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INTEGRATING TRI AND UTAUT IN E-WALLET ADOPTION: A VALIDITY AND RELIABILITY STUDY

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Abstract

Fintech innovations such as electronic wallet (e-wallet) is reshaping the payment landscape. However, in actual fact, e-wallet has yet to reach high-scale adoption in Malaysia inspite of its large potential. At the moment, little is known about the setback. This present study intends to examine the possibility of integrating Technology Readiness Index (TRI) and Unified Theory of Acceptance and Use of Technology (UTAUT) in explaining e-wallet adoption. We validate the model that may help to explain the e-wallet adoption behaviour, the representativeness of items to a construct domain, and the overall instrument in order to evaluate the actual study result. The indicators including outer loading and Cronbach's Alpha for indicator reliability; Composite Reliability (CR) for internal consistency reliability; and Average Variance Extracted (AVE) for convergent validity were tested and verified in this present study. The instruments shall be beneficial to those who hold a particular interest in e-wallet adoption studies.

Keywords: E-wallet, TRI, UTAUT, reliability, validity, Fintech.

1. Introduction

The emerging of electronic wallets (e-wallet) are revolutionizing the way in which people conduct different kind of transactions. E-wallet (sometimes: mobile wallet or digital wallet) is a sub-category of electronic payments (Gomber et al., 2017) and new application of mobile payment (Shin, 2009). Generally, e-wallet is the online equivalent of physical wallets, where users can store credentials like financial and sensitive information (personal identification number (PIN) number and credit and debit card number), personal information (identification information, contact information, and shipping or billing information) and support of loyalty programs (digital version of coupons, vouchers) to enable users to conduct online or offline and large or micropayment transaction easier and faster (Aite Group, 2016; Junadi & Sfenrianto, 2015).

With everything can be done through a device on a palm, it seems like human is one step closer to live in a digital world. The unparalleled convenience e-wallet offers users led to rapid adoption in worldwide mainly in those developed countries like China and United States. Venmo from the United States took only three years to gain 10 million active users and WeChat Pay from China obtained 200 million users within the same portion of time (Tang et al., 2019). Another example of e-wallet giant in China is Alipay, with hundreds millions of active users (Shao et al., 2019). China has become the world's leader in the e-wallet platforms and its success is a best example for Southeast Asia FinTech players because they can keep up the pace through learning from the world leader which also has the similar environment to theirs.

Just like other Southeast Asia countries, Malaysia is also envisioned to become a fully digital nation with the ability to offer excellent financial services to serve and fit the needs of every Malaysian (Bank Negara Malaysia, 2018). In 2011, Bank Negara Malaysia (BNM) developed a 10-year Financial Sector Blueprint (FSBP) to provide a roadmap to move towards a cashless society and further advance the financial system which has to be accomplished by the end of 2020 (Bank Negara Malaysia, 2011). E-wallet as part of e-payment systems, plays a pivotal role in the transformation, because of the use of digital devices for payment has a considerable potential in lessen the usage of paper-based instruments (Wei & Tsu, 2018). In a Central Bank of Malaysia's report, the report noted that the cashless transaction value in Malaysia is amount to approximate RM1.8 trillion whereas the cashless transaction volume is approximate 3.2 billion in 2017 (Bank Negara Malaysia, 2017). It is noticeable that e-wallet set to see a vast growth potential. In fact, a study conducted by Nielsen Malaysia (2019) discloses that the usage rate of e-wallet in the country is only 8%.

2. Problem Statement

Despite its large growth potential, e-wallet is yet to achieve extensive adoption in Malaysia and little is known of the reason. Although numerous researches had been done in examining the adoption of various e-payment system, only a handful of studies focus on e-wallet have been done previously. It is possible that e-wallet is still immature in the country and thus underexplored compared to related areas of research like online banking and mobile payment. Hence, this study intends to examine the possibility of the integration between technology readiness index (TRI) which could explain personal factors and unified theory of

acceptance and use of technology (UTAUT) which could explain users' perceptions of a technology, social factor, and environment factor.

3.   Research Questions

What is the reliable instrument in examining the e-wallet adoption behaviour elaborately especially in Malaysia?

4.   Purpose of the Study

The objective of this current study is to validate the model that may help to explain the Malaysian e-wallet adoption behaviour, the representativeness of items to a construct domain, and the overall instrument to confirm the validity and reliability of each items in order to evaluate the potential results of the actual study. By meeting the objectives, this study attempts to provide a reliable instrument that examine the e-wallet adoption behaviour elaborately especially in Malaysia. The instrument will be beneficial to both academic and practitioner communities who hold a particular interest in e-wallet adoption study and management. The following sections sequentially elucidate the theoretical background, research methodology, findings, results and discussion, and conclusion.

5.   Research Methods

This current study intends to validate the conceptual research model, the representativeness of items to a construct domain, and the overall instruments to confirm the validity and reliability of each items specifically in Malaysia context to ensure the accuracy in conducting actual data collection and reduce the possibility of research bias. Thus, the results will be based on the data collected for pilot study.

5.1.   Population, Sample and Data Collection Procedure

Malaysian e-wallet users who are above 18 years old were selected as sample for this study. The respondents have to be e-wallet user because nobody is more familiar to e-wallet unless he or she is the real user. Besides that, the reason 18 years old and above is chosen as one of the criteria because the saving account of people who are below 16 years old must be operated by his or her trustees which can be his or her parent or guardian according to Rules and Regulations Governing Savings Accounts (Maybank, 2018). Since the minor do not have access to bank by themselves, the criteria of aged 18 years old and above is included. Other than these, the respondents can be selected randomly from any occupation, education level, races, religions, etc., as long as he or she is a Malaysian e-wallet user. When it comes to selecting an appropriate sample size, a ratio as low as 5 cases per indicator variable would be sufficient as suggested by Bentler and Chou (1987). Given that there are 8 variables in this study, it can be asserted that at least 40 sample size are required.

For the pilot study, Multimedia Super Corridor (MSC) in Malaysia which includes Putrajaya and Cyberjaya is selected. MSC is a program inaugurated by Prime Minister, Dr Mahathir Mohammed in 1995 to lead the country into a knowledge-intensive economy with the use of most advanced and modern technology (Ramasamy et al., 2004). The reason MSC is chosen because it is a special economic zone and

high-technology business district which is compatible with the focal technology of this study. Web-based self-administered survey was utilized to assemble the information of target respondents. The data collection was carried out in May 2019 and a total of 49 valid data were gathered which would be analyzed to deduce findings for this study.

5.2. Research Instruments and Data Analysis

Variables in the TRI and UTAUT were combined to find out the key reasons that will influence the e-wallet adoption in Malaysia. The research instruments were formed according to the literature review. A structured questionnaire was adapted as the research instrument in this study. Generally, the questionnaire is separated into three sections. Section A consists of eight questions related to the respondents' socio-demographic profile; section B involves four questions related to respondents' e-wallet usage preferences, and lastly, section C consists of eight questions to represent each construct which are pertaining to the circumstances that will lead the respondent to exhibit adoption behaviour. The research items of Section C are presented in Table 01. Johns (2010) found that when the number of Likert scale points are above seven or below five, the data will become significantly less accurate. In this study, seven-point Likert scale is chosen to follow the original scale used in the earliest measurement of UTAUT to capture the intensity of respondents' perceptions towards all the variables. To achieve the research objectives, the initial stage of this study is to confirm the reliability and validity of each items, thus, Smart PLS 3.2 will be used to assess the measurement model because of small sample size and the ability in handling complex model (Henseler et al., 2009). SPSS 22 statistical analysis tool will be used for descriptive analysis.

Table 01. Research items and sources of references

Constructs	Items	Sources
Optimism	OPT1. New technology contributes to a better quality of life.	Parasuraman (2015)
	OPT2. New technology gives me more freedom of mobility.	
	OPT3. New technology gives people more control over their daily lives.	
	OPT4. New technology makes me more productive in my personal life.	
Innovativeness	INNO1. Other people come to you for advice on new technologies.	Parasuraman (2015)
	INNO2. In general, I am among the first in my circle of friends to acquire new technology when it appears.	
	INNO3. I can usually figure out new high-tech products and services without help from others.	
	INNO4. I keep up with the latest technological developments in my areas of interest.	
Performance Expectancy	PE1. I would find e-wallet very useful in my daily life.	Venkatesh et al. (2003)
	PE2. Using e-wallet improves my payment efficiency.	
	PE3. Using e-wallet improves my payment convenience.	
	PE4. Using e-wallet enables me to make payments more quickly.	
Effort Expectancy	EE1. Learning how to use e-wallet is easy for me.	Venkatesh et al. (2003)

	EE2. My interaction with e-wallet is clear and understandable.	
	EE3. I find e-wallet is easy to use.	
	EE4. It is easy for me to become skillful at using e-wallet	
Social Influence	SI1. People who are important to me think that I should use e-wallet.	Venkatesh et al. (2003)
	SI2. People who influence my behaviour think that I should use e-wallet.	
	SI3. People whose opinions that I value prefer that I use e-wallet.	
Facilitating Conditions	FC1. I have the resources necessary to use e-wallet.	Venkatesh et al. (2003)
	FC2. I have the knowledge necessary to use e-wallet.	
	FC3. E-wallet is compatible with other systems I use.	
Behavioural Intention	BI1. I intend to use e-wallet in the future.	Venkatesh et al. (2003)
	BI2. I will always try to use e-wallet in my daily life.	
	BI3. I plan to use e-wallet in future.	
	BI4. I predict I would use e-wallet in the future.	
Use Behaviour	UB1. I often use e-wallet to manage my account.	Venkatesh et al. (2003)
	UB2. I often use e-wallet to transfer and remit money.	
	UB3. I often use e-wallet to make payments.	

6. Findings

6.1. Descriptive Analysis

The response rate of the pilot study is 96%. The evaluation of descriptive statistics of respondent characteristics using SPSS 22 are presented in Table 02. According to Table 02, the respondents are equal representation for each gender because the valid responses consist of 24 males (49%) and 25 females (51%). The respondents are mostly from 18 – 34 years old range. Respondent who are above 55 years old are found to be rare. Most of the respondents are either Malays or Chinese and their marital status are either single or married. With respect to employment status, 69% of them are employed full time. Among all the valid responses, 37% of them are degree holder, 27% of them are diploma holder and 22% of them are SPM and below. All the respondents are under B40 and M40 groups if based on their personal monthly income. If considering the household monthly income, more than half of them (53%) are under M40 group, 35% of them are under B40 group, and lastly, only 12% of them are under T20 group.

Table 02. Descriptive Statistics of Respondent Characteristics

Measure	Items	Frequency	Percentage (%)
Gender	Male	24	48.98
	Female	25	51.02
Age	18-24 years old	15	30.61
	25-34 years old	17	34.69
	35-44 years old	8	16.33
	45-54 years old	7	14.29
	55-64 years old	1	2.04
	65 years old and above	1	2.04

Ethnicity	Malay	19	38.78
	Chinese	19	38.78
	Indian	11	22.45
	Other	0	0.00
Marital status	Single	25	51.02
	Married	22	44.90
	Widowed/Divorced	2	4.08
Employment Status	Employed full-time	34	69.39
	Employed part-time	3	6.12
	Out of work and looking for work	1	2.04
	Out of work but not currently looking for work	0	0.00
	Homemaker	1	2.04
	Student	9	18.37
	Retired	1	2.04
Highest Academic Qualification	SPM and below	11	22.45
	STPM/A-Level/Foundation	2	4.08
	Diploma	13	26.53
	Bachelor's degree	18	36.73
	Master's degree	5	10.20
	Doctorate degree	0	0.00
Personal Monthly Income	Less than RM2,848	29	59.18
	RM2,849 – RM16,087	20	40.82
	Above RM16,088	0	0.00
Household Monthly Income	Less than RM2,848	17	34.69
	RM2,849 – RM16,087	26	53.06
	Above RM16,088	6	12.24

6.2. Respondents' E-wallet Usage Scenario

With the intention of obtaining a brief understanding of e-wallet usage scenario in Malaysia, a total 4 questions were asked in the questionnaire. Based on the evaluation using SPSS 22 as shown in Table 03, Touch n' Go e-Wallet is the most popular e-wallet among the respondents with nearly 38% of them using it, followed by GrabPay (29.85%) and Boost (15.74%). Majority of them use e-wallet for transportation transaction (34%) and food and beverage transaction (26%). Based on the valid responses, 18% of them are new users, 24% of them are early adopters, 37% of them have 1 to 6 months usage experience, and the remaining (24%) have 6 to 12 months usage experience. With the respect of frequency of e-wallet usage, half of them (51%) use e-wallet 1 to 3 times a month and 27% use 3 to 8 times.

Table 03. E-wallet Usage Scenario

Measure	Items	Frequency	Percentage (%)
Types of E-wallet	GrabPay	29	26.85
	Touch n' Go e-Wallet	41	37.96
	Boost	17	15.74
	Maybank QRPay	5	4.63
	WeChat Pay	4	3.70
	FavePay	6	5.56
	AliPay	0	0.00

	BigPay	6	5.56
	Other	0	0.00
Core E-wallet Use Cases	Retail transaction	12	11.43
	Transportation transaction	36	34.29
	F&B transaction	27	25.71
	Prepaid top-up	6	5.71
	e-Commerce transaction	9	8.57
	Peer-to-Peer transfers	2	1.90
	Bill payment	13	12.38
How long have you been using e-wallet?	Less than 1 month	9	18.37
	1 to 6 months	18	36.73
	6 to 12 months	12	24.49
	More than 1 year	10	20.41
How frequently do you use e-wallet per month?	Less than 1 time	2	4.08
	1 to 3 times	25	51.02
	3 to 8 times	13	26.53
	8 to 12 times	6	12.24
	over 12 times	3	6.12

6.3. Measurement Model Assessments

For evaluating the measurement model, two of the significant tests that need to take into consideration in evaluating the goodness of fit of proposed model are the reliability and validity test. The indicators including outer loading and Cronbach's Alpha for indicator reliability, Composite Reliability (CR) for internal consistency reliability, and Average Variance Extracted (AVE) for convergent validity will be measured.

According to Hair et al. (2011)'s rule of thumb and Fornell and Larcker (1981), the outer loadings should be higher than 0.7 and Cronbach's Alpha should be higher than 0.6 in indicator reliability test, and CR should be higher than 0.7 in internal consistency reliability test. In the first evaluation using Smart PLS, the outer loadings of all items have met the threshold point, except INNO1 with outer loadings of 0.695. To have a good decision in whether INNO1 should be removed or not, the analysis was rerun without INNO1. The results showed that AVE and CR are increased after removing INNO1. Thus, it is suggested to discarded INNO1 in the actual questionnaire. The modified results are presented in Table 04 which the outer loadings of all items above 0.736, Cronbach's Alpha above 0.797 and lastly, CR above 0.873. The results imply that all the remaining items are valuable and consistent.

To examine the validity, convergent validity and discriminant validity test are applied. The AVE should be greater than 0.5 to verify the appropriateness of the constructs (Hair et al., 2011). According to the modified outcomes in Table 04, all the AVE values are above 0.696. All the constructs satisfied Hair et al. (2011)'s rule of thumb.

Table 04. Results of Measurement Model Assessment (Modified)

Constructs	Items	Loadings	AVE	CR	Cronbach's Alpha
Optimism	OPT1	0.879	0.696	0.901	0.881
	OPT2	0.854			
	OPT3	0.736			
	OPT4	0.861			

Innovativeness	INNO2	0.833	0.697	0.873	0.797
	INNO3	0.865			
	INNO4	0.805			
Performance	PE1	0.814	0.738	0.918	0.887
Expectancy	PE2	0.917			
	PE3	0.844			
	PE4	0.86			
Effort	EE1	0.844	0.766	0.929	0.907
Expectancy	EE2	0.884			
	EE3	0.879			
	EE4	0.892			
Social	SI1	0.899	0.851	0.945	0.92
Influence	SI2	0.937			
	SI3	0.931			
Facilitating	FC1	0.77	0.714	0.882	0.798
Conditions	FC2	0.887			
	FC3	0.873			
Behavioural	BI1	0.897	0.865	0.95	0.924
Intention	BI2	0.939			
	BI3	0.953			
Adoption	UA1	0.891	0.724	0.887	0.809
	UA2	0.896			
	UA3	0.759			

Discriminant validity can be checked through Cross Loadings, Fornell-Lacker criterion, and Heterotrait-Monotrait (HTMT). In this study, HTMT is used as recommended by Henseler et al. (2009). HTMT ratio below 0.90 indicates discriminant validity has been established between two reflective constructs (Henseler et al., 2009). In accordance with the findings in Table 05, all the HTMT ratios are below 0.775, implying discriminant validity is created.

Table 05. Heterotrait-Monotrait ratio (HTMT)

Constructs	Adop tion	Behavioural Intention to Adopt	Effort Expecta ncy	Facilitating Conditions	Innovati veness	Opti mism	Performance Expectancy	Social Influence
Adoption								
Behavioural Intention to Adopt	0.677							
Effort Expectancy	0.376	0.297						
Facilitating Conditions	0.505	0.624	0.461					
Innovativeness	0.315	0.363	0.514	0.415				
Optimism	0.502	0.575	0.63	0.616	0.65			
Performance	0.6	0.449	0.683	0.544	0.5	0.775		

Expectanc y								
Social Influence	0.655	0.597	0.086	0.286	0.043	0.171	0.089	

7. Conclusion

This present study proposed a research model which incorporated TRI and UTAUT that can be used to identify the key reasons influencing e-wallet adoption in Malaysia. The conceptual research model postulates that personal traits like optimism and innovativeness will influence users' perception of e-wallet helpfulness and ease of use and eventually lead to the adoption of e-wallet. Besides that, social and environment factors were also included in the model. Constructs that building up for the conceptual research model in this study were brought together from related literatures in the past. Though this study is not going to discover the key reasons that will bring about e-wallet adoption in Malaysia, but it aims to validate the model which may help to explain the e-wallet adoption behaviour, the representativeness of items to a construct domain, and the overall instrument to verify the reliability and validity of each items for the sake of evaluating the potential results of the actual study.

In regard to the results of proposed conceptual research model measurement analysis, it is evident that the criteria suggested by Hair et al. (2011) and Fornell and Larcker (1981) for the reliability and validity were met after removing one item from the construct innovativeness. Hence, the measurement model established is satisfactory in reliability and validity standard which means that it is ready to be used in the actual data collection stage. However, the findings are suitable to use at cities in Malaysia only, this is because the pilot study was conducted in MSC which is a high-technology business district whereby not every place have the same characteristics. This study will need to be continued for the purpose of revealing the real key reasons that will lead to e-wallet adoption. Therefore, researchers who have interests in e-wallet adoption study is suggested that to further study this area.

Acknowledgments

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