (2019). Mobile payment is not all the same: The adoption of mobile payment systems depending on the technology applied. *Technological Forecasting and Social Change*, *146*, 931-944.

Derinalp Çanakçı, S., & Birdir, K. (2020). The relation among food involvement, food variety seeking and food neophobia: A study on foreign tourists visiting Turkey. *Current Issues in Tourism*, *23*(8), 917-928.

Dhagarra, D., Goswami, M., & Kumar, G. (2020). Impact of trust and privacy concerns on technology acceptance in healthcare: an Indian perspective. *International journal of medical informatics*, *141*, 104164.

Dong, X., Chang, Y., Wang, Y., & Yan, J. (2017). Understanding usage of Internet of Things (IOT) systems in China: Cognitive experience and affect experience as moderator. *Information Technology & People*, *30*(1), 117-138.

Eren, B. A. (2022). QR code m-payment from a customer experience perspective. *Journal of Financial Services Marketing*, 1-16.

Farahani, B., Firouzi, F., Chang, V., Badaroglu, M., Constant, N., & Mankodiya, K. (2018). Towards fog-driven IoT eHealth: Promises and challenges of IoT in medicine and healthcare. *Future Generation Computer Systems*, *78*, 659-676.

Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: a perceived risk facets perspective. *International journal of human-computer studies*, *59*(4), 451-474.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Forsythe, S. M., & Shi, B. (2003). Consumer patronage and risk perceptions in Internet shopping. *Journal of Business research*, *56*(11), 867-875.

Fredette, J., Marom, R., Steiner, K., & Witters, L. (2012). The promise and peril of hyperconnectivity for organisations and societies. *The global information technology report*, *2012*, 113-119.

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 (IJEA)*, *10*(1), 18-33.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS quarterly*, 27(1), 51-90.

Giovanis, A. N., Binioris, S., & Polychronopoulos, G. (2012). An extension of TAM model with IDT and security/privacy risk in the adoption of internet banking services in Greece. *EuroMed Journal of Business*, *7*(1), 24-53.

Götz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In *Handbook of partial least squares: Concepts, methods and applications* (pp. 691-711). Berlin, Heidelberg: Springer Berlin Heidelberg.

Grabner-Kräuter, S., & Faullant, R. (2008). Consumer acceptance of internet banking: the influence of internet trust. *International Journal of bank marketing*. *26*(7), 483-504.

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of business research*, *62*(5), 565-571.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2-24.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, *43*(1), 115-135.

Hoffman, D. L., Novak, T. P., & Peralta, M. (1999). Building consumer trust online. *Communications of the ACM*, *42*(4), 80-85.

Holak, S. L., & Lehmann, D. R. (1990). Purchase intentions and the dimensions of innovation: An exploratory model. *Journal of Product Innovation Management: an international publication of the product development & management association*, *7*(1), 59-73.

Hou, A. C., Chern, C. C., Chen, H. G., & Chen, Y. C. (2011). 'Migrating to a new virtual world': Exploring MMORPG switching through human migration theory. *Computers in Human Behavior*, *27*(5), 1892-1903.

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.

Huarng, K. H., Yu, T. H. K., & Huang, J. J. (2010). The impacts of instructional video advertising on customer purchasing intentions on the Internet. *Service Business*, *4*, 27-36.

Huei, C. T., Cheng, L. S., Seong, L. C., Khin, A. A., & Bin, R. L. L. (2018). Preliminary study on consumer attitude towards fintech products and services in Malaysia. *International Journal of Engineering & Technology*, *7*(2.29), 166-169.

Im, I., Kim, Y., & Han, H. J. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, *45*(1), 1-9.

Jin, Z., & Lim, C. K. (2021). Structural relationships among service quality, systemic characteristics, customer trust, perceived risk, customer satisfaction and intention of continuous use in mobile payment service. *Journal of System and Management Sciences*, *11*(2), 48-64.

Kang, M. J., & Hwang, Y. C. (2022). Exploring the Factors Affecting the Continued Usage Intention of IoT-Based Healthcare Wearable Devices Using the TAM Model. *Sustainability*, *14*(19), 12492.

Kang, S., & Choi, H. (2019). Motive and attitude to use QR code as an advertising and publicity media: an empirical study. *Journal of System and Management Sciences*, *9*(4), 111-126.

Keni, K., Tjoe, H., Wilson, N., & Negara, E. S. (2020, December). The Effect of Perceived Security, Ease of Use and Perceived Usefulness on Intention to Use Towards Mobile Payment Services in Indonesia. In *The 2nd Tarumanagara International Conference on the Applications of Social Sciences and Humanities (TICASH 2020)* (pp. 78-84). Atlantis Press.

Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008a). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision support systems*, *44*(2), 544-564.

Kim, J. H., Kim, M. S., Hong, R. K., & Ko, J. W. (2019). Continuous use intention of corporate mobile SNS users and its determinants: application of extended technology acceptance model. *Journal of System and Management Sciences*, *9*(4), 12-28.

Kim, T. G., Lee, J. H., & Law, R. (2008b). An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model. *Tourism management*, *29*(3), 500-513.

Kim, Y., Park, Y., & Choi, J. (2017). A study on the adoption of IoT smart home service: using Value-based Adoption Model. *Total Quality Management & Business Excellence*, *28*(9-10), 1149-1165.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & management*, *43*(6), 740-755.

Koschate-Fischer, N., Hoyer, W. D., Stokburger-Sauer, N. E., & Engling, J. (2018). Do life events always lead to change in purchase? The mediating role of change in consumer innovativeness, the variety seeking tendency, and price consciousness. *Journal of the Academy of Marketing Science*, *46*, 516-536.

Le, X. C. (2022). The diffusion of mobile QR-code payment: an empirical evaluation for a pandemic. *Asia-Pacific Journal of Business Administration*, *14*(4), 617-636.

Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic commerce research and applications*, *8*(3), 130-141.

Lee, M. K., Cheung, C. M., & Chen, Z. (2005). Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation. *Information & management*, *42*(8), 1095-1104.

Lee, S., Chua, B. L., & Han, H. (2020). Variety-seeking motivations and customer behaviors for new restaurants: An empirical comparison among full-service, quick-casual, and quick-service restaurants. *Journal of Hospitality and Tourism Management*, *43*, 220-231.

Lepore, L., Metallo, C., Schiavone, F., & Landriani, L. (2018). Cultural orientations and information systems success in public and private hospitals: preliminary evidences from Italy. *BMC health services research*, *18*(1), 1-13.

Li, Z., Liu, G., Liu, L., Lai, X., & Xu, G. (2017). IoT-based tracking and tracing platform for prepackaged food supply chain. *Industrial Management & Data Systems*, *117*(9), 1906-1916.

Liébana-Cabanillas, F., Ramos de Luna, I., & Montoro-Ríos, F. J. (2015). User behaviour in QR mobile payment system: the QR Payment Acceptance Model. *Technology Analysis & Strategic Management*, *27*(9), 1031-1049.

Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. (2014). Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behavior*, *35*, 464-478.

Liu, R., Wu, J., & Yu-Buck, G. F. (2021). The influence of mobile QR code payment on payment pleasure: evidence from China. *The International Journal of Bank Marketing*, *39*(2), 337-356.

Liu, Y., Hong, Z., & Liu, Y. (2016). Do driving restriction policies effectively motivate commuters to use public transportation?. *Energy Policy*, *90*, 253-261.

Liu, Z., Ben, S., & Zhang, R. (2019). Factors affecting consumers' mobile payment behavior: A meta-analysis. *Electronic Commerce Research*, *19*(3), 575-601.

Lu, H. P., Hsu, C. L., & Hsu, H. Y. (2005). An empirical study of the effect of perceived risk upon intention to use online applications. *Information Management & Computer Security*, *13*(2), 106-120.

Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information systems research*, *2*(3), 173-191.

McAlister, L. (1982). A dynamic attribute satiation model of variety-seeking behavior. *Journal of Consumer research*, *9*(2), 141-150.

Mital, M., Chang, V., Choudhary, P., Papa, A., & Pani, A. K. (2018). Adoption of Internet of Things in India: A test of competing models using a structured equation modeling approach. *Technological Forecasting and Social Change*, *136*, 339-346.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, *2*(3), 192-222.

Muñoz-Leiva, F., Hernández-Méndez, J., & Sánchez-Fernández, J. (2012). Generalising user behaviour in online travel sites through the Travel 2.0 website acceptance model. *Online Information Review*, *36*(6), 879-902.

Nord, J. H., Koohang, A., & Paliszkiewicz, J. (2019). The Internet of Things: Review and theoretical framework. *Expert Systems with Applications*, *133*, 97-108.

Ohkubo, M., Suzuki, K., & Kinoshita, S. (2005). RFID privacy issues and technical challenges. *Communications of the ACM*, *48*(9), 66-71.

Palalic, R., Ramadani, V., Mariam Gilani, S., Gërguri-Rashiti, S., & Dana, L. P. (2021). Social media and consumer buying behavior decision: what entrepreneurs should know?. *Management Decision*, *59*(6), 1249-1270.

Park, E., Kim, S., Kim, Y., & Kwon, S. J. (2018). Smart home services as the next mainstream of the ICT industry: determinants of the adoption of smart home services. *Universal Access in the Information Society*, *17*(1), 175-190.

Pavlou, P. (2001). Integrating trust in electronic commerce with the technology acceptance model: model development and validation. *Amcis 2001 proceedings*, 816-822.

Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International journal of electronic commerce*, *7*(3), 101-134.

Pillai, A. E., Prakash, D., Al-Marhoobi, N. A., & Shrivastava, M. (2017). Application of QR codes in tourism industry: A review of literature. *International Journal of Computer Technology & Applications*, *8*(6), 678-687.

Pinho, J. C. M. R., & Soares, A. M. (2011). Examining the technology acceptance model in the adoption of social networks. *Journal of Research in Interactive Marketing*, *5*(2-3), 116-129.

Pinochet, L. H. C., Lopes, E. L., Srulzon, C. H. F., & Onusic, L. M. (2018). The influence of the attributes of" Internet of Things" products on functional and emotional experiences of purchase intention. *Innovation & Management Review*, *15*(3), 303-320.

Ramalho, J. F., Correia, S. F., Fu, L., António, L. L., Brites, C. D., André, P. S., ... & Carlos, L. D. (2019). Luminescence Thermometry on the Route of the Mobile-Based Internet of Things (IoT): How Smart QR Codes Make It Real. *Advanced Science*, *6*(19), 1900950.

Ramalho, J. F., Dias, L. M., Fu, L., Botas, A. M., Carlos, L. D., Carneiro Neto, A. N., ... & Ferreira, R. A. (2022). Customised luminescent multiplexed quick-response codes as reliable temperature mobile optical sensors for eHealth and Internet of Things. *Advanced Photonics Research*, *3*(6), 2100206.

Rouillard, J. (2008, July). Contextual QR codes. In *2008 The Third International Multi-Conference on Computing in the Global Information Technology (iccgi 2008)* (pp. 50-55). IEEE.

Sang Ryu, J., & Murdock, K. (2013). Consumer acceptance of mobile marketing communications using the QR code. *Journal of Direct, Data and Digital Marketing Practice*, *15*, 111-124.

Shih, Y. Y., & Fang, K. (2004). The use of a decomposed theory of planned behavior to study Internet banking in Taiwan. *Internet research*, *14*(3), 213-223.

Shin, D. H., & Shin, Y. J. (2011). Why do people play social network games?. *Computers in Human Behavior*, *27*(2), 852-861.

Shin, D. H., Jung, J., & Chang, B. H. (2012). The psychology behind QR codes: User experience perspective. *Computers in Human Behavior*, *28*(4), 1417-1426.

Shin, J., Park, Y., & Lee, D. (2018). Who will be smart home users? An analysis of adoption and diffusion of smart homes. *Technological Forecasting and Social Change*, *134*, 246-253.

Sokullu, R., Akkaş, M. A., & Demir, E. (2020). IoT supported smart home for the elderly. *Internet of Things*, *11*, 100239.

Song, H., Ruan, W. J., & Jeon, Y. J. J. (2021). An integrated approach to the purchase decision making process of food-delivery apps: Focusing on the TAM and AIDA models. *International Journal of Hospitality Management*, *95*, 102943.

Srisawatsakul, C., & Boontarig, W. (2020). An Empirical Study Towards the Intention to Use QR Code Payment in Champasak Province, Lao People's Democratic Republic. In *Recent Advances in Information and Communication Technology 2020: Proceedings of the 16th International Conference on Computing and Information Technology (IC2IT 2020)* (pp. 1-10). Springer International Publishing.

Srivastava, S. C., Chandra, S., & Theng, Y. L. (2010). Evaluating the role of trust in consumer adoption of mobile payment systems: An empirical analysis. *Communications of the Association for Information systems*, *27*, 561-588.

Suh, B., & Han, I. (2002). Effect of trust on customer acceptance of Internet banking. *Electronic Commerce research and applications*, *1*(3-4), 247-263.

Sun, J., & Chi, T. (2018). Key factors influencing the adoption of apparel mobile commerce: an empirical study of Chinese consumers. *The journal of the Textile Institute*, *109*(6), 785-797.

Sun, S., Zhang, F., Liao, K., & Chang, V. (2021). Determine factors of NFC mobile payment continuous adoption in shopping malls: Evidence from Indonesia. *International Journal of Business Intelligence Research (IJBIR), 12*(2), 1-20.

Sutanonpaiboon, J., & Mastor, N. H. (2010). Malay, Chinese, and internet banking. *Chinese Management Studies, 4*(2), 141-153.

Tan, M., & Teo, T. S. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for information Systems, 1*(1), 5.

Tan, S. J. (1999). Strategies for reducing consumers' risk aversion in Internet shopping. *Journal of Consumer Marketing, 16*(2), 163-180.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research, 6*(2), 144-176.

Tuli, S., Basumatary, N., Gill, S. S., Kahani, M., Arya, R. C., Wander, G. S., & Buyya, R. (2020). HealthFog: An ensemble deep learning based Smart Healthcare System for Automatic Diagnosis of Heart Diseases in integrated IoT and fog computing environments. *Future Generation Computer Systems, 104*, 187-200.

Türker, C., Altay, B. C., & Okumuş, A. (2022). Understanding user acceptance of QR code mobile payment systems in Turkey: An extended TAM. *Technological Forecasting and Social Change, 184*, 121968.

Van Trijp, H. C., & Steenkamp, J. B. E. (1992). Consumers' variety seeking tendency with respect to foods: measurement and managerial implications. *European Review of Agricultural Economics, 19*(2), 181-195.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research, 11*(4), 342-365.

Walker, R. H., & Johnson, L. W. (2006). Why consumers use and do not use technology-enabled services. *Journal of services Marketing, 20*(2), 125-135.

Wang, X., Li, J., Yang, M., Chen, Y., & Xu, X. (2018). An empirical study on the factors influencing mobile library usage in IoT era. *Library Hi Tech, 36*(4), 605-621.

Woratschek, H., & Horbel, C. (2006). Are variety-seekers bad customers? An analysis of the role of recommendations in the service profit chain. *Journal of Relationship Marketing, 4*(3-4), 43-57.

Xu, B., Huang, D., & Mi, B. (2022). Research on the application of mobile payment security system based on the Internet of Things. *Concurrency and Computation: Practice and Experience, 34*(9), e5779.

Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. (2012). Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits. *Computers in Human Behavior, 28*(1), 129-142.

Yang, Y., Liu, Y., Li, H., & Yu, B. (2015). Understanding perceived risks in mobile payment acceptance. *Industrial Management & Data Systems, 115*(2), 253-269.

Yoon, S., Park, H., & Yoo, H. S. (2015). Security issues on smarthome in IoT environment. In *Computer Science and its Applications: Ubiquitous Information Technologies* (pp. 691-696). Springer Berlin Heidelberg.

Yuan, S., Liu, L., Su, B., & Zhang, H. (2020). Determining the antecedents of mobile payment loyalty: Cognitive and affective perspectives. *Electronic Commerce Research and Applications, 41*, 100971.

Zhang, W., & Liu, L. (2022). How consumers' adopting intentions towards eco-friendly smart home services are shaped? An extended technology acceptance model. *The Annals of Regional Science*, *68*(2), 307-330.

Zhao, A. L., Hanmer-Lloyd, S., Ward, P., & Goode, M. M. (2008). Perceived risk and Chinese consumers' internet banking services adoption. *International journal of bank marketing*, *26*(7), 505-525.

Zhong, Y., & Moon, H. C. (2022). Investigating customer behavior of using contactless payment in China: A comparative study of facial recognition payment and mobile QR-code payment. *Sustainability*, *14*(12), 7150.