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CONTINUANCE INTENTION ON MOBILE WALLET: INTEGRATED TECHNOLOGY READINESS AND EXPECTATION-CONFIRMATION MODEL ANALYSIS

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Abstract

This study aims to investigate the potential for consumers' continued usage of a mobile wallet through an integrated and extension framework based on two established models: the Technology Readiness and Expectation–Confirmation model. Hence, to investigate the impact of technology readiness, perceived usefulness, confirmation expectation, users' satisfaction, perceived cybersecurity risk and marketing effort on young consumers' intention to continuously use mobile wallet in Malaysia. A sample of 530 participants with experience online transaction using mobile wallets apps was used. Partial least squares (PLS-SEM) method was applied in the study and explained the 54% variance in consumers' continuous intention towards mobile wallet usage. This study found that technology readiness, confirmation expectation, users' satisfaction, and perceived security are the key elements that influence the consumers' continued usage of a mobile wallet. The study brings to fore significant insights and a set of suggestions for the companies carrying out the development, execution, and marketing of mobile wallet services.

1. Introduction

In the new era of globalization, the technological advancement has improved the social advancement and enhancing the quality of life. Most of the people are having their own mobile devices, which is internet accessible. Presently, the popularity of mobile technology has increased the need and demand of smartphone as it is getting convenient and it made worldwide get connected (Poushter, 2016). The mobile penetration rate in Malaysia reached 75.9% with 42.4 million mobile phone subscriptions in 2017 for a

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population of 32.1 million (Wei and Sue, 2018). It is suggested that a large number of Malaysian users own more than one active mobile phone. Consumers utilized mobile technology not only for communication purposes, but also for other services such as mobile commerce, mobile identity, mobile payment, and mobile banking. Mobile wallet is a new technology that is gaining fast recognition in business, and bring values not only benefit consumers but also the opportunity to a mobile service provider, bank or merchant for gaining a competitive edge in the mobile marketplace (Bezovski, 2016). According to Mew & Millan (2021) mobile payments are not only the features in the mobile wallet, its additional features such as electronic version of driving license, health insurance card, and loyalty program identification may provide more reasons for using this service. However, the values of the expected business transaction that resulting from mobile wallet business depends on consumer's adoption and continuous intention (Humbani, 2018). Previous research indicates that the Malaysian consumer's percentage of using mobile wallet service is relatively low (Cheng et al., 2018). It was noted by Lee (2019) that the majority of consumers in Malaysia (29.6% under the age of 15 years old, 65.4% between 15–64 years old, and 5% ages above 65 years old) is still preferred physical payment. Even though the figure of 92.5% of payment transactions in cash seems like a high percentage, but the cashless payment method is increasing at 9% annually. The absence of perceived relative advantage is mostly attributable to the fact that trusted service providers' contactless credit and debit cards have evolved quicker than the trend of mobile payments (Fisher, 2019). This figure indicates the need to formulate more efficient digital wallet business to increase post-consumption in mobile wallet service especially for young consumers in Malaysia.

The reason of selecting young consumers in this study based on several factors. Based on internet users' demographics statistic as depicted in Table 1, young group (20-34 age) were more likely to use internet compared to adult group (35-49 age). The young group of internet users in 2016 increased to 53.6% compared to 52.2% in 2015, showing that this group were more engaged in online activities and will benefit to a mobile service provider to a great extent. Considering the rate of internet penetration in the East Coast region of Malaysia between years 2015 to 2016, there were decreases from 16.4% to 12.3% as compared to other regions. While 67.2% of residents of urban areas had accessed internet in 2016, only 32.8 % of those in rural area accessed internet in 2016 showing decrease at 5.1% from 2015. Admittedly, the internet users in the rural areas are less in embracing mobile wallet usage due to the technology and economic factors leading them in continuously using mobile technology in lieu of demanding for higher services.

Moreover, there is no exception in the rural areas of East Coast region of Malaysia as their rate of development is quite low when compared with the rest of the regions in Malaysia, causing backwardness or stagnant in the usage of mobile wallet. In line with previous research (Muraina et al., 2016) claimed that there is currently a lack of publicly available research on rural consumers, especially when it comes to their digital behaviors on mobile. Unlike general mobile services, mobile wallet is a payment system that stores

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users' payment information and passwords to be used as payment methods (Nair, Dahiya, & Gupta, 2016). This method is vulnerable to cybersecurity risks where in any digital payment can cause the fraud to take place direct or indirectly (Pelton & Singh, 2015). Therefore, users cannot get advantage resulted from the execution of mobile wallet services if they do not use them because of the negative risk perception (Humbani, 2018). As a result, the author argued that mobile service provider is not able to recover their investments in digital wallet technology if consumer's adoption and continuance intentions behavior is unfavorable. Although consumer behavior adoption is important in new technology research, the previous study shows that the factors that influence consumers' adoption choices may not have the same effect on their continuance intentions. Consequently, examining the factors that affect consumers' adoption is a significant first step; but the ultimate success of any new technology relies on individuals' intention to continue use (Humbani & Wiese, 2019). It is important, therefore, to investigate the factors that affect consumers' intention to continuously use the services after their initial consumption.

The expectation-confirmation model (ECM) is one of the models that will be adopted in this proposal to predict the users' continuance intention towards new technology (Bhattacherjee & Lin, 2015). In general, there are three key main constructs in the model; perceived usefulness, confirmation of expectations, and user's satisfaction. Because of the growing use of emerging digital wallet technology, a clear understanding of consumers' readiness to adopt mobile wallet services is critical especially to facilitate them in using the service frequently (Mensah, 2018). The influence of technology readiness is important as antecedents of psychological traits in determining consumers' preferences and perceptions (Fan et al., 2018). Therefore, this study will propose to use technology readiness to explain the cognitive dimensions of ECM. The previous study on the innovative technologies post consumption is focused on innovation technology acceptance model (Aizstrauta, Ginters & Eroles, 2015), diffusion theory (Wani & Ali, 2015) and the theory of planned behavior (Montano & Kasprzyk, 2015). Few studies have integrated personality-based construct and cognitive antecedents in the study of mobile wallet continuance intention (Hariguna, Hung & Sukmana, 2019; Fan et al., 2018). Based on the technology readiness and the ECM proposed earlier, this proposal will also investigate the effects of perceived cybersecurity risk and marketing effort in enhancing constructs on continuance use of mobile wallet service. Therefore, this study intends to examine the fitness of Technology Readiness Index and the Expectation–Confirmation model (TRECM) with addition of perceived cybersecurity risk and marketing effort on the mobile wallet continuous usage in the rural areas in a context of young consumers.

2. Literature Review

2.1 Technology Readiness

Technology readiness index (TRI) scale has developed by Parasuraman & Colby (2015) to access the level of readiness to use technology. Technology readiness is defined as

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personality characters that help to improve the adoption of new technologies for work-related goals accomplishment. TRI is a multidimensional construct comprised of four components on the basis of personality characters which are optimism, innovativeness, discomfort, and insecurity (Rojas-Méndez, Parasuraman & Papadopoulos, 2015). According to the researchers, when the drivers in technology readiness namely optimism and innovativeness are positive, it indicates a user's openness and holds a positive attitude towards technology. On the contrary, the inhibitors in technology readiness: discomfort and insecurity are referring to negative attitudes which make consumers unwilling to adopt new technology. Generally, Parasuraman & Colby (2015) defines TRI as follows: a) Optimism: A relative of positive trust about technology to increase efficiency in their lives by using more optimistic strategies and less likely to focus on negative events. b) Innovativeness: A tendency of individuals who have motivations to accept new technology and to be the first trying new technology. c) Discomfort: Lack of control perception over technology and a sense of being overwhelmed by it. d) Insecurity: Disbelieving technology for security and privacy reasons and skepticism about its ability to work properly.

H1: Technology readiness positively affects perceived usefulness of mobile wallet service.

H2: Technology readiness positively affects the confirmation of expectations of mobile wallet service. H3: Technology readiness positively affects a user's satisfaction in mobile wallet service.

H4: Technology readiness positively affects the continuance intention of mobile wallet service.

2.2 Expectation Confirmation Model (ECM)

Expectation Confirmation Model (ECM) is a prominent model in consumer behavior and marketing literature to explain post-consumption behavior (Bhattacherjee & Lin, 2015). The main dimensions in the model are perceived usefulness, confirmation of expectations and satisfaction. The ECM postulates that positive effect in perceived usefulness and confirmation of expectations can foster a feeling of user's satisfaction in technology post consumption, thus resulting in increasing future consumer's continuance intentions (Bhattacherjee & Lin, 2015). In addition, the user's satisfaction is defined as the main factor that can impact users' continuance intentions (Bhattacherjee & Lin, 2015). This study views satisfaction in a mobile wallet service context as a psychological state resulting from the valuation of expectation and performance perceived difference. In other words, satisfaction can be described as a subjective assessment of whether the product or service used provided a pleasurable level of consumption-related fulfillment. Additionally, users' satisfaction is affected by two factors in cognitive constructs namely confirmation of expectations and perceived usefulness. Confirmation of expectations is an assessment process of a user's expectation before and after consumption (Oghuma et al., 2016). When the pre-consumption expectation is met, consumers are likely to foster a positive feeling towards the new technology. Furthermore, perceived usefulness refers

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to a utilitarian assessment of the technology (Bhattacherjee & Lin, 2015). Consumers will perceive new technology is useful if they get to benefit from the usage. In other words, the higher the perceived usefulness consumers have, the higher they are to be satisfied with the technology (Kucukusta et al., 2015). On the other hand, continuance intentions refer to the tendency to continue using technology after initial acceptance. In the study of consumer behavior, the adoption intention and continuance intention are two different aims. In the pre-consumption stage, forming adoption intention is more important, whereas in the postconsumption stage continuance intention carries more weight (Oghuma et al., 2016). In new technology cases, like mobile wallet, a study of continuance intention is critical to the viability of the services (Pachpande, & Kamble, 2018). Although most of previous studies emphasis on the context of technologies adoption (Kucukusta et al., 2015; Humbani, 2018; Hariguna et al., 2019), but, a few research only has employed the ECM to understand consumers' continuous use in technologies context (Bhattacherjee & Lin, 2015; Humbani & Wiese, 2019; Poushter, 2016). Importantly, none of these studies has investigated continuous use specifically in the context of the mobile wallet. Increasing consumers' continuous use of mobile wallet will build a customer relationship that foster companies to gain a competitive advantage in the digital wallet marketplace (Hariguna et al., 2019).Based on the above studies, the formulated hypotheses are:

H5: Confirmation of expectations positively affects the satisfaction of mobile wallet service.

H6: Confirmation of expectations positively affects the perceived usefulness of mobile wallet service. H7: Confirmation of expectations positively affects the continuance intention of mobile wallet service. H8: Perceived usefulness positively affects the satisfaction of mobile wallet service.

H9: Perceived usefulness positively affects the continuance intention of using mobile wallet service. H10: Satisfaction positively affects the continuance intention of using a mobile wallet service

H13: Satisfaction mediates the relationship between technology readiness and continuance intention of using a mobile wallet service.

H14: Satisfaction mediates the relationship between perceived usefulness and continuance intention of using a mobile wallet service.

H15: Satisfaction mediates the relationship between confirmation of expectations and continuance intention of using a mobile wallet service

2.3 Perceived Security Risk

Perceived security risk is a critical and growing problem worldwide. The worldwide cybersecurity market has become a fast-growing market, as by year 2020 the expectations of expenditures in cybersecurity is up to US$175 billion globally (Morgan, 2016). CNSS (2010) defined cybersecurity as "the ability to protect or defend the use of cyberspace from cyber-attacks." Another definition is "the body of technologies,

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processes, practices and response and mitigation measures designed to protect networks, computers, programs and data from attack, damage or unauthorized access so as to ensure confidentiality, integrity, and availability." (Public Safety Canada, 2014). On the other hand, perceived risk is defined in the marketing context, as option values based on the possibility and desirability of the significances of the option (Bhatia et al., 2016). In other words, it is an act of recognizing a choice. Therefore, perceived cybersecurity risk is defined as a tendency to be harmed or loss consequential from security breaches or cyber-attacks on information systems (Rahim et al., 2015). Cybersecurity is a very important issue in mobile wallets as this service provides numerous functions and roles on a single mobile phone. Resulting from having all personal information on a phone poses a great data risk if the phone is broken or lost. In addition, cyber-attacks on digital wallet have caused billions of dollars in losses annually. Cybercriminals have launched attacks via threat vectors such as unsecured wireless networks on Internet users who are usually not aware of such attacks, and this is largely due to their low cybersecurity risk avoidance (CNSS, 2010). Finally, as claimed by Nilsen (2017), issues of cybersecurity have been addressed on the technical aspects in only a few studies, and the previous study has neglected the importance of people aspects in terms of user's perception. Importantly, the previous research depicted that perceived risk has a negative effect on continuance usage intention (Liu et. al., 2018). Thus, it is important to investigate how users perceive risk about cybersecurity and what their privacy concerns over mobile wallets are.

H11: Perceived cybersecurity risk negatively affects the continuance intention of mobile wallet service.

2.4 Marketing effort

Marketing efforts refer to a series of marketing activities aimed at stimulating the purchase behavior of consumers. In the increasingly competitive mobile payment market, many companies often conduct promotional activities to attract new customers. Previous research has shown that marketing efforts have an important influence on consumer behavior (Godey et. al, 2016; Claudy, Garcia & O'Driscoll, 2015). A company's existing consumers may be attracted by the marketing efforts of its competitors. These consumers may reduce or even stop using the services of this company when the marketing efforts of other companies are attractive enough. Therefore, the present study proposes the hypothesis that marketing efforts have positive impacts on the intention to continue using a mobile wallet service.

H12: Marketing effort positively affects the continuance intention of using a mobile wallet service

2.5 Digital Wallet

In Malaysia, the consumer is still in the transition process towards an emerging market and e-Commerce system (Nizam, Hwang & Valaei, 2018). The author argued that, even though e-commerce has been around since 1980, they are still under development. The

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Digital wallet is the engine of e-commerce that has been developing in recent years. Digital wallet is known as a software application in which a user can store money that may come from a debit or credit card for any future online transaction (Pachpande & Kamble, 2018). Digital wallet delivers value to the consumers as it is a very pleasant and simple method for customers. The transfer of the payment to the retailer is very quick as online checkout requires verification such as email address and password only for an e-wallet account (Nizam et al.,2018) and later, verify an exchange of financial value in return for goods and services (Alaeddin et al., 2018). The author claimed that the convenience process because of the financial data such as credit card data has been keyed in once during registration and are stored in the e-wallet account. This technology has been later added to mobile phones where the user can securely save all the payment information in a digital wallet which can be used later to commence, verify and confirm an exchange of financial value in return for goods and services (Alaeddin et al., 2018). The example of digital wallet platforms that allow transaction are Google Pay, Pay, Pay and Pay (Wei & Sue, 2018). With a much-advanced versatile application; however, customer apathy seems to be the greatest barrier (Wei & Sue, 2018). According to Nail et al., (2016) consumers are uncomfortable with the idea of mobile payment because of the fear of an unknown medium and they are not even willing to try paying with their mobile device. While there are widespread enthusiasm and hope about mobile wallet service, there are also fears of security breaches and identity theft (Ho, Wang & Fang, 2017). Despite that, the mobile payment service providers must understand the changing needs and wants of consumers in order to develop and implement strategies to retain existing consumers. Thus it is important to determine factors of consumers' continuance intention in mobile wallet services.

2.6 Conceptual framework

The conceptual framework is drawn to structure the theoretical framework and the establishment of the research problem. Figure 1 depicts the proposed conceptual framework namely TRECM model specifying the relationship between selected independent variables and the dependent variable. This proposal is to investigate the impact of technology readiness, perceived usefulness, confirmation expectation, users' satisfaction, perceived cybersecurity risk and marketing effort on young users' intention to continue using Mobile wallet service in Terengganu and Kelantan.

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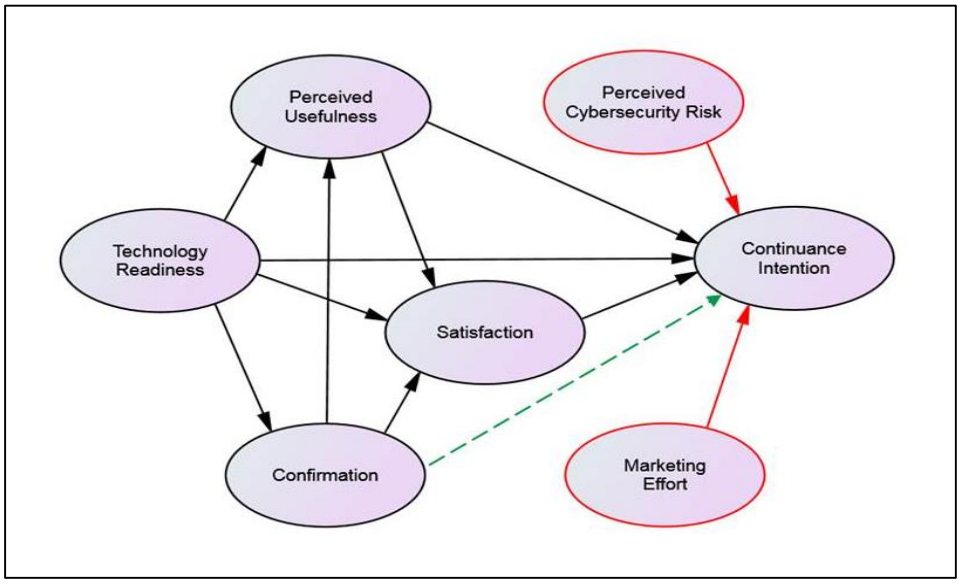

Note: Path did not study by Chen, Liu & Lin (2013)
Newly proposed constructs

Figure 1: Conceptual Framework of TRECM model

This present conceptual framework is adapted from the work of Chen at al., (2013) as presented in Figure 2. This proposal has fulfilled the gap by studying the path that were not tested by the researchers. In addition, two constructs namely perceived cybersecurity risk and marketing effort has been proposed to refine the current model.

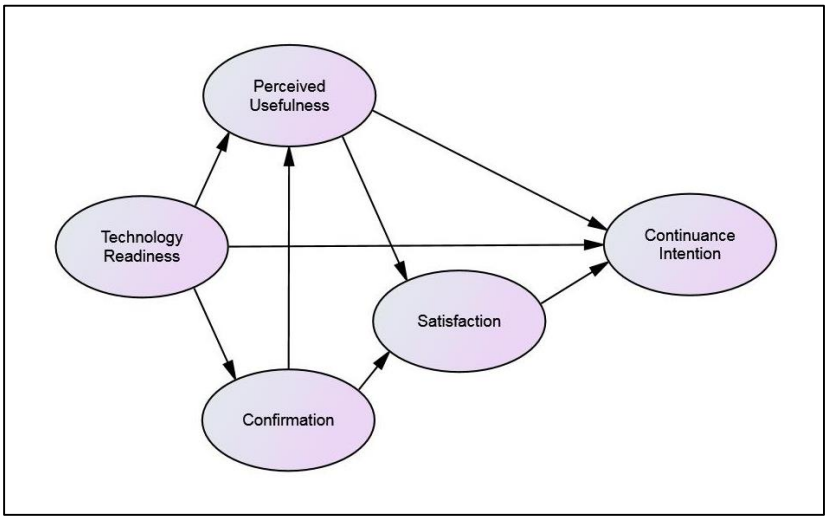

Figure 2: Theoretical Framework developed by Chen et al., (2013)

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3. Methodology

3.1 Data Collection and Sampling Method

The sample is made up of public university students from the east coast of Malaysia. The research considered only participants who had previous knowledge of mobile wallet usage because the goal was to measure their expertise to use mobile wallets and continuance. Besides, an online questionnaire was created for data collection in the Google Forms online program. For many factors, it's agreed to use online platforms to spread the questionnaire because:

a. Young people actively use the internet, and it was easy to approach target respondents online.
b. Online questionnaire resources have a high degree of versatility to develop an easy-to-use questionnaire that decreases respondent fatigue and bias issues.

Since the unit of analysis of this study is at the individual level, which conduce to the unavailability of sampling frames, non-probability with purposive sampling method was used. To ensure the data are represented young people, the respondents need to declare the district of origin, which will be transformed in to the state, in the data analysis section. There are two states chosen which are Kelantan and Terengganu, Malaysia.

The G-power program was used to measure the minimum required sample size with an effect size medium (0.15) and power needed as 0.95 to determine the respondents' sample size. A total of 350 surveys have been conducted and checked, which meet the minimum sample size criteria. Furthermore, Hoyle (1995) indicated that a sample size of 100 to 200 would be feasible for modelling this research (Hoyle, 1995).

3.2 Survey Development

To test the hypothesis in the research framework, a quantitative approach using self-administered questionnaire was adopted. There are two sections in the questionnaire. Part A, regarding their profile, such as gender, monthly income, highest qualification and their working status, and part B consist of exogenous and endogenous variables of the study. Since the study used Smart Partial least Squares (PLS) 3.2.8, which is using confirmatory composite analysis (CCA), all the items to measure the constructs were adopted and adapted from previous studies as shown in Table 2:

Table 2: Construct and No. of Item Measurement

Constructs	No. of Items	Sources
Technology Readiness:		
1) Optimism	10	Parasuraman (2015)
2) Innovativeness	7	Parasuraman (2015)
3) Discomfort	9	Parasuraman (2015)

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4) Insecurity	9	Parasuraman (2015)
Marketing Effort	8	Yoo, Donthu, and Lee (2000), Baidya and Maity (2011)
Perceived Usefulness	10	Davis et al. (1989), Bhattacherjee et al. (2004)
Confirmation of Expectation	3	Bhattacherjee (2001)
Satisfaction	3	Thong et al. (2006), Bhattacherjee and Premkumar (2004)
Perceived Security	8	Kajzer, D'Arcy, Crowell, Striegel, and Bruggen (2014)
Continuance Usage Intention	3	Bhattacherjee (2001), Liao et al. (2009)

4. Result and Discussion

4.1 Profile of Respondents

The majority of respondents are Malay and women, who make up 71.4% and 71.1% of the respondents' total community, respectively. Most respondents (51.7%) belonging to the 21 to 25-year-old age group and followed by 15 to 20-year-old age group which at 41.1%. From the 350 respondents, 70.9% would use an e-wallet at least two times in a month, while others would regularly use it. All of the respondents have mobile wallet app installed, most of them have one app (44%) and two apps (31.1%) in their smart phone. Online platform was the most contributors on the respondents' mobile wallet knowledge. 43.1% of them learn on mobile wallet in the internet, 34% from the social media while remaining on offline method.

Measurement Model

The two-stage approach is necessary when performing the PLS-SEM. Initially, the first stage is required to evaluate the validity of the measurement model comprehensively. We examined the value of indicator loadings, composite reliability (CR), average variance extracted (AVE), convergent validity, construct validity and discriminant validity. Next, the second stage will be conducted for testing the structural model and hypotheses. To test the construct and convergent validity, the PLS algorithm was executed. These validities were assessed through the value of composite loadings, CR, AVE and Standardized Root Mean of Residual (SRMR; Hair et al., 2017; Yusoff et al., 2021a). Table 3 presents all indicator loadings higher than the acceptable limit of 0.60 (Yusoff et al., 2021b). Moreover, the CR values higher than the acceptable limit of 0.7 suggesting that the reliability for each construct was reliable. Other than that, the AVE, represents the total variance in the item accounted for by the latent construct higher than the threshold value of 0.50 (Karim, Mohamad & Muhammad, 2019; Karim et. al, 2021). For the construct validity perspective,

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the value of SRMR was 0.071, lower than the recommended value of 0.08, thus suggesting that both convergent and construct validity were achieved.

Next, we assessed the discriminant validity for the present study. We use two different approaches for establishing the discriminant validity, 1) Fornell & Larcker and 2) Heterotrait-Monotrait Ratio (HTMT). These approaches were useful to measure the uniqueness of each construct applied in the present study. It was observed a good discriminant validity when the results show the value of low correlation between the variable of interest and other variables. According to Afthanorhan et al., (2021), HTMT method is much recommended than the conventional method of Fornell & Larcker when involves the composite method. Yet, the Fornell & Larcker is remained prominent across research field when establishing the discriminant validity. In this regard, the present study applies both approaches for establishing the discriminant validity. Table 4 present the output of discriminant validity using Fornell & Larcker approach. It was observed that the square root of AVE values (diagonal values) is higher than their corresponding correlation values, indicating adequate discriminant validity (Fornell & Larcker, 1981; Afthanorhan et al., 2021; Voorhees et al., 2016). Other than Fornell & Larcker approach, Table 5 presents the discriminant validity output using HTMT approach. It was observed that all construct correlations were lower than the recommended value of 0.85, suggesting that the both discriminant validities approaches were established.

Table 3: Reliability and validity for each construct

	Factor Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Confirmation		**0.910**	**0.943**	**0.847**
My experience with the mobile wallet app was better than what I expected.	**0.910**			
The service level provided by the mobile wallet app was better than what I expected.	**0.932**			
Overall, most of my expectations about the mobile wallet app were confirmed.	**0.920**			
Continuance Intention		**0.903**	**0.939**	**0.837**
I intend to continue mobile wallet in the future.	**0.927**			
I intend to increase my use of mobile wallet in the future.	**0.923**			
I will keep using mobile wallet as regularly as I do now.	**0.894**			

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Discomfort		**0.866**	**0.893**	**0.511**
New technology is often too complicated to be useful.	**0.654**			
Sometimes, you think that technology systems are not designed for use by ordinary people.	**0.705**			
There is no such thing as a manual for a high-tech product or service that's written in plain language.	**0.730**			
When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do.	**0.724**			
It is embarrassing when you have trouble with a high-tech gadget while people are watching.	**0.695**			
There should be caution in replacing important people-tasks with technology because new technology can breakdown or get disconnected.	**0.755**			
Many new technologies have health or safety risks that are not discovered until after people have used them.	**0.723**			
New technology makes it too easy for governments and companies to spy on people.	**0.730**			
Innovativeness		**0.873**	**0.905**	**0.616**
Other people come to me for advice on new mobile wallet technology.	**0.639**			
In general, I am among the first in my circle of friends to acquire new mobile wallet technology when it appears.	**0.729**			
I can usually figure out new mobile wallet high-tech products and services without help from others.	**0.840**			
I always keep up with the latest technological developments which related to mobile wallet technologies.	**0.879**			
I enjoy the challenge of figuring out high-tech mobile wallet application.	**0.788**			

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I find that I have fewer problems than other people in making mobile wallet technology work for me.	**0.810**			
Insecurity		**0.876**	**0.901**	**0.504**
You do not consider it safe giving out a credit card number over a computer.	**0.680**			
You do not consider it safe to do any kind of financial business online.	**0.630**			
You worry that information you send over the Internet will be seen by other people.	**0.754**			
Any business transaction you do electronically should be confirmed later with something in writing.	**0.657**			
Whenever something gets automated, you need to check carefully that the machine or computer is not making mistakes.	**0.798**			
The human touch is very important when doing business with a company.	**0.720**			
When you call a business, you prefer to talk to a person rather than a machine.	**0.618**			
If you provide information to a machine or over the Internet, you can never be sure it really gets to the right place.	**0.746**			
You do not consider it safe giving out a credit card number over a computer.	**0.763**			
Marketing Effort		**0.892**	**0.915**	**0.606**
Using X brand's mobile wallet is fun.	**0.783**			
X brand's mobile wallet offer a customized information search.	**0.782**			
X brand's mobile wallet provide customized service.	**0.774**			
I would like to pass information on brand, product, or services from X brand's mobile wallet to my friends.	**0.792**			
I would like to upload content from X brand's mobile wallet on my blog or social media.	**0.760**			
I often see price discounts from X brand's mobile wallet.	**0.760**			
I often see advertising from X brand's mobile wallet.	**0.799**			

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Optimism		**0.913**	**0.928**	**0.565**
Mobile wallet technology gives people more control over their daily lives.	**0.634**			
Mobile wallet's products and services that use the newest technologies are much more convenient to use.	**0.755**			
I like the idea of doing business transaction via mobile wallet because I am not limited to regular business hours.	**0.770**			
I prefer to use the most advanced mobile wallet technology available.	**0.734**			
I like mobile wallet application that allow me to tailor things to fit my own needs.	**0.804**			
Mobile wallet technology makes me more efficient in my daily activities	**0.803**			
I find mobile wallet technology to be mentally stimulating.	**0.837**			
Mobile wallet technology gives me more freedom of mobility.	**0.677**			
Learning about mobile wallet technology can be as rewarding as the technology itself.	**0.678**			
I feel confident that mobile wallet technology will follow through with what I have instructed them to do.	**0.798**			
Perceived Security Risk		**0.889**	**0.914**	**0.605**
I feel secure in providing sensitive information when transacting on mobile wallet.	**0.798**			
I would feel totally safe providing information about myself on mobile wallet.	**0.850**			
I would feel secure sending sensitive information on mobile wallet.	**0.837**			
The security issue of sensitive information was a major obstacle to my online purchases on mobile wallet.	**0.740**			
The mobile wallet's blocking of unauthorized access into its quarters by hackers.	**0.813**			
The mobile wallet's top management commitment in security related issues.	**0.779**			

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The mobile wallet's give effort to make its users aware of the security procedures it utilizes.	**0.601**			
Perceived Usefulness		**0.940**	**0.950**	**0.707**
My payment would be difficult to perform without mobile wallet.	**0.857**			
Using mobile wallet gives me greater control over my payment.	**0.732**			
Using mobile wallet improves my transaction performance.	**0.743**			
The mobile wallet system addresses my transaction need.	**0.876**			
Using the mobile wallet app saves my time.	**0.846**			
Using the mobile wallet app helps me accomplish things more quickly.	**0.907**			
The mobile wallet app makes my work and life more effective	**0.857**			
Using the mobile wallet app increases my productivity.	**0.890**			
Satisfaction		**0.947**	**0.966**	**0.904**
I feel satisfied with using mobile wallet.	**0.955**			
I feel contented with using mobile wallet.	**0.956**			
I feel pleased with using mobile wallet.	**0.942**			

Table 4: Discriminant validity using Fornell & Larcker

	Confirmation	Continuance Intention	Discomfort	Innovativeness	Insecurity	Marketing Effort	Optimism	Perceived Security Risk	Perceived Usefulness	Satisfaction	Technology Readiness
Confirmation	0.92										
Continuance Intention	0.64	0.91									
Discomfort	0.22	0.12	0.72								
Innovativeness	0.57	0.55	0.09	0.78							
Insecurity	0.32	0.17	0.61	0.16	0.71						

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Marketing Effort	0.61	0.52	0.33	0.50	0.34	0.78					
Optimism	0.67	0.66	0.20	0.63	0.27	0.60	0.75				
Perceived Security Risk	0.53	0.56	0.18	0.45	0.16	0.52	0.53	0.78			
Perceived Usefulness	0.80	0.65	0.23	0.57	0.38	0.63	0.72	0.51	0.84		
Satisfaction	0.84	0.69	0.16	0.57	0.32	0.63	0.76	0.54	0.81	0.95	
Technology Readiness	0.70	0.63	0.50	0.74	0.60	0.66	0.89	0.52	0.74	0.73	0.51

Table 5: Discriminant validity using HTMT

	Confirmation	Continuance Intention	Discomfort	Innovativeness	Insecurity	Marketing Effort	Optimism	Perceived Security Risk	Perceived Usefulness	Satisfaction
Confirmation										
Continuance Intention	0.705									
Discomfort	0.228	0.129								
Innovativeness	0.629	0.615	0.13							
Insecurity	0.355	0.191	0.66	0.191						
Marketing Effort	0.677	0.574	0.35	0.553	0.38					
Optimism	0.733	0.723	0.21	0.697	0.29	0.659				
Perceived Security Risk	0.574	0.611	0.23	0.501	0.25	0.580	0.58			
Perceived Usefulness	0.863	0.697	0.22	0.618	0.40	0.688	0.76	0.543		

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Satisfaction	0.900	0.742	0.15	0.611	0.34	0.680	0.80	0.575	0.839	
Technology Readiness	0.678	0.584	0.75	0.706	0.81	0.682	0.82	0.542	0.711	0.679

Structural Model

Moreover, Figure 3 shows the structural model of first-order construct. Initially, the technology readiness was designated as a second order construct with four dimensions, namely optimism, innovativeness, discomfort, and insecurity. Using two-stage approach, the latent variable score or construct score are initially estimated on all first-order construct using PLS algorithm without the presence of second order construct (technology readiness). Subsequently, the latent variable scores were used and formed as the indicators for the technology readiness. Therefore, it may offer advantages when the analyst estimating the research model with higher-order model (Anderson & Gerbing, 1988; Afthanorhan et al., 2020b).

The weight for “discomfort’ construct is 0.138 with a t-statistics of 3.684 indicating a first-order construct with technology readiness as the designated second order construct. Similarly, ‘innovativeness’ with the weight of 0.428 and t-statistics of 17.916; insecurity with the weight of 0.229 and t-statistics of 7.038; and optimism with the weight of 0.531 and t-statistics of 18.343 again indicate these first-order constructs were significantly formed with technology readiness as the designated second order construct as depicted in Table 6 .

A bootstrapping application with 1000 iterations was performed to generate the outcomes of the path coefficients for the use of hypotheses testing. For structural model evaluation, the R^2 can be used as for evaluating the explanatory power of the model being tested (Wasko & Faraj, 2005). Alternatively, we also use another diagnostic tool for assessing the structural fit as presented by Tenenhaus et al. (2005). For the structural fitness, we calculated a goodness of fit value of 0.6521, which indicates an excellent model fit as depicted in Table 7. Hoffman & Brinbrich (2012) contemplated that a cut-off value of 0.36 is considered as a good fit. Next, the R^2 also presented in the Table 7. It was observed that technology readiness and perceived usefulness explained 66.6% of their confirmation (R^2 = 0.666). Technology readiness explained 55.1% of their perceived usefulness (R^2 = 0.551). Technology readiness, perceived usefulness and confirmation predict 77.1% of customer satisfaction (R^2 = 0.771). Lastly, 55% of continuance intention has been explained by perceived security risk, marketing effort, satisfaction, confirmation, perceived usefulness and technology readiness. According to Chin et al. (2008), the size of R^2 can be classified into three types such as substantial (R^2 = 0.67), moderate (R^2 = 0.33) and weak (R^2 = 0.19). Using this recommendation, we can conclude that the

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customer satisfaction can be described as substantial while other factors were classified as moderate.

Table 6: Outer Weights of the first-order construct on the designated second-order construct

Second Order Construct	First Order Construct	Outer Weight	T-Statistics	P-Value
Technology Readiness	Discomfort	0.138	3.684	0.000
	Innovativeness	0.428	17.916	0.000
	Insecurity	0.229	7.038	0.000
	Optimism	0.531	18.343	0.000

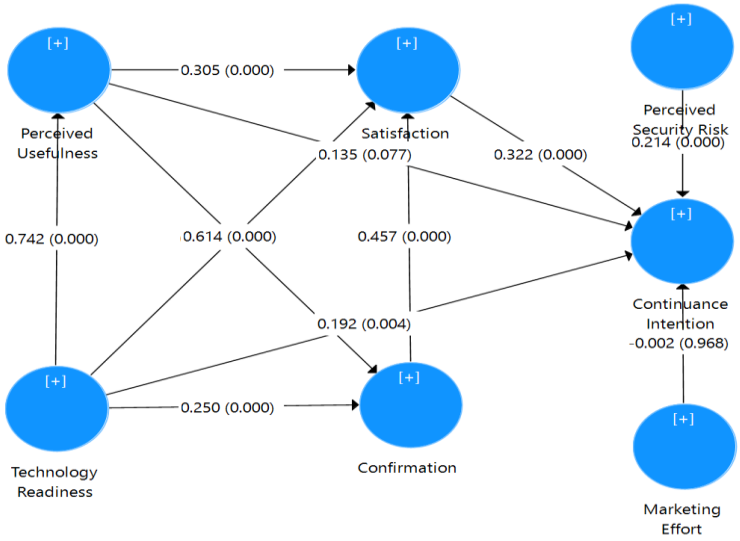

Figure 3: Structural model

Table 7: Goodness of Fit (GOF) index

	R Square	R Square Adjusted
Confirmation	0.666	0.664
Continuance Intention	0.550	0.543
Perceived Usefulness	0.551	0.550
Satisfaction	0.771	0.769
GOF Index		
Average AVE Scores	0.6702	
Average R square	0.6345	
AVE * R^2	0.4253	
GOF = $\sqrt{AVE * R^2}$	0.6521	

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Table 8 presents the complete results of the direct effect after performing the bootstrapping application. Out of eleven hypotheses, nine hypotheses were strongly supported indicating that perceived security risk, technology readiness and satisfaction were the good predictors of continuance intention. Moreover, technology readiness, perceived usefulness and confirmation were the good predictors for the satisfaction. Other than satisfaction and continuance intention, technology readiness and perceived usefulness were the good predictors for the confirmation. Finally, technology readiness is seemed also impacting the perceived usefulness factor. Overall, we can conclude that the technology readiness was the best predictor in the model as this factor impacting to all endogenous constructs.

Table 8: Structural Estimates (Direct Effects)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Confirmation -> Satisfaction	0.457	0.461	0.054	8.473	0.000
Marketing Effort -> Continuance Intention	-0.002	-0.001	0.055	0.041	0.968
Perceived Security Risk -> Continuance Intention	0.214	0.214	0.050	4.258	0.000
Perceived Usefulness -> Confirmation	0.614	0.612	0.051	11.921	0.000
Perceived Usefulness -> Continuance Intention	0.135	0.133	0.076	1.769	0.077
Perceived Usefulness -> Satisfaction	0.305	0.303	0.055	5.557	0.000
Satisfaction -> Continuance Intention	0.322	0.322	0.081	3.969	0.000

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Technology Readiness -> Confirmation	0.250	0.252	0.049	5.122	0.000
Technology Readiness -> Continuance Intention	0.192	0.193	0.066	2.900	0.004
Technology Readiness -> Perceived Usefulness	0.742	0.745	0.023	32.423	0.000
Technology Readiness -> Satisfaction	0.191	0.190	0.047	4.044	0.000

Mediation Analysis

In order to fulfill the research hypotheses requirements, the mediation analysis was also performed using SmartPLS 3.2. This software offers an advantage to PLS-SEM by providing more assessments to perform the complex modeling which are involves higher-order model, moderating and mediation analysis. That is, the Preacher & Hayes (2008) approach is performed for mediation analysis. The mediation results were shown in the Table 9. It was observed that only one hypothesis was not supported (Technology Readiness -> Perceived Usefulness -> Continuance Intention). Hence, perceived usefulness, confirmation, and satisfaction constructs were partial mediator in all relationships displayed in the model.

Table 9: Structural Estimates (Specific Indirect Effect)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Technology Readiness -> Perceived Usefulness -> Confirmation	0.455	0.456	0.041	11.222	0.000
Technology Readiness -> Perceived Usefulness -> Continuance Intention	0.100	0.100	0.058	1.743	0.082
Perceived Usefulness ->	0.090	0.091	0.027	3.338	0.001

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Confirmation -> Satisfaction -> Continuance Intention					
Technology Readiness -> Perceived Usefulness -> Confirmation -> Satisfaction -> Continuance Intention	0.067	0.068	0.020	3.288	0.001
Confirmation -> Satisfaction -> Continuance Intention	0.147	0.149	0.043	3.418	0.001
Technology Readiness -> Confirmation -> Satisfaction -> Continuance Intention	0.037	0.038	0.014	2.660	0.008
Perceived Usefulness -> Satisfaction -> Continuance Intention	0.098	0.097	0.030	3.274	0.001
Technology Readiness -> Perceived Usefulness -> Satisfaction -> Continuance Intention	0.073	0.072	0.023	3.206	0.001
Technology Readiness -> Satisfaction -> Continuance Intention	0.061	0.061	0.022	2.768	0.006
Perceived Usefulness -> Confirmation -> Satisfaction	0.281	0.282	0.040	7.004	0.000
Technology Readiness -> Perceived Usefulness ->	0.208	0.210	0.031	6.804	0.000

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Confirmation -> Satisfaction					
Technology Readiness -> Confirmation -> Satisfaction	0.114	0.116	0.027	4.154	0.000
Technology Readiness -> Perceived Usefulness -> Satisfaction	0.226	0.226	0.042	5.348	0.000

5. Conclusion

This research aims to study the key determinants of consumers' continued usage of a mobile wallet. To accomplish this objective, a model was constituted based on the Technology Readiness and Expectation–Confirmation model by integrating two additional construct namely perceived security and marketing effort. This study used a PLS-SEM technique to help in assessing the hypotheses. This study offers some fascinating insights and helps us draw essential conclusions about mobile wallet use. The PLS-SEM findings showed that variables such as perceived usefulness influence users' satisfaction, both of which had positive effects on the intentions of mobile wallet users to continue using. This research has significant implications, both theoretical and practical. Firstly, by analyzing the factors influencing mobile wallet users' continuing usage intentions, we have contributed new data to understanding the Technology Readiness and ECM continuance model. We examined how perceived usefulness and satisfaction variables influenced consumer decisions to start applications on mobile wallets. Besides, we have contributed to the literature on e-commerce using PLS-SEM methods. Many previous researches offered a clear understanding of the underlying mobile payment mechanisms Oliveira et. al, 2016), but several studies cantered on mobile wallet users' intentions to go ahead. This study further adds to the current database by discussing two combinations of appropriate conditions to clarify the continued purpose of users to use them.

This research delivers important theoretical contributions to the body of knowledge relevant to the Technology Readiness and Expectation–Confirmation model, and specifically to mobile wallet literature.

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