
Adoption of Mobile Wallet During Covid-19 Outbreak: The Consumer Perspective

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Abstract - Government authorities have encouraged the public to use the contactless payment method in accordance with the new norm practised during the COVID-19 pandemic outbreak. Malaysians will receive RM50 in mobile wallet credit as part of a Penjana Economic Recovery Plan initiative in July 2020 to encourage safe and contact-free payment. Hence, this paper aimed to study the factors influencing consumer adoption of mobile wallets during the COVID-19 outbreak. The independent variables included in this study are perceived usefulness, perceived ease of use, perceived social influence and perceived security. A total of 250 Malaysians from three states of Malaysia are given a set of self-administered questionnaires to be answered. The response rate is 94%, with 235 sets of completed questionnaires used for analysis. The Partial Least Squares Structural Equation Modelling (PLS-SEM 3.3.3) is used to analyse the model. The hypothesis testing results concluded that perceived usefulness, social influence and perceived security have a significant relationship with mobile wallet adoption during the COVID-19 outbreak. Nonetheless, this research is useful for mobile wallet developers and other researchers. Lastly, the findings of this study provide some managerial implications for mobile wallet developers, which can help developers produce a better mobile wallet in the marketplace.

Keywords - Adoption, COVID-19, Mobile Wallet, Perceived Security, Perceived Usefulness, Social Influence

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I. Introduction

Due to the outbreak of the Corona Virus Disease 2019 (COVID-19) that has happened globally, the World Health Organisation (WHO) has encouraged the implementation of the social distancing policy where the public is encouraged to do contactless activities, including contactless payment transactions. One of the problems which consumers do not adopt on mobile wallets is the need to spend their time on making the payment step-by-step via mobile wallet where the mobile wallet is a significant need of the effort to purchase goods or services. Thus, the consumers suffer from the procedures of the mobile wallet and this becomes a problem why the users do not adopt

it. The foremost serious issue which makes consumers not adopt mobile wallets is about security. 46% of non-users mentioned that the biggest barrier which lets them give away to try mobile wallets is security. Besides, more than 59% of people believe that they make payment by using mobile wallets, and are concerned that their credit card or debit card will be misused fraudulently. Consumers do not use mobile wallets due to worry that the website is fake and the bank details will leak out (Putit et al, 2021; Tan, 2019). Furthermore, the risks of another incident encountered by users include scams such as hacking, phishing attacks, and etc. Some of the hackers are paid by someone to block the victim and get important and sensitive information through the devices. Another way that cybercriminals can steal sensitive information by using public Wi-Fi. Users should take this as an important issue to prevent the incident from happening again. Users must avoid doing any transactions by using public computers and networks (Yuen, 2019). It is to prevent others from misuse of personal information.

Yunus (2020) stated that mobile wallet providers are seeing increased take-up during movement control periods as consumers adopted contactless payment as a safer mode of payment during the outbreak of COVID-19 pandemic. The transaction value exceeds RM 20 billion from January 2020 to September 2020 (Yunus, 2020). Hence, the main objective of this study is to investigate the factors that influenced mobile wallet adoption during the COVID-19 pandemic outbreak.

II. Literature Review

Consumer Adoption of E-wallet

Adoption means whether an individual consumer accepts or rejects a specific innovation. Adoption also can be defined as integrated into an innovation context appropriately. It is a small change in a whole which is called a micro perspective. Through the factors of contextual, cognitive and affective, the researcher can understand well the change of consumer behaviour. Since the statement of behavioural change is measured by adoption (Straub, 2009). Besides that, adoption is also defined as the use of the new invention to create the best method of action for making a choice (Sahin & Rogers, 2006). Based on the definitions mentioned above, adoption can be defined as whether consumers are willing to accept new information technologies. Electronic wallet (E-wallet) is a wallet that people save money and make any transaction by using any electronic devices. Most of the e-wallet is an app that consumers can download on the mobile phone. It is simpler for everyone to make a payment using a mobile phone. The customer can pay by scanning the QR code. An e-wallet is more convenient than a physical wallet.

Davis et al. (2017) investigated how variables influence e-wallet usage and perception in Chennai. Some of the criteria have an impact on the e-wallet usage rate. Davis et al. (2017) concluded that e-wallet must have an appropriate design which consumers can easily access. The most important criteria that an e-wallet must fulfil are privacy and security due to consumer need to key in sensitive and personal information during the registration process. The goal of introducing e-wallets into the world is to reduce consumers' dependence on traditional payment methods and transition the world to a cashless society. New users of e-wallets have lower perceptions than existing users because they are unfamiliar with the new application and believe it is more convenient to make payments (Davis et al., 2017).

Perceived Usefulness

Perceived usefulness is referred to those people who have faith in using a specific system that can boost up the performance of the job (Davis, 1989). This concept will have an impact on consumer adoption of e-wallets. Most creators will recognise this as the most important construct and will employ it in the development of new information technologies and information systems that benefit everyone. The world is full of cutting-edge technology. Technology is multifunctional, allowing people to perform their jobs more efficiently by reducing the time it takes to complete a task.

An e-wallet is a type of convenience wallet in which consumers can conduct transactions using their mobile phones. Consumers will adopt new technologies or systems based on their perceived benefits or usefulness. Perceived usefulness can be treated as an important independent variable in the Technology Acceptance Model. Perceived usefulness is one of the key factors that influence consumers to use e-wallets due to the speed of transactions and the convenience of making transactions at any time and from any location (Chen, 2006). Hassan et al. (2014) concluded that when new information technologies and information systems are not useful to the consumer, they will not adopt them. There is also a negative correlation between perceived usefulness and consumer adoption. According to Zahid et al. (2010), the relationship between perceived usefulness and consumer acceptance of online banking is positive because the correlation value of perceived value is higher than other

variables. Perceived usefulness is a key construct influencing consumer intentions to use a mobile wallet (Shin, 2009).

H1: Perceived usefulness significantly affected consumer adoption of mobile wallet during COVID-19 outbreak.

Perceived Ease of Use

Perceived ease of use is the percentage of people who believe they can use a specific system without exerting any effort (Davis, 1989). Perceived ease of use is a direct cause of perceived usefulness. The consumer can improve job performance by utilising an easier-to-use system. Consumers who understand the system's procedures can make the job easier and improve job performance and productivity. The system's usefulness will be influenced indirectly by its features, such as how simple it is to use for the consumer (Davis, 1986). According to the findings from the previous study, perceived usefulness and perceived ease of use have both direct and indirect effects on the consumer's intention to use mobile payments (Kim et al., 2010).

There are 93 percent of responses that indicated that applications or systems must be simple to use, and other responses indicated that technology should be simple to learn for everyone (Pousttchi, 2003). According to the findings of the Pousttchi (2003) study, perceived ease of use is important in information technologies and information systems. Consumers will be more likely to adopt information technologies and information systems if they are easier to use and learn. Pikkarainen et al. (2004) concluded that consumer intention to use online banking does not have statistically impact on perceived ease of use. This means that perceived ease of use does not have a positive correlation with consumer intent to use online banking. In contrast, perceived ease of use has a significant relationship with consumer intent to use an Internet banking system (Wang et al., 2003). According to Kallanmarthodi and Vaithyanathan (2012), perceived ease of use is an important factor in determining consumer adoption of electronic banking (e-banking). The perceived ease of use is an important factor that can encourage consumer adoption of mobile payment applications (Gana et al., 2018). A consumer who intends to use a mobile payment application because it is more convenient to use. In short, perceived ease of use is important in information technologies and information systems because it influences consumer willingness to adopt new technologies.

H2: Perceived ease of use significantly affected consumer adoption of mobile wallet during COVID-19 outbreak.

Social Influence

According to Riquelme and Rios (2010), social influence is known as a social norm, which means that consumers will be influenced by family members, friends, or other relatives when they make any purchase or transaction. Social Influence is the consumer perception of a specific technology that is influenced by their important people (Venkateshet al., 2012). The definition demonstrates that consumers intend to adopt specific information technologies and information systems based on word-of-mouth in public or among friends. Consumers will believe that specific information technologies and information systems are useful and beneficial to them based on word-of-mouth. According to Riquelme and Rios (2010), social influence is one of the most important factors influencing consumer intentions to use online banking services. Females are more likely to use online banking than males if they are influenced by social media (Riquelme & Rios, 2010).

Furthermore, social influence has a greater impact on consumer adoption on the mobile wallet (Amoroso and Magnier-Watanabe, 2012). This research study concluded that Japan used a variety of strategies, such as advertising on train stations, conducting campaigns to promote the mobile wallet, advertising the mobile wallet in social media with idols, and so on, to entice consumers to use the mobile wallet known as "Mobile Suica." All of the strategies used on the mobile wallet raise consumer awareness and spread through word-of-mouth, and these strategies can influence the consumer's intention to use the mobile wallet (Amoroso & Magnier-Watanabe, 2012). The social network is also one of the social influences that consumers can use to search for, find, and explore other information. It can influence consumer intentions to adopt specific information systems or information technologies. Consumers prefer mobile payment services because they can easily access financial information (Brauw, 2015). One study conducted in Malaysia discovered that social influence has a positive relationship with consumer adoption of mobile wallets. Consumers use mobile wallets after being influenced by family members, friends, and others. At the same time, consumers use mobile wallets and believe they are useful in everyday life because they make it easier to make transactions and purchases in online and physical stores that accept mobile wallets (Yap & Ng, 2019).

H3: Social influence significantly affected consumer adoption of mobile wallet during COVID-19 outbreak.

Perceived Security

Perceived security can be defined as a consumer's willingness to use a secure online payment method (Chawla & Joshi, 2019). Chang and Chen (2009) defined perceived security as the level of security with which consumers convey sensitive information online. The definition above demonstrates that consumers are more concerned about security than objective measurement when deciding whether or not to adopt specific information technology. According to the findings of a study conducted by Kumar et al. (2018), perceived security has a significant impact on consumers' long-term intention to use mobile wallets. Service providers who want consumers to use mobile wallets must ensure that the transactions are secure and transparent while providing the service (Kumar et al., 2018). Another study conducted by Routray et al. (2019) discovered that perceived security has a significant impact on consumers' intention to use mobile wallets. In addition, perceived security can be influenced by service quality, which has a significant impact on consumer intent to use mobile wallets (Routray et al., 2019).

According to the findings of Oliveira et al. (2016), perceived security influences consumer intent to adopt a mobile wallet in technology. Consumers will use a secure mobile payment method to complete any transaction because it involves sensitive and personal information (Oliveira et al., 2016). Consumers in Malaysia are more concerned about security when entering sensitive information into information technologies and information systems. When consumers make any transactions, information systems or applications such as e-wallets should provide a safe platform. Security is considered as a major factor influencing consumer adoption of mobile payment devices. Because it is critical, suppliers of mobile payment devices will concentrate on the security of mobile payments in order to gain consumer trust. If mobile payment devices are secure for consumers to use for any transaction, the company's image will improve, and the performance of mobile payment devices will improve as well (Musa et al., 2015).

H4: Perceived security significantly affected consumer adoption of mobile wallet during COVID-19 outbreak.

III. Research Methodology

A set of self-administered questionnaires was distributed to 250 respondents in three States of Malaysia: Johor, Melaka, and Selangor, covering the majority of Malaysia's population. All of the participants in this study were over the age of 18. This study employed the convenience sampling method. The response rate of this research is 94% where 235 sets completed questionnaires are used for the analysis purpose in this study. The four independent variables which are perceived usefulness, perceived ease of use, social influence and perceived security are employed to study the relationship towards mobile wallet adoption during COVID-19 pandemic. The questionnaire items which used to measure Perceived Ease of Use and Perceived Usefulness are adopted from Chawla and Joshi (2019), the questionnaire items for Perceived Security and Social Influence are adopted from Musa et al. (2015) and lastly, the questionnaire items for Consumer Adoption are adopted from Venkatesh et al. (2012). The collected data were entered into SPSS version 25 and the hypothesis was tested using Partial Least Square Structural Equation Modeling (PLS-SEM 3.3.3).

IV. Results and Findings

The data analysis in this study used a total of 235 sets of completed questionnaires. This research study included 81 male respondents (34.5%) and 154 female respondents (65.5%). Majority of the respondents in this study are between the ages of 25 and 31, accounting for 28.5%. Then, 23% of respondents are between the ages of 32 and 38, 17.9% are between the ages of 18 and 24, and 16.2% are between the ages of 39 and 45. However, respondents aged 45 and up made up the smallest age group, accounting for 14.5 percent of all respondents. The majority of respondents (36.2%) work in the private sector, and the majority of respondents have a bachelor's degree (60.9 %).

Following that, the first step in data analysis is to test the construct's reliability and validity (Hair et al., 2017). Table 1 shows that all of the item loadings range from 0.869 to 0.956. This indicates that all of the item loadings meet the minimum requirement (Chin, 1998). Furthermore, the composite reliability ranges from 0.950 to 0.975. This also demonstrated that the measurement model is reliable and has adequate convergent reliability. The average variance extracted (AVE), Cronbach alpha (CA), and Rho A values for all variables also met the minimum requirements. To summarise, all of the instruments used in this study met the criteria for reliability and convergent validity.

Table 1: Convergent Validity Assessment

Model construct	Items	Loadings	AVE	CR	CA	Rho_A
Consumer Adoption	CA1	0.942	0.871	0.971	0.963	0.963
	CA2	0.935				
	CA3	0.939				
	CA4	0.936				
	CA5	0.915				
Perceived Ease of Use	PEOU1	0.887	0.830	0.967	0.959	0.960
	PEOU2	0.911				
	PEOU3	0.908				
	PEOU4	0.910				
	PEOU5	0.927				
	PEOU6	0.921				
Perceived Security	PS1	0.895	0.868	0.975	0.970	0.970
	PS2	0.930				
	PS3	0.942				
	PS4	0.956				
	PS5	0.939				
	PS6	0.927				
Perceived Usefulness	PU1	0.909	0.840	0.969	0.962	0.962
	PU2	0.923				
	PU3	0.926				
	PU4	0.922				
	PU5	0.915				
	PU6	0.907				
Social Influence	SI1	0.880	0.790	0.950	0.934	0.938
	SI2	0.900				
	SI3	0.869				
	SI4	0.899				
	SI5	0.898				

Table 2 displays that all of the Heterotrait-Monotrait (HTMT) criteria values were less than the 0.90 required by Gold et al (2001). As a result of this analysis, the discriminant validity of the set of data was proven and verified, indicating that the proposed hypotheses were accepted. Furthermore, the collinearity problem also did not exist in this study as all the VIF values for all independent variables are less than 5 as shown in Table 3.

Table 2: Discriminant Validity of Constructs

	Consumer Adoption	Perceived Ease of Use	Perceived Security	Perceived Usefulness	Social Influence
Consumer Adoption					
Perceived Ease of Use	0.798				
Perceived Security	0.837	0.769			
Perceived Usefulness	0.767	0.825	0.685		
Social Influence	0.787	0.746	0.740	0.691	

The bootstrapping technique can be used to determine statistical significance. As a result, the minimum number of bootstrap samples in this study is 5000. The R² value of this study is 0.762 which indicates that 76.2% of total variation in the dependent variable which is consumer adoption can be explained by the four independent variables. The model summary of this study is shown in Figure 1. Table 3 summarised the hypothesis testing result of this study.

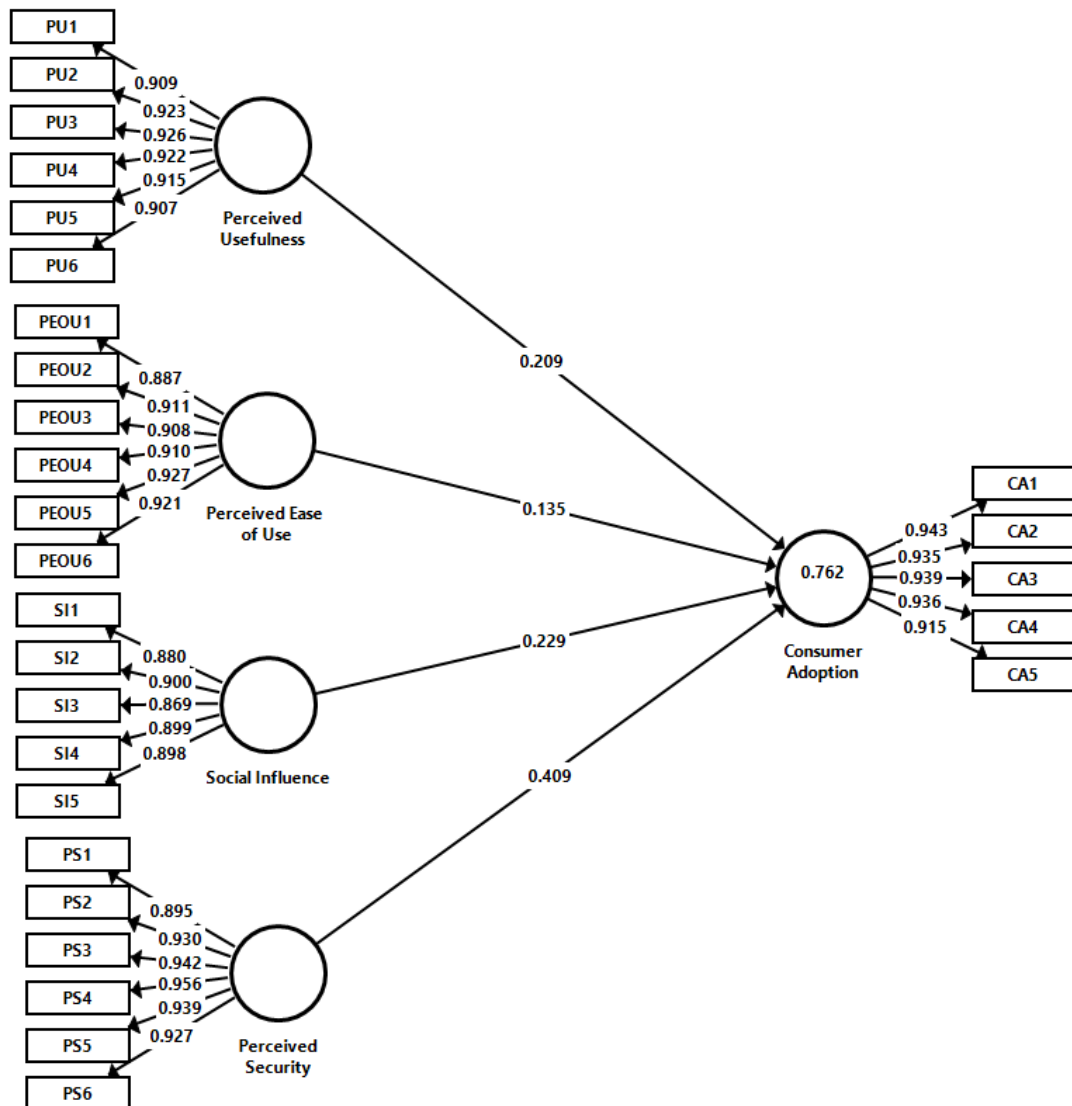


Figure 1: Overview of the Model

Table 3: Results of the Hypothesis Testing

Relationship	Std Beta	Std Error	t-value	LL	UL	Decision	VIF
Perceived Ease of Use -> Consumer Adoption	0.135	0.087	1.546	-0.021	0.319	Not Supported	3.681
Perceived Security -> Consumer Adoption	0.409	0.073	5.619*	0.252	0.534	Supported	2.638
Perceived Usefulness -> Consumer Adoption	0.209	0.091	2.306*	0.031	0.397	Supported	2.866
Social Influence -> Consumer Adoption	0.229	0.077	2.998*	0.071	0.374	Supported	2.446

**p<0.01, *p<0.05, Bootstrapping (n=5000)

For the result of hypothesis testing, it shows there are three variables out of the four which are perceived security, perceived usefulness and social influence are supported whereas the perceived ease of use is not supported.

V. Discussion and Conclusion

According to the findings of the study, there is a significant relationship between perceived security and consumer adoption of mobile wallets. As a result, developers must be concerned about security while consumers are enthusiastic about using mobile wallets in Malaysia. If the security of the mobile wallet is poor, consumers will not use it because it does not protect the users' personal and private information. Nowadays, consumers are more concerned about security because they are afraid that others will misuse or share personal or private information on social media. As a result, developers must devote more time and effort to mobile wallet security in order to ensure that users' personal information is secure when they enter it. This result is also supported by Musa et al. (2015) and Kumar et al (2018). Musa et al. (2015) concluded that female users are more concerned than male users about the perceived security of mobile wallets. Furthermore, the focus will be more on the impact of security on female users. Hence, females are the targeted users because they are more concerned about security and are willing to pay more for it.

Furthermore, this study advises developers to improve the performance of mobile wallets so that consumers can make a transaction more quickly, improve the quality of online transactions, increase the efficiency of online transactions, and so on. It is to ensure that consumers in Malaysia have a positive attitude toward the use of mobile wallets. This result was consistent with Carlsson et al. (2006) and Musa et al. (2015). Carlsson et al. (2006) discovered that consumer adoption of mobile wallets is significantly influenced by perceived usefulness.

However, perceived ease of use does not have a significant relationship with mobile wallet adoption. This result could be attributed to the fact that more than half of the respondents in this study are from generation Y, also known as digital natives. This group of respondents can be classified as technologically savvy, as they were well-versed in current technology. As a result, this is not the primary factor influencing their adoption of mobile wallets, particularly during the outbreak of the COVID-19 pandemic.

In conclusion the main contribution of this research is focusing on the knowledge about factors affecting consumer adoption of mobile wallets in Malaysia during the outbreak of COVID-19 pandemic. This information is particularly useful for mobile wallet developers. Its purpose is to provide developers with a better understanding of mobile wallet consumer adoption in Malaysia. Developers must determine which factors are most important to consumers and concentrate on them in order to outperform competitors. They should put more effort into the factors that will affect consumer adoption of mobile wallets in Malaysia to ensure that the majority of consumers use mobile wallets to make any transaction.

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