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Factors Driving Intention to Use E-wallet Services in Malaysia

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Abstract
Purpose: The purpose of this study is to determine the factors influencing technology users' intentions to adopt e-wallet services in Malaysia and utilized the Diffusion of Innovation Theory.
Design/methodology/approach: A self-administered online questionnaire was used to gather data from 540 Malaysian respondents using a purposive sampling strategy. SPSS version 26 and SmartPLS 3.3.3 was used to analyse the data.
Findings: Relative advantage and perceived security influence e-wallet adoption intention positively. While trialability and ubiquity have a positive effect on perceived security. It is also interesting to identify that Trialability has a medium effect on perceived security while relative advantage and perceived security have a small effect on usage intention. Ubiquity has a small effect on perceived security. Besides that, the Q-Predict values for usage intention were 0.493 and the PLS-predict demonstrated low predictive relevance.
Research limitations/implications: The data was collected in June 2020. At that period of time, researchers did not expect that the adoption of e-wallet would have increase significantly due to the covid-19 pandemic.
Practical implications: Organisations should pay attention particularly to trialability because this factor contributes the most towards the perceived security of e-wallet among Malaysian. As they are comfortable with e-wallet services and have confidence in its security, this will encourage adoption especially the late adopters. Besides that, e-wallet services providers should also stress the relative advantage of the usage of e-wallet, particularly in their marketing communication strategy.
Originality/value: This research helps to understand what are the critical characteristics that are important for e-wallet adoption, particularly among the Malaysian, because previous research had identified that different countries would have different propensities to use the e-wallet. Due to the differences, certain factors such as ease of use, relative advantage, visibility and perceived security need to be given consideration and attention in a country such as Malaysia. As a result, this study will revisit these factors whether these factors will contribute towards Malaysian intention to use e-wallet.

Keywords: e-wallet, Diffusion of Innovations theory (DOI), Malaysia

Introduction

Sharing economy is one of the terms that promote sustainability (Belk, 2014). According Chan, Leong and Yiong (2020), digital and mobile technology had enabled peers and merchants to share their financial transaction activities. In other words, the increase's usage of sharing platforms such as Grab and Airbnb has also increased the use of mobile payment technology and indirectly increased the growth of usage in e-wallet. The term "e-wallet" refers to a modern payment system that allows individuals to conduct electronic transactions utilising any electronic device or internet service (Phophalia, Goswami, Prasad, Arora, & Graph, 2018). The money in an e-wallet is kept on a server rather than a chip card (Aji, Berakon, & Riza, 2020). E-wallet has changed the way consumers make their payment for services and products. It has eliminated consumers to carry physical wallets that consist of their debit card, cash or credit cards. During the covid 19, The World Health Organisation (WHO) encouraged consumers worldwide to reduce the usage of cash or any other contact-based payment because it could increase the possible source of infection (Auer, Cornelli, & Frost, 2020).

In Malaysia, the government had encouraged the use of e-wallet especially under the *e-tunai Rakyat Programme,* in January 2020. Malaysian aged 18 and above with an annual income of RM100,000 and below will receive RM30 in spending money (Azura, 2020). This programme has contributed towards digital stimulus to the Malaysia e-wallet landscape. According to Fintech News Malaysia (2021), Malaysian have 38 active e-wallets services. Although the current situation of covid 19 Pandemic and various development and encouragement of e-wallet usage, there still needs to understand consumers adoption in using the e-wallet. According to Chan et al. (2020), it is crucial to identify the determinants of e-wallet usage intention, especially during the post monetary incentive phase. Mainly of the previous researchers have proposed the Technology Acceptance Model (Chan et al., 2020) and Theory of Acceptance and Use of Theory (UTAUT) when studying e-wallet; however, this study adopts the Diffusion of Innovations theory (DOI). It is important to note that consumers adopt the usage of e-wallet relies on their acceptance and the pace and drivers of their diffusions (Shaw, Eschenbrenner, & Brand, 2022). In addition, (Min, So, & Jeong, 2019) stated that DOI theory is very useful, especially for research that wants to understand people's innovation characteristics. Although there are various e-wallet studies had been done either in the western countries or eastern countries such as Malaysia, but there are very limited studies that concentrate on the DOI theory.

In their study, Shaw, Eschenbrenner and Brand (2022) have proven that different countries will have different propensities to use an e-wallet. Due to the differences, certain factors need to be given consideration and attention. Due to that, this research will adopt Johnson, Kiser, Washington and Torres (2018) DOI model to examine what determinants consumers adoption towards e-wallet in Malaysia. Therefore, this study aims to identify what are the determinants that contribute towards e-wallet adoption in Malaysia.

This research is organised as follows. First, the theories underlying the foundation of this study will be discussed. This followed by the hypothesis development, the research method, findings and discussions. At the end of this study, theoretical and practical implications, limitations and suggestions for future research will be addressed.

Literature Review

The underlining theory of this study is based on Diffusion of Innovation Theory (DOI). Rogers (1995) stated that DOI is a social and psychological theory that could predict users' decisions about embracing an innovation service. Roger (1995) introduced five characteristics of

innovations: relative advantages, Compatibility, Complexity, trial, and observability. Previous researchers such as Al-jabri (2012); Ali, Soar and Shrestha (2018); Ruangkanjanases and Techapoolphol (2018); Alkhalil, Sahandi, and John (2017); Natarajan, Balasubramanian, and Kasilingam (2017) has been utilised this theory particularly in regards to the application of innovation, and it had been applied in various fields as well. According to researchers such as Roger (1995); and; Ruangkanjanases and Techapoolphol (2018), researchers should not assume that all innovations will obtain similar factors. In their study, Shaw, Eschenbrenner and Brand (2022) have proven that different countries tend to have different propensities to use the e-wallet. Due to the differences, certain factors need to be given consideration and attention. Therefore, this study adopts Johnson et al 2018 study to reconfirm and identify differences between users' m-payment and users e-wallet.

Hypothesis Development

Ease of use

Ease of use is the degree to which individuals view the use of new technology or innovation is easy to use, and little physical and mental effort it required (Johnson et al., 2018). Ease of use has been widely used in technology adoption studies. In addition, ease of use also plays a significant role. According to Venkatesh et al. (2012), to determine whether users will use the new innovation, especially e-wallet, ease of use is very important. In other words, if consumers perceive that the e-wallet is easy to use, they will intend to accept its usage of e-wallet. As a result, the following hypotheses were formulated:

H1: Ease of use has a positive impact on usage intention.

Relative Advantage

Relative advantage is defined as users' perception of the innovation of a new technology as superior (Roger, 1995). From an e-wallet perspective, e-wallet is expected to deliver services of relative benefit to customers. For example, e-wallet allow users to conduct transaction independently without concern of their time and location as long as the merchant allows the usage of e-wallet. Compared to traditional payment methods, e-wallet users could conduct financial transactions at any time and anywhere. Users capability to use e-wallet not only project the importance of technology innovation but also support the relative advantage of an e-wallet (Mombeuil & Uhde, 2021). As a result, the following hypotheses were formulated:

H2: Relative advantage has a positive impact on usage intention.

Visibility

Visibility refers to a person's perception of how visible the usage of an E-wallet to others. During the covid-19 pandemic, it is reasonable to assume that e-wallet services' benefit has become widespread. Not to mention the infrastructures supporting of e-wallet has also been improved. Consumers can uses e-wallet either at online or offline retail stores. This visibility will ease the concern usage of e-wallet among consumers. Therefore, if the benefits and support of an e-wallet are visible to a person, their chances to use an e-wallet will increase. As a result, the following hypotheses were formulated:

H3: Visibility has a positive impact on usage intention.

Perceived Security

Perceived security is defined as what extends a consumer's belief and trusts an innovative technology system when providing sensitive information. Security issues are one of the issues that could prohibit a user from using innovative technology. According to Merhi, Hone and Tarhini (2019), security failures were thought to be a significant barrier to consumers to uses

new innovative technology such as e-wallet. As a result, if users perceive e-wallet is secure, they are more likely to use the e-wallet. Perceived security has also shown that it has a positive impact on adoption. As a result, the following hypotheses were formulated:
H4: Perceived security has a positive impact on usage intention.

Privacy risk
Balapour, Nikkhah, and Sabherwal (2020) stated that "privacy risk and perceived security will affect and connect with each other. Privacy risk refers to users potential compromisation towards their personal information (Johnson et al., 2018). Researchers such as Johnson et al. (2018) identified that users' privacy risk would negatively impact users' perceived security when users feel that the e-wallet is insecure. If they use an e-wallet, it will put themselves, particularly their personal details at risk. In addition, in their study, Balapour et al. (2020) also identified that if users perceived that they might lose their personal information, therefore, user-perceived the security of the e-wallet is insecure. As a result, the following hypotheses were formulated:
H5: Privacy risk has a negative impact on perceived security

Ubiquity
Ubiquity refers to the new innovation technology available for users anytime and anywhere (Roy & Moorthi, 2017). With the advancement of the internet, mobile devices and mobile networks have provided users to use e-wallet services. Nowadays, e-wallet services can be found in both online and offline retail stores (anyplace) at anytime. In addition, with the support from the retail stores, enable e-wallet services to expand and be available. As e-wallet become more common and more comfortable among users, this will positively impact users perceived security (Johnson et al., 2018). As a result, the following hypotheses were formulated:
H6: Perceived ubiquity positively impacts perceived security

Trialability
Trialability refers to potential users having the chance to experiment with the technology before committing to using the technology (Moore & Benbasat, 1991). The experiment could help increase users' degree of comfort and reduce users fear (Johnson, Woolridge, Wang, & Bell, 2020; Kaur, Dhir, Bodhi, Singh, & Almotairi, 2020). According to Chellappa and Pavlou (2002), there are four security issues that users are concerned about technology transactions: encryption, protection, verification, and authentication. Therefore, as users gain more experience through the trialability with the e-wallet, they will become familiar with the security features. This will also reduce their concern about the security of the technology. As a result, the following hypotheses were formulated:
H7: Trialability have a positive impact on perceived security

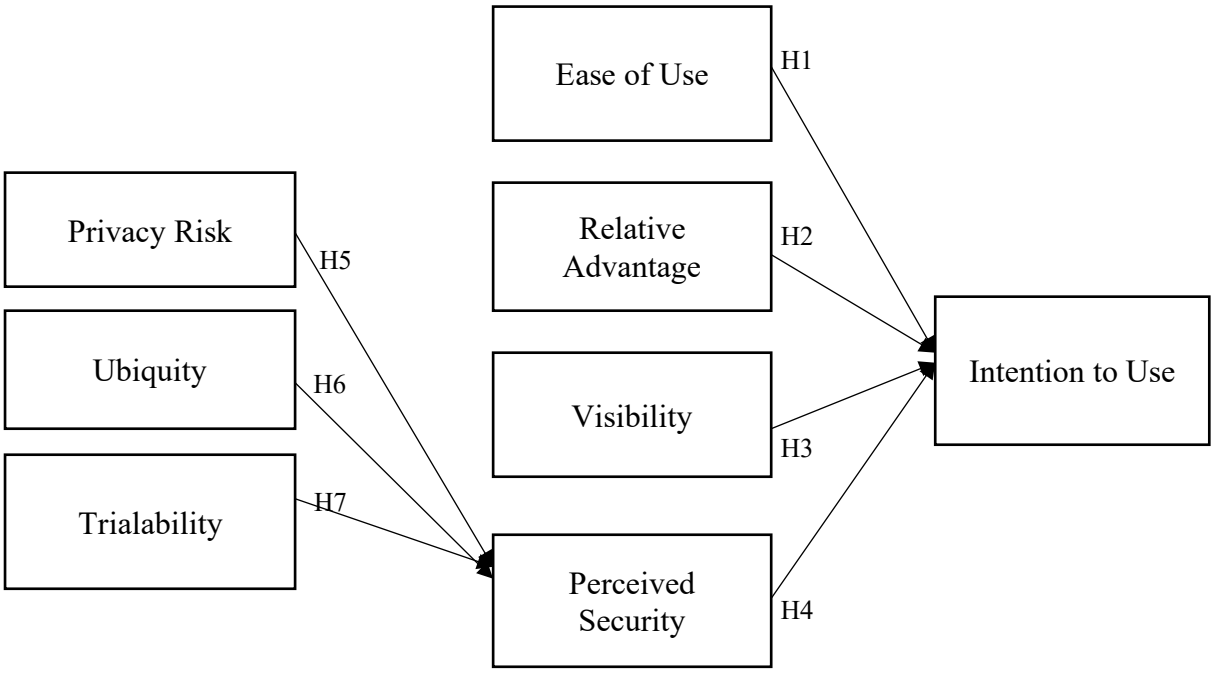

Figure 1. Research model

Methods

Population and Sample

This study concentrated exclusively on Malaysians. In this study, a non-probability sampling method, specifically purposive sampling was used. To be eligible for this study, respondents had to be Malaysians and had never used an e-wallet before. Only respondents with no experience were informed to proceed with the survey. The G-Power software (Faul, Erdfelder, Buchner, & Lang 2009) suggests a sample size of 85 responders (minimum). However, to achieved the acceptable level of statistical power in partial least square, a threshold of 100 was required (Reinartz, Haenlein, & Henseler, 2009). A total of 591 were collected. Due to outliers' issues, only 540 are usable questionnaires.

Instruments and Measures

Authors social media sites (Facebook)and message groups (Whatsapps) were used to distribute the google forms questionnaire link. A total of 540 responses were collected over two months in the year 2020. This study consists of 3 sections, including the screening questions, followed by questions about the respondents' demographics, and concluded with the questionnair's items assessing the variables included in the research model.

The instrument of this study (Ease of Use, Visibility, Trialability, Perceived risk, Ubiquity Security and Usage intention) was adopted from Johnson et al. (2018) with a few minor changes to fit this study. 5 point Likert scale was used for all the items, where 1 indicating strongly disagree and 5 indicating strongly agree. In order to analyse the data, two different tools were used. The demographic profile was generated using SPSS26 and the SmartPLS version 3.3.3 was utilised for the partial least square analisis (Ringle, Wende & Becker, 2015).

Findings

Respondents' Profile

Most of the respondents are female (58.5%) and most were between the ages 18 and 27 (38.1%) and 48-57 years old (19.8%). In terms of occupation, most of them are students (25.4%) and Employed in the private sector (23.9%). Most respondents earned less than RM2,000 monthly (43.5%). 55.9% of the respondents have used the e-wallet for 1-2 years (58.9%), and more than half of the respondents uses the e-wallet sometimes, 28.9% uses very often, and 15.2% rarely uses the e-wallet.

Table 1 Respondents Profile

Demographics	*Frequency*	*Percentage*
Gender		
Male	224	41.5
Female	316	58.5
Age		
18-27 years old	206	38.1
28-37 years old	58	10.7
38-47 years old	92	17.0
48-57 years old	107	19.8
58 years old and above	77	14.3
Ethnicity		
Chinese	231	42.8
Malay	157	29.1
India	90	16.7
Other	62	11.5
Occupation		
Students	137	25.4
Self-employed	88	16.3
Employed-private section	129	23.9
Employed-Government section	64	11.9
Housewife	39	7.2
Retired	83	15.4
Income status		
Less than RM2,000	*235*	*43.5*
RM2,001-RM4,000	69	12.8
RM4,001-RM6,000	117	21.7
RM6,001-RM8,000	86	15.9
RM8,001 and above	33	6.1

Common Method Bias

Because the data were from a single source, it was necessary to assess for common method bias (Tehseen, Ramayah, & Sajilan, 2017). Several questions about users' cognitive rigidity (Oreg, 2003) were collected to identify if common bias occurred. Partialling out a marker variable method was implemented where researcher observed the endogenous constructs' R values, the usage intention and perceived security before and after introducing the marker variable. The R-value for usage intention is 0.425 before, and 0.491 after adding in the marker

variable. While the R-value for perceived security is 0.393, after adding in the marker variable, the R values are 0.396. The different between these two R values is 0.066 for usage intention and 0.003 for perceived security. This shows minor R changes in the endogenous constructs. Thus, ir may be established that there is no common method bias occur.

Measurement Model

The loading on all of the items was significantly higher than the curoff of 0.70, indicating high individual item reliability. The composite reliability (CR) of the scales ranged from 0.861 to0.942, showing that the constructs were internally consistent. AVE values varied from 0.555 to 0.84, above the cut-off value of 0.50 and suggesting convergent validity for all constructs.

Table 2 Measurement Model

Construct	**Items**	**Loadings**	**CR**	**AVE**
Ease of Use	EoU1	0.894	0.948	0.786
	EoU2	0.896		
	EoU3	0.908		
	EoU4	0.866		
	EoU5	0.868		
Privacy Risk	Prisk1	0.719	0.861	0.555
	Prisk2	0.702		
	Prisk3	0.73		
	Prisk4	0.732		
	Prisk5	0.836		
Relative Advantage	RA1	0.886	0.940	0.759
	RA2	0.897		
	RA3	0.909		
	RA4	0.778		
	RA5	0.879		
Perceived Security	Sec1	0.884	0.963	0.840
	Sec2	0.935		
	Sec3	0.905		
	Sec4	0.923		
	Sec5	0.935		
Trialability	Tri1	0.824	0.906	0.706
	Tri2	0.85		
	Tri3	0.869		
	Tri4	0.818		
Usage Intention	UIntent1	0.865	0.915	0.729
	UIntent2	0.853		
	UIntent3	0.867		
	UIntent4	0.829		
Ubiquity	Ubiq1	0.792	0.910	0.670
	Ubiq2	0.827		
	Ubiq3	0.825		

	Ubiq4	0.831		
	Ubiq5	0.816		
Visibility	Vis1	0.891	0.942	0.803
	Vis2	0.888		
	Vis3	0.913		
	Vis4	0.891		

The Heterotrait-Monotrait Ratio of Correlations (HTMT) was used to test the measurement model's discriminant validity. Table 03 reveals that all inter-construct correlations were below 0.90. (Henseler et al., 2015) except for trialability towards intention, which is 0.928. However, through the bootstrapping analysis, this relationship does not exceed one. Because none of the HTMT confidence intervals straddled the value of zero, all of the constructs in the measurement model were conceptually distinct from one another.

Table 3 Heterotait Monotrait Ratio of Correlations (HTMT)

	1	2	3	4	5	6	7	8
EOU								
INT	0.649							
PRISK	0.223	0.426						
RA	0.893	0.689	0.252					
SEC	0.804	0.665	0.237	0.841				
TRI	0.640	0.928	0.480	0.732	0.678			
UBIQ	0.587	0.773	0.546	0.679	0.598	0.872		
VIS	0.826	0.627	0.319	0.836	0.893	0.647	0.586	

Note: 1=Ease of Use (EOU); 2=Intention to Use (INT); 3= Privacy Risk (PRISK); 4= Relative Advantage (RA); 5=Perceived Security (SEC); 6=Trialability (TRI); 7=Ubiquity (UBIQ); 8=Visibility (VIS)

Structural Model

The analysis moved on to the structural model assessment. A bootstrapping procedure of 5000 samples was used to obtain the path coefficients and corresponding t-values. Table 4 reveal that all of the variables variance inflation factors (VIFs) fell within a 5 point range (less or equal to 5) (Hair, Hult, Ringle, & Sarstedt, 2017).

Table 4 Lateral Collinearity Assessment (VIF)

	Usage Intention	Perceived Security
Ease of Use	3.661	
Usage Intention		
Privacy Risk		1.494
Relative Advantage	4.001	
Perceived Security	4.085	
Trialability		2.412
Ubiquity		2.670
Visibility	3.921	

Falk and Miller (1992) suggested that the threshold for R2 values must be at least 0.10 for the variance explained by a particular endogenous construct. 42.9% of variance in usage intention (R^2=0.429) and 39.6% of variance in perceived security (R^2=0.396) were explained by the model of this study.

The variables that are significant and positively affect usage intention were relative advantage (β=0.273; t=3.772) and perceived security (β=0.270; t=3.883). While trialability (β=0.472; t=7.940) and ubiquity (β=0.205; t=3.612) positively affect perceived security. However, ease of use (β=0.147; t=1.546) and visibility (β=0.015; t=0.195) were not significant to usage intention and perceived risk (β=-0.024; t=0.504) were not significant on perceived security. However, in terms of lower and upper confidence levels, there were not straddle a '0' rendering the abovementioned paths for relative advantage, perceived security, triability and ubiquity but not ease of use, privacy risk and visibility.
The exogenous construcy must likewise have a significant impact on the endogenous constructs. To quantify this, Cohen's (1988) effect sizes (f2) were used, with 0.02 being a minor effect, 0.15 medium effect and 0.35 large effect. Trialability has a medium effect (f^2=0.153) on perceived security while relative advantage (f^2=0.033) and perceived security (f^2=0.031) have a minor effect on usage intention. Ubiquity (f^2=0.026) have a minor effect towards perceived security. Besides that, the Q-Predict values for usage intention were 0.493.

Table 5 Result of the Structural Model

Hypothesis	Std. Beta	Std. Error	t-value	p-value	BCI LL	BCI UL	Decision	f^2	R^2	Q-Predict
Ease of Use -> Intention to Use	0.147	0.095	1.546	0.123	-0.046	0.322	Not significant	0.010	0.429	0.493
Privacy Risk -> Perceived Security	-0.024	0.047	0.504	0.615	-0.091	0.100	Not significant	0.001	0.396	
Relative Advantage -> Intention to Use	0.273	0.072	3.772	P<.001	0.130	0.411	Significant	0.033		
Perceived Security -> Intention to Use	0.270	0.069	3.883	P<.001	0.139	0.408	Significant	0.031		
Trialability -> Perceived Security	0.472	0.059	7.940	P<.001	0.344	0.579	Significant	0.153		
Ubiquity -> Perceived Security	0.205	0.057	3.612	P<.001	0.093	0.312	Significant	0.026		
Visibility -> Intention to Use	0.015	0.076	0.195	0.845	-0.131	0.178	Not significant	0.000		

Table 6 PLS- Predict

	PLS RMSE	MAE	LM RMSE	MAE	PLS-LM RMSE	MAE
UIntent1	0.601	0.511	0.528	0.409	0.073	0.102
UIntent2	0.606	0.511	0.564	0.453	0.042	0.058
UIntent3	0.599	0.513	0.534	0.425	0.065	0.088
UIntent4	0.606	0.521	0.557	0.449	0.049	0.072

Because none of the indicators in the PLS_SEM study had greater RMSE values than the Naïve LM benchmark, the PLS-predict has low predictive relevance (Hair, Risher, Sarstedt, & Ringle, 2019). Therefore, is to say that the current model with the current data worked well.

Discussion

The analysis results demonstrate that ease of use was not significant in determining users' usage intention. This study is consistent with the previous finding by Koenig-Lewis, Morgan, Palmer and Zhao (2015). One of the reasons could be that many mobile users who answer this

questionnaire have yet to find out that an e-wallet is easy to use and effortless compared to other payment methods. Furthermore, there could also be a possibility they may have only installed an e-wallet when the Malaysian government announced the current incentives.

This research suggests that privacy risk does not negatively affect perceived security, which is inconsistent with Balapour et al. (2020) and Johnson et al. (2020) findings. This indicates that privacy risk is will not influence users perceived security. One possible explanation is user identified that there is still privacy risk in using an e-wallet. However, they believed that the e-wallet platform could mitigate the perceived security of the systems.

This study assumes that the effect of visibility of e-wallet will contribute towards users usage intention. However, the result is contrary to the hypothesis. This result authenticates the discovery of previous studies where visibility does not contribute towards users' usage intention (Qi Dong, 2009). One possible explanation is that the survey was done during movement order control. During this new normal, Malaysians did not go out very often, but only there was a necessity. Due to that, the visibility of others using an e-wallet is minimal. Not to mention, the acceptance of the e-wallet either in the online or offline retail stores is still in the early stage. As a result, the visibility might not influence the user's usage intention.

Trialability is positively effect e-wallet users perceived security. This present study is contrast with Shaw et al. (2022). The current research confirmed that user needed to experiment e-wallet services before adopting the system. This result also indicates that through the experiment, it could help to increase users degree of comfort and reduce users fear. Hence, this may lead towards users perceived security.

Ubiquity is positive and has a significant effect on users perceived security. This is consistent with the past studies of m-commerce (Roy & Moorthi, 2017). E-wallet users would have access to e-wallet services anytime and anyplace if they wanted to use it. Such ubiquity allows users to become more familiar and comfortable with e-wallet and feel secure towards the e-wallet.

This study demonstrates that perceived security has a positive impact on intention to use. This finding is similar to (Johnson et al., 2018), where perceived security positively impacts intention. This indicates that users perceived that the e-wallet services are secure.

The positive and significant effect of relative advantage on usage intention was also parallel with previous research (Kaur et al., 2020). That is to say; respondents saw the benefit of using e-wallet services.

Theoretical Implications

Theoretically, the finding of this research shown that Malaysian usage intention towards e-wallet can be understood through DOI theory. Factors such as relative advantage and perceived security leading towards usage intention of e-wallet. Trialability and ubiquity will be considered by an individual when they perceive e-wallet's security. In addition, it is also confirmed that different countries will have different findings, especially for e-wallet adoption in Malaysia, particularly for Malaysians who have yet to adopt the services.

Practical and Social Implications

Based on the findings of this study, e-wallet services providers should pay attention particularly on trialability because this factor contributes the most towards the perceived security of e-wallet among Malaysians. In other words, e-wallet services providers could allow Malaysians to trial on their services for few transactions in few months before they decide to adopt the services. As they are comfortable with e-wallet services and have confidence in its security, this will encourage adoption among Malaysian who consider themselves late adopters.

E-wallet services providers should encourage non-e-wallet user by state the relative advantage of the usage of e-wallet, particularly in their marketing communication strategy. This is important because non-e-wallet user-perceived that relative advantage of new innovation, in this case, the e-wallet could motivate their intention to uses e-wallet.

Limitations and Suggestions for Future Research

Similar to other research, this study has several limitations that should be highlighted. As the usage of e-wallet among Malaysian has increased in recent years, this research is only relevant to the e-wallet provider who would like to encourage none e-wallet users. Furthermore, the data was collected in June 2020. At that period of time, researcher did not expect that the adoption of e-wallet would increase significantly due to the covid-19 pandemic. Future research may consider doing comparison research between early adoption e-wallet users and mature adopters.

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