

## **M-PAYMENT BEHAVIOURAL INTENTION: REVISITING THE MODELS USING THE CASE OF SARAWAK PAY**

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### **ABSTRACT**

**Background and Purpose:** With the acceleration of mobile payment usage in the daily routine, this study intends to examine the determinant factors on the users' behavioural intention on the Sarawak Pay using the theory of reasoned action (TRA), technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), and a modified model.

**Methodology:** A total of 195 Sarawak Pay users was selected using the purposive sampling technique to collect their responses through the questionnaire-based online survey. The PLS-SEM was utilised to examine the proposed hypotheses.

**Findings:** The study found that the modified model had the greatest explanatory and predictive power than the other conventional models. Moreover, the performance expectancy, facilitating conditions and attitude positively influenced the behavioural intention and use behaviour on the Sarawak Pay, while effort expectancy had a contrary effect. Furthermore, the social influence failed to impact the Sarawak Pay users' behavioural intention and their use behaviour.

**Contributions:** The findings offered a clear understanding of the drivers and inhibitors that inspired the users' behavioural intention and their use behaviour on the Sarawak Pay, as it had a critical

implication for the Sarawak government. This evidence was derived from three conventional models and a modified model.

**Keywords:** M-payment, mobile payment, unified theory of acceptance and use of technology, technology acceptance model, theory of reasoned action.

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## 1.0 INTRODUCTION

The advancement of technology and enhancement features of smartphones have driven a new feature that focuses on transaction payment services, which is also known as mobile payment (or m-payment). This payment channel has permeated into our daily routine as it would provide fast, convenient and secured payment services that could be used anytime and anywhere, thus improve the efficiency and convenience of payment transactions (Leong et al., 2020). Moreover, m-payment services allow individuals to purchase and make payments using their mobile devices (Chen, Chen, & Chen, 2019). Precisely, m-payment could be defined as the use of mobile devices like smartphones and personal digital assistants in payment processes (Dahlberg et al., 2008). Hence, individuals only have to make the payments with their mobile devices as the money has been stored in the payment platform.

Furthermore, with the advancement and convenience of m-payment, this payment channel has gained wide acceptance worldwide and it is the fastest growing mobile application (Chen et al., 2019). For instance, the global mobile wallet users have achieved 2.1 billion in 2019 (mobilepaymentsworld.com) and the mobile payment transactions are projected to increase 50% between 2020 and 2025 due to the COVID-19 crisis (globenewswrite.com). The total transaction of electronic payment was growing rapidly worldwide and it was also observed in developing markets, such as Malaysia. For instance, in Malaysia, the number of electronic payment transactions was growing tremendously with a 14% growth rate in 2020 (Bank Negara Malaysia, 2020). Besides that, the total volume of electronic wallet transactions also increased by 131% in the same period. Furthermore, the Quick Response (QR) code payment acceptance of the merchants also increased by 164% in 2020. This incredible growth was due to the shifting from conventional payment towards contactless and online payments (Bank Negara Malaysia,

2020), and also the government's initiatives in cultivating the public's awareness on e-payment services through several campaigns.

With the fantastic growth of this contactless payment channel, several m-payment service platforms, such as Boost, Grab Pay, Touch n Go, AliPay, Big Pay, and many others had been introduced in Malaysia. However, all of these platforms were introduced and managed by private organisations. Recently, the governments or related agencies have taken this initiative to introduce their payment platforms such as the Sarawak Pay and the KelantanPay. This presented a slightly different perspective as those platforms offered by the government agencies had strong and well-established technical support, which was perceived to be better than the platform introduced by the private organisations. This could increase the individual's intention and willingness to use these government-related platforms rather than the private organisations' platforms.

This study was exclusively focused on the Sarawak Pay platform, which is the payment platform introduced by the Sarawak state government in 2017 as a step towards a cashless community. Moreover, this initiative was also in-line with the national agenda of promoting the Digital Economy and also moving into the 4<sup>th</sup> Industrial Revolution era. However, the registered users of Sarawak Pay are still at a very low level with only around 440,000 users as at September 2020 (Sarawak Pay, 2020), compared to the 2.9 million Sarawak's population. This raised the curiosity as the adoption of this payment platform was extremely low compared to other platforms. Therefore, it is crucial to understand the factors that influenced the users to adopt Sarawak Pay.

The use and acceptance of new technology, such as mobile payment have become an interesting and "hot topic" amongst the academics (Rondan-Catalunam, Arenas-Gaitan, & Ramirez-Correa, 2015). This was in line with the proposition that identifying the drivers that stimulated users' behaviour on mobile payment was a critical agenda (Leong et al., 2020). Moreover, the inconclusive findings of the determinants of behavioural intention towards mobile payment were observed in several previous studies. For instance, although performance expectancy positively explained behavioural intention (Abdullah, Redzuan, & Daud, 2020; Gupta & Arora, 2020; Tang, Aik, & Choong, 2021) while Sharma et al. (2021) and Sankaran and Chakraborty (2021) found an insignificant association. Similarly, Gupta and Arora (2020) and Tang et al. (2021) explored the significant relationship effort expectancy, while others found no effect (Madan & Yadav, 2016; Yan et al., 2021). Subsequently, Abdullah et al. (2020), Al-Saedi et al. (2020), and Patil et al. (2020) discovered that social influence has a significant

effect, while others found insignificant influence in predicting behavioural intention (Tang et al., 2021; Sharma et al., 2021; Susanto et al., 2020).

Furthermore, by acknowledging the importance of the behavioural intention on mobile payment, this study wishes to explore on the significant determinants that influence the Sarawak Pay users' behavioural intention through the different conventional models from the theory of reasoned action (TRA), technology acceptance model (TAM) and unified theory of acceptance and use of technology (UTAUT), and also the proposed modified model. This was because those conventional models were introduced with different concepts and purposes but did not consider the contribution of the alternative model (Rondan-Catalunam et al., 2015). Ooi and Tan (2016) further argued that those conventional models may not be appropriate to use in explaining mobile technology adoption due to their limitations. Therefore, this paper used three conventional models and a modified model to evaluate the determinant factors. Moreover, Chen et al. (2019) mentioned that there was limited evidence that provided a better understanding of the way to encourage and inhibit individuals to use mobile payment. Hence, it is essential to investigate such a topic as it has a great implication to the industry, especially for the operators of Sarawak Pay to increase the number of users. For that reason, the modified model that integrated TRA, TAM and UTAUT was proposed to better examine the behavioural intention of the Sarawak Pay users.

This study offered new insights that were different from the empirical evidence in the literature. Firstly, this study focused on the behavioural intention of Sarawak Pay users exclusively. As mentioned above, Sarawak Pay was the first mobile payment platform introduced by the state government. Hence, the users could behave with different intentions and behaviour compared to conventional mobile payment platforms. Furthermore, the evidence was provided from the developing market perspective, as most of the previous studies focused on the developed markets. The internet facilities and infrastructure might not be well-equipped in a developing market, or as in this case, Sarawak have a wide coverage and huge rural areas that might not have sufficient internet coverage. Besides, the modified model from the three conventional models was proposed in this study to capture all the possible influences of different variables as suggested in the models. This modified model was proven to provide a more comprehensive predicting power than the conventional models as the variables from the three models had been unified into one proposed model.

## 2.0 LITERATURE REVIEW

Several theories had been introduced to examine the behavioural intention of an individual towards a technology, which examined the matter from different perspectives. For that reason, this study included three of these theories or models, namely TRA, TAM and UTAUT. Moreover, by acknowledging the different perspectives of these models, this study proposed a modified model that integrated all variables from these models. A discussion of the different theories is provided.

### 2.1 Theory of Reasoned Action (TRA)

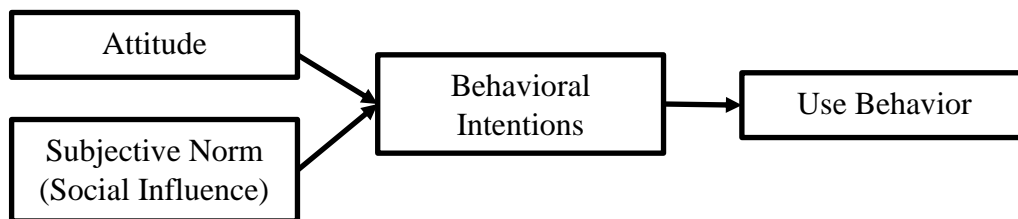


Figure 1: Theory of Reasoned Action (TRA)

Fishbein and Ajzen (1975) proposed the TRA that focused on two factors that predicted the individual's intention and behaviour, as presented in Figure 1. These two factors were attitude and subjective norms (or social influence). As proposed, an individual is likely to perform a certain behaviour if they have a positive attitude or influenced by people in their social context, and thus this intention would motivate their behaviour. However, TRA is not specifically for a certain behaviour or technology as it could be applied in other matters (Rondan-Catalunam et al., 2015).

### 2.2 Technology Acceptance Model (TAM)

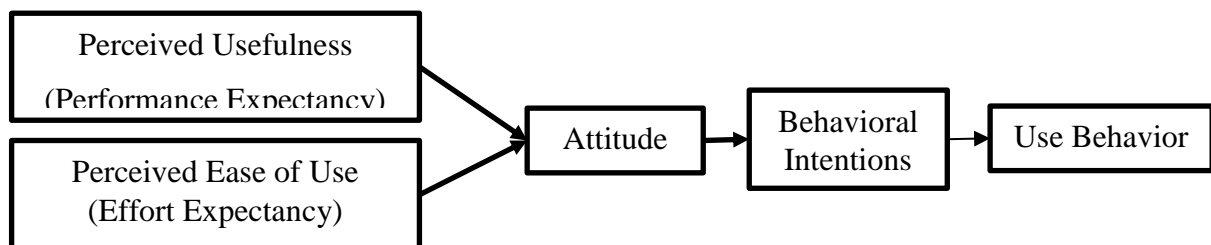


Figure 2: Technology Acceptance Model (TAM)

TAM was introduced by Davis (1989), whereby it was proposed that perceived usefulness and perceived ease of use had a significant influence on the individuals' behavioural intention to

adopt a technology, as shown in Figure 2. The TAM was a revision from TRA, which was explicitly custom-made for the user's acceptance of the technology (Rondan-Catalunam et al., 2015). However, TAM was initially proposed to explore the electronic mail system adoption in organizational settings (Ooi & Tan, 2016), and this makes it may not be appropriate in m-payment adoption was individual's voluntary behaviour. Moreover, this model was considered to be lack of explanation ability as only two predictors were included in the model to determine the individual's intention and there could be other predictors that influenced the intention (Gao & Bai, 2014). Therefore, the TAM model was extended with other predictors that were relevant to technology (Schierz, Schilke, & Wirtz, 2010). Yet, TAM remained as one of the broadly used frameworks, although there were limitations (Slade et al., 2015).

### 2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

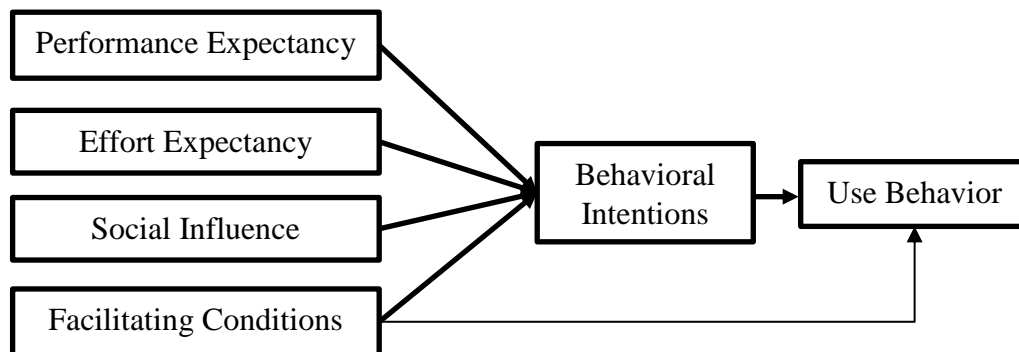


Figure 3: Unified Theory of Acceptance and Use of Technology (UTAUT)

Due to the need for an integrated model that could unify the variables in the different models, Venkatesh et al. (2003) proposed the UTAUT that integrated important elements from different models. UTAUT was the most inclusive model to explain the acceptance of technology. As presented in Figure 3, four major factors were included in the model, namely performance expectancy, effort expectancy, social influence and facilitating conditions, and all four factors were assumed to significantly influence the behavioural intention and use behaviour. Moreover, the use behaviour could be influenced by facilitating conditions. As mentioned by Madan and Yadav (2016), UTAUT was the most frequently used model to study on new technology or system's adoption behaviour. But the adoption behaviour of the new technology proposed by UTAUT is also mainly designed for the employees with organisational settings (Ooi & Tan, 2016). Therefore, this also gives the idea that it may not suit the m-payment usage that is heavily based on an individual's voluntary use behaviour. However, UTAUT did not include the potential influence of attitude proposed in TRA and TAM.

## 2.4 Proposed Modified Model

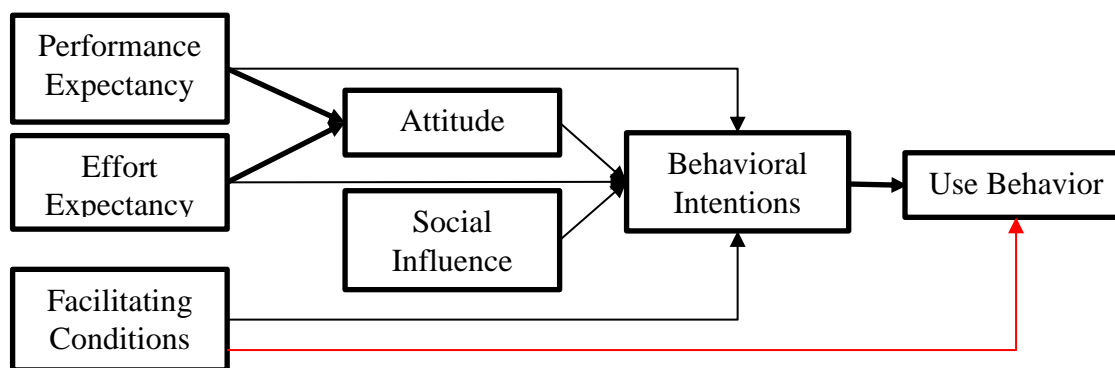


Figure 4: Proposed Modified Model

Due to the shortfalls of the aforementioned models such as the models were designed for different contexts, purposes and technologies, the above-modified model was proposed. It is an integration model from the TRA, TAM and UTAUT, whereby each of them possesses a certain limitation. As presented in Figure 4, the user's behavioural intention of the mobile payment could be determined by five predictors, which were attitude, performance expectancy, effort expectancy, social influence and facilitating conditions. Moreover, the attitude could be predicted by the performance expectancy and effort expectancy. Lastly, the use behaviour of an individual was determined by behavioural intention and facilitating conditions.

### 2.4.1 Performance Expectancy

The performance improvement expectation of an individual with the adoption of certain technology denotes performance expectancy (Venkatesh et al., 2003). An individual could perceive the process of purchasing transactions to be improving by adopting the mobile payment services (Madan & Yadav, 2016). As mentioned by Madan and Yadav (2016), the performance expectancy was similar to the perceived usefulness in the TAM. Therefore, the performance expectancy was assumed to be similar with PU. Empirically, the significant relationship between the performance expectancy or perceived usefulness on the behavioural intention to use technology was proven (e.g. Abdullah et al., 2020; Madan & Yadav, 2016; Gupta & Arora, 2020; Kuciapski, 2017; Tang et al., 2021). However, the insignificant association of the performance expectancy was also reported (e.g. Sharma et al., 2021; Sankaran & Chakraborty, 2021; Susanto et al., 2020). Moreover, as suggested in TRA, the performance expectancy had a significant influence on the individual's attitude to perform a behaviour. This proposition was supported by several studies, whereby the performance expectancy or perceived usefulness was found to significantly impacted attitude (Patil et al.,

2020; Liebana-Cabanillas, Luna, & Montoro-Rios, 2017; Chawla & Joshi, 2019; Flavian, Guinaliu, & Lu, 2020). Therefore, the following hypotheses were suggested:

H<sub>1</sub>: There is a significant relationship between performance expectancy and behavioural intention.

H<sub>2</sub>: There is a significant relationship between performance expectancy and attitude.

#### **2.4.2 Effort Expectancy (EE)**

Similar to the perceived ease of use in TAM, the effort expectancy refers to the individuals who presume the easiness of using the technology in their daily routine with no complicated learning process (Madan & Yadav, 2016). The degree of ease of use was important to drive an individual to use the technology. When mobile payment is easily applied in the transaction, then it could attract more individuals to use it. Therefore, a positive association was expected for the effort expectancy and behavioural intention to use the mobile payment. This was supported in prior studies, whereby the effort expectancy or perceived ease of use had positive influence on the individual's behavioural intention to use new technology (e.g. Gupta & Arora, 2020; Tang et al., 2021; Al-Saedi et al., 2020). However, the insignificant effect of the effort expectancy was also found (e.g. Yan et al., 2021; Susanto et al., 2020; Kaur & Arora, 2021). Similar to the performance expectancy, the significant effect of effort expectancy or perceived ease of use towards attitude was also acknowledged in numerous studies (Patil et al., 2020; Flavian et al., 2020). For that reason, the following hypotheses were proposed.

H<sub>3</sub>: There is a significant relationship between effort expectancy and behavioural intention.

H<sub>4</sub>: There is a significant relationship between effort expectancy and attitude.

#### **2.4.3 Facilitating Conditions**

Facilitating conditions were the construct proposed in UTAUT (Venkatesh et al., 2003). It refers to the likelihood of individuals who are confident that technical support and backup are provided by the organisation for the users when they used the technology (Venkatesh et al., 2003). Madan and Yadav (2016) defined that the facilitating conditions included the resources and physical environment required when using the technology. An individual is likely to use a technology or mobile payment service if they believe that there will be resources and support when it is required. Therefore, it was expected that there was a significant relationship between facilitating conditions and behavioural intention as concluded in previous studies (e.g. Abdullah et al., 2020; Madan & Yadav, 2016; Gupta & Arora, 2020; Patil et al., 2020). However, some other studies found the otherwise results (e.g. Sharma et al., 2021; Kaur &



Arora, 2021). Furthermore, as proposed in the UTAUT model, the facilitating conditions could predict the individuals' use behaviour as the individuals are likely to use the services when they realised that the services provided a certain degree of technical support and resources, besides being well-matched with other technologies (Alalwan, Dwivedi, & Rana, 2017). The relationship was observed in different research contexts, such as e-money (Susanto et al., 2020), mobile banking (Alalwan et al., 2017) and e-government (Camilleri, 2020). Thus, the following hypothesis were proposed.

H<sub>5</sub>: There is a significant relationship between the facilitating conditions and behavioural intention.

H<sub>6</sub>: There is a significant relationship between the facilitating conditions and use behaviour.

#### ***2.4.4 Social Influence***

The influence of people's surrounding on the individuals' intention to use technology had been defined as social influence or subjective norm. The opinion of the peers, family and media could affect the individuals' adoption decisions (Gao & Bai, 2014). Chen et al. (2019) remarked on the influence of people in social networks on individuals' behaviour. An individual tends to seek the opinion from others when there is insufficient information to decide on the usage of the technology (Gao & Bai, 2014). Therefore, social influence could be the main predictor for new technology acceptance (Al-Saedi et al., 2020). The significant relationship between social influence and behavioural intention was consistently reported (e.g. Abdullah et al., 2020; Madan & Yadav, 2016; Al-Saedi et al., 2020; Patil et al., 2020; Kuciapski, 2017). However, the insignificant role of social influence is documented in other studies (e.g. Gupta & Arora, 2020; Tang et al., 2021; Sharma et al., 2021; Susanto et al., 2020). Therefore, the following statement was hypothesised.

H<sub>7</sub>: There is a significant relationship between social influence and behavioural intention.

#### ***2.4.5 Attitude***

Empirically, the influence of attitude towards individuals' behavioural intention had been widely recognised. Attitude refers to the degree to which an individual has a favourable or unfavourable evaluation of the given behaviour (Ajzen, 1991). Therefore, the attitude of an individual has a significant influence on the intention to use the mobile payment (Teng et al., 2020). This was supported by several studies, which also found the same association. For instance, Liebana-Cabanillas et al. (2017), Patil et al. (2020) and Flavian et al. (2020) revealed

the significant influence of attitude on the individual's intention. Therefore, the following hypothesis was suggested.

H<sub>8</sub>: There is a significant relationship between attitude and behavioural intention.

#### **2.4.6 Behavioural Intention**

Behavioural intention is defined as the likelihood of an individual's anticipation to behave in a certain behaviour (Fishbein & Ajzen, 1975), such as to use the mobile payment. Throughout the literature, numerous studies had acknowledged the predictive ability of the behavioural intention towards the individuals' use behaviour (e.g. Gupta & Arora, 2020; Patil et al., 2020; Alalwan et al., 2017; Susanto et al., 2020). Moreover, as mentioned by Patil et al. (2020), behavioural intention could capture several motivational factors that caused individuals to react to a behaviour. Thus, behavioural intention was also treated as the dependent variable to determine the antecedents of the individuals' willingness to use the mobile payment (Patil et al., 2020). Therefore, the acceptance of an individual on the technology or mobile payment could be used as a predictor of actual behaviour. Hence, the following hypothesis was suggested.

H<sub>9</sub>: There is a significant relationship between behavioural intention and use behaviour.

### **3.0 RESEARCH DESIGN**

To examine the antecedents of the mobile payment behavioural intention, the quantitative research approach was employed as the quantitative primary data were collected from the targeted population, which were the Sarawak Pay users. The study used the purposive sampling method to select the respondents, as only the Sarawak Pay users were invited to participate. The final sample size was 195 respondents, which met the minimum sample size of 103, as determined using the power analysis with an effect size of 0.15, a power level of 80% and seven predictors. The responses were collected from the online questionnaire using Google Form. The questionnaire was divided into three sections, whereby Section A was related to the respondents' demographic profiles, Section B was the measurement items related to the independent variables and Section C focused on the measurement items for mediators and dependent variables. The measurement items were adapted from several sources, such as Akbar (2013), Patel (2016), Flavian et al. (2020) and Yan et al. (2021) with a total of 27 items for seven constructs. The 5-point Likert scale was used to indicate the level of agreement and disagreement of respondents on each item. The measurement items were prepared in the English language and also translated into Bahasa Malaysia to avoid any misunderstandings.

The respondents' demographic profiles were analysed using the descriptive frequency in the SPSS software. The path relationship of the different models was analysed using the SmartPLS software through the partial least square structural equation modelling (PLS-SEM). Before the path relationship, reliability and validity tests were performed using the same software together with the predictive relevance of the constructs.

#### **4.0 ANALYSIS AND FINDINGS**

The frequency of the respondents' demographic profiles is presented in Table 1. The respondents were mainly dominated by female users (64.10%) and the remaining were male users. Majority of the respondents were 25 years old and below (37.43%) followed by other users aged between 26 to 35 years old (30.77%) and 36 to 45 years old (17.44%). In terms of occupation, 65 respondents were working in the private sector, while 50 respondents were students and 44 respondents were government servants. Table 1 also showed that 61% of the respondents were single and 38% were married. By comparing the most frequently used services, approximately two-third of the respondents used the Sarawak Pay when they purchased items from the supermarket, food court, convenience shop and others, followed by the utility bills payment.

Table 1: Respondents' profiles

<b>Demographics</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Gender</b>		
Male	70	35.90
Female	125	64.10
<b>Age Group</b>		
25 year old and below	73	37.43
26 to 35 year old	60	30.77
36 to 45 year old	34	17.44
46 to 55 year old	19	9.74
56 year old and above	9	4.62
<b>Occupation</b>		
Government Servants	44	22.56
Private Sector Servants	65	33.33
Self-Employed / Business Owner	18	9.23
Students	50	25.64
Retirees	5	2.56
Others	13	6.67
<b>Marital Status</b>		
Single	119	61.02
Married	74	37.95
Others	2	1.03
<b>Most Frequently Used</b>		
Assessment bill of Local Councils	11	5.64
Utilities Bills	31	15.90
Hotels managed by SEDC	1	0.51
Education fees or loan repayment	3	1.54
Telecommunications Bills	8	4.10
Supermarket, Food court, Convenience shop, etc.	128	65.64
Others	13	6.67

Firstly, the study evaluated the multivariate normality of the dataset using Mardia's coefficient procedure and the results were provided in Table 2. As presented, Mardia's multivariate kurtosis for all models was greater than the threshold level of 20 and this indicated the dataset were randomly distributed (Byrne, 2013; Kline, 2011). Hence, the PLS-SEM was the appropriate technique to examine the relationship. Moreover, Table 2 also showed the Standardised Root Means Square Residual (SRMR), which implied that all datasets for different models were goodness-of-fit as the SRMR values were lower than 0.08 (Hu &

Benlter, 1999). The possibility of the common method variance issues was associated as the primary data was collected from a one-time survey with the same measurement scales (Hakimi et al., 2019). Therefore, Harman's single factor test was utilised to assess the existence of the common method variance. As provided in Table 2, the variance was explained in one factor, in which all four models were less than 50% that indicated the common method variance was not present in the models.

Table 2: Goodness-of-fit and common method bias

<b>Model</b>	<b>Mardia's multivariate Kurtosis</b>	<b>SRMR Result</b>	<b>Harman's Single Factor Test</b>
TRA	30.3555	0.0640	47.7200%
TAM	48.0573	0.0760	46.1000%
UTAUT	63.1798	0.0780	41.3480%
Modified	84.3157	0.0750	39.8480%

Prior to the assessment of the structural model, the model measurements had to be performed and the results were presented in Table 3. In this study, the outer loading was used to evaluate the convergent validity and the results indicated that all items had met the minimum threshold value of 0.708 (Hair et al., 2017), except for two measurement items for facilitating conditions and one item for social influence that was deleted due to the lower loading values. Moreover, the values of average variance extracted (AVE) for all constructs were also greater than the suggested level of 0.5 (Hair et al., 2017) and indicated that the convergent validity requirements of all constructs were met. The internal consistency was evaluated using the composite reliability (CR) and the results showed that all constructs had passed the 0.7 level (Gefen, Straub, & Boudreau, 2000).

Table 3: Construct reliability and convergent validity

Constructs	Items	Loading	AVE	CR
Effort Expectancy (EE)	EE1	0.7960	0.6340	0.8740
	EE2	0.8090		
	EE3	0.7490		
	EE4	0.8290		
Performance Expectancy (FE)	PE1	0.7350	0.6320	0.8720
	PE2	0.8710		
	PE3	0.8400		
	PE4	0.7230		
Facilitating Conditions (FC)	FC1	0.9130	0.8190	0.9010
	FC2	0.8980		
Social Influence (SI)	SI1	0.9220	0.7560	0.9250
	SI2	0.9230		
	SI3	0.8250		
	SI4	0.8020		
Attitude (ATT)	ATT1	0.8820	0.7970	0.9400
	ATT2	0.8930		
	ATT3	0.9170		
	ATT4	0.8780		
Behavioural Intentions (BI)	BI1	0.8710	0.7380	0.9180
	BI2	0.8490		
	BI3	0.8790		
	BI4	0.8350		
Use Behaviour (UB)	UB1	0.9650	0.9290	0.9630
	UB2	0.9630		

Additionally, the Heterotrait-Monotrait (HTMT) ratio was used to evaluate the discriminant validity and the results were presented in Table 4. All constructs discriminate values were lower than 0.85 (Kline, 2011) except for one construct, but it was still lower than the most liberal level of 0.90 (Gold, Malhotra, & Segars, 2001). This result indicated that the discriminant validity of the models was determined. As the multivariate technique was used to examine the relationship between the constructs, the multicollinearity of the predictors had to be assessed. The variance inflation factor (VIF) was employed to assess the multicollinearity problem as displayed in Table 4. The results revealed that all VIF values were less than 3.30, which indicated that the multicollinearity issues did not occur in the models (Diamantopoulos & Siguaw, 2006).

Table 4: Discriminant validity using HTMT and VIF

	ATT	BI	EE	FC	PE	SI	UB	VIF (BI)	VIF (UB)
<b>ATT</b>								2.0760	
<b>BI</b>	0.8560								1.0000
<b>EE</b>	0.6570	0.5170						1.8620	
<b>FC</b>	0.5300	0.5240	0.6850					1.5030	
<b>PE</b>	0.7510	0.7260	0.6330	0.3930				2.0230	
<b>SI</b>	0.4240	0.4370	0.3260	0.2380	0.5650			1.3340	
<b>UB</b>	0.6060	0.7380	0.5080	0.4500	0.5650	0.2680			

The path coefficients of the proposed hypotheses were examined using the bootstrap with 5,000 re-sample techniques. The results of the structural modelling were presented in Table 5 together with the R-squared ( $R^2$ ) and also the predictive relevance ( $Q^2$ ) for all models. While the results of the PLS path analysis from the SmartPLS for the modified model displayed in Figure 5. The results of TRA indicated that social influence ( $\beta=0.1110$ ) and attitude ( $\beta=0.7250$ ) had a significant association with the behavioural intention, and thus the hypotheses of ( $H_7$  and  $H_8$ ) for TRA were accepted. A positive significant relationship was also found for behavioural intention and use behaviour ( $\beta=0.6700$ ). Moreover, the results of TAM showed that all hypotheses were also supported ( $H_2$ ,  $H_4$ ,  $H_8$  and  $H_9$ ). Specifically, the results showed that both performance expectancy ( $\beta=0.4800$ ) and effort expectancy ( $\beta=0.3210$ ) exhibited a positive significant association with attitude, whereby attitude ( $\beta=0.7680$ ) posited the same influence towards behavioural intention. Similar to TRA, the positive significant relationship between the behavioural intention and use behaviour was also proven ( $\beta=0.6700$ ).

Furthermore, Table 5 also provides the results of UTAUT. Unlike the previous models that supported all the proposed hypotheses, slightly different results were found in UTAUT, whereby both effort expectancy ( $\beta=0.0330$ ) and social influence ( $\beta=0.1060$ ) had no significant relationship with behavioural intention, and thus  $H_3$  and  $H_7$  for UTAUT were rejected. However, a significant association between the performance expectancy ( $\beta=0.4710$ ), facilitating conditions ( $\beta=0.2470$ ) and behavioural intention was found, and thus  $H_1$  and  $H_5$  for UTAUT were accepted. Moreover, the use behaviour predicted by the facilitating conditions also proved that  $H_6$  for UTAUT was supported. The significant relationship between behavioural intention and use behaviour ( $\beta=0.6230$ ) again had been proven.

Lastly, the proposed modified model that integrated TRA, TAM and UTAUT was also examined. The results in Table 5 showed that performance expectancy ( $\beta=0.1980$ ), facilitating

conditions ( $\beta=0.1440$ ) and attitude ( $\beta=0.6120$ ) presented positive associations with behavioural intention, while social influence ( $\beta=0.0570$ ) remained insignificant as shown in TAM. This indicated that in the UTAUT model, H<sub>1</sub>, H<sub>5</sub>, and H<sub>8</sub> were supported, but H<sub>7</sub> was rejected. Surprisingly, the effort expectancy ( $\beta=-0.1040$ ) turned to negative significance in this modified model. Both the performance expectancy ( $\beta=0.4800$ ) and effort expectancy ( $\beta=0.3200$ ) remained the significant relationship with attitude. Furthermore, the positive significant relationship between behavioural intention and use behaviour ( $\beta=0.6220$ ) was also identified. The significant relationship between the facilitating conditions and use behaviour again had been proven in the modified model, and thus H<sub>6</sub> was supported ( $\beta=-0.1100$ ).

Table 5: Path-coefficients, R-squared (R<sup>2</sup>) and predictive relevance (Q<sup>2</sup>)

Hypothesis		TRA	TAM	UTAUT	Modified
H <sub>1</sub>	PE - > BI			0.4710 (6.0880)**	0.1980 (2.7010)**
H <sub>2</sub>	PE - > ATT		0.4800 (6.9490)**		0.4800 (6.8250)**
H <sub>3</sub>	EE - > BI			0.0330 (0.4910)	-0.1040 (1.8270)*
H <sub>4</sub>	EE - > ATT		0.3210 (4.5120)**		0.3200 (4.4540)**
H <sub>5</sub>	FC - > BI			0.2470 (3.5860)**	0.1440 (2.3910)**
H <sub>6</sub>	FC - > UB			0.1090 (1.7840)*	0.1100 (1.7930)*
H <sub>7</sub>	SI - > BI	0.1110 (2.0850)*		0.1060 (1.6580)	0.0570 (1.1090)
H <sub>8</sub>	ATT - > BI	0.7250 (15.7320)**	0.7680 (19.1420)**		0.6120 (7.9810)**
H <sub>9</sub>	BI - > UB	0.6700 (15.4280)**	0.6700 (15.3420)**	0.6230 (12.1490)**	0.6220 (11.9440)**
<b>R-Squared (R<sup>2</sup>)</b>					
Attitude			0.4910		0.4910
Behavioural Intentions		0.6010	0.5900	0.4560	0.6300
Use Behaviour		0.4490	0.4490	0.4600	0.4590
<b>Predictive Relevance (Q<sup>2</sup>)</b>					
Attitude			0.3670		0.3670
Behavioural Intentions		0.4160	0.4110	0.3110	0.4330
Use Behaviour		0.3960	0.3960	0.4040	0.4030



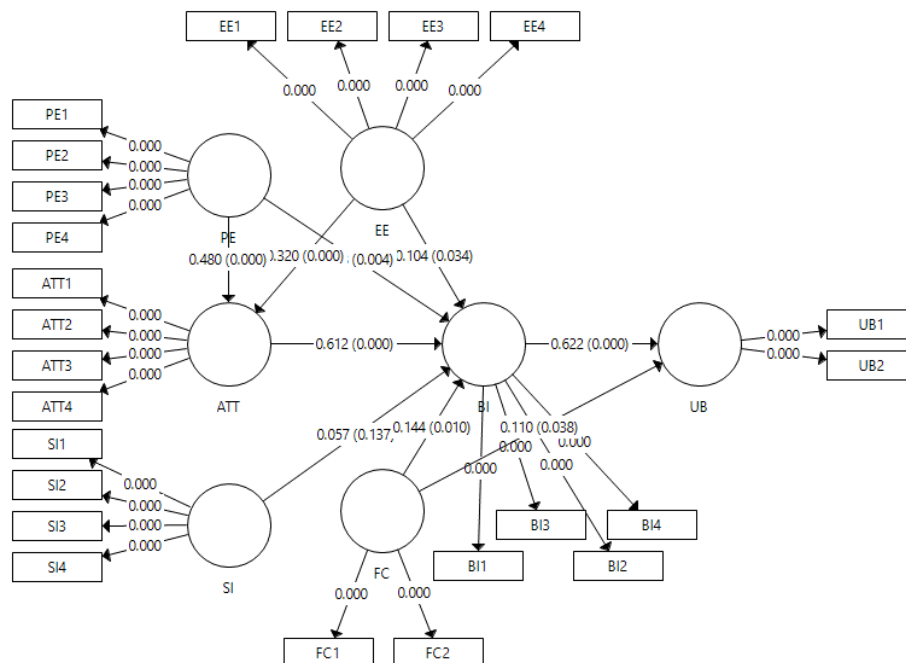


Figure 5: Results of path analysis from SmartPLS

Generally, the results of the different models indicated some consistent and inconsistent findings. For instance, the performance expectancy, facilitating conditions and attitude were found to have a significant relationship with behavioural intention in all models. Besides, performance expectancy and effort expectancy also consistently had a significant relationship with attitude in both TAM and the modified model. The significant relationship between behavioural intention and use behaviour was also acknowledged in all four models. However, inconsistent findings were found in the relationship between effort expectancy and social influence towards behavioural intention. For example, the negative significant influence of effort expectancy was found in the modified model, but an insignificant association was remarked in the UTAUT model. Similarly, the positive significant association between social influence and behavioural intention was revealed in TRA, but insignificant results were found in UTAUT and the modified model.

By focusing on the R-squared and predictive relevance amongst the four models, the results proved that the proposed modified model had the greatest explainability and predictive power than other models. For instance, the R-squared for the modified model was 63%, which was greater than others. This indicated 63% of the variance in the behavioural intention in UTAUT could be explained by the five predictors. As the predictive relevance value of all models was greater than zero, thus this signified the predictive relevance and validity of the models. Specifically, the predictive relevance ( $Q^2$ ) of the modified model (0.4330) was the

highest among all models. This proved that the proposed modified model had a superior level of determination and predictive power than conventional models. Surprisingly, even though the TRA was the oldest model with the least predictors, but the determination level and predictive power were greater than TAM and UTAUT. Hence, this indicated that the latest or complex models were not better.

The effect size ( $f^2$ ) of each predictor was evaluated and the results were presented in Table 6. The four predictors of behavioural intention in the modified model had a small effect size ( $f^2 < 0.15$ ), while attitude had a large effect size ( $f^2 > 0.35$ ) on behavioural intention. The small effect size of effort expectancy on attitude was also observed, but a moderate effect size was reported for performance expectancy. Across the four models, attitude was found to have a large effect on behavioural intention, while social influence had the least effect size. Moreover, the large effect size of behavioural intention on the use behaviour was also found in all the four models.

Table 6: Effect size ( $f^2$ )

Effect Size ( $f^2$ )	TRA	TAM	UTAUT	Modified
PE - > BI		0.3330	0.2510	0.0530
PE - > ATT				0.3340
EE - > BI		0.1490	0.0010	0.0160
EE - > ATT				0.1480
FC - > BI			0.0780	0.0380
FC - > UB			0.0180	0.0180
SI - > BI	0.0260		0.0160	0.0070
ATT - > BI	1.1080	1.4480		0.4900
BI - > UB	0.8140	0.8160	0.5820	0.5780

## 5.0 DISCUSSION

This study concluded that the proposed modified model had greater explanatory and predictive power than the other three conventional models. This provided evidence that the conventional models should be extended by incorporating other possible variables as the individuals' behavioural intention were getting complex, and thus it was difficult to be explained by the conventional models. However, it does not mean that more predictors in a model is better, which was proven in this study. For instance, the proposed modified model that consisted of five predictors towards behavioural intention had the highest R-squared and predictive relevance values, but the TRA had greater explanatory and predictive power compared to TAM

and UTAUT, although TRA had only two predictors. Surprisingly, the explanatory and predictive power for UTAUT was the least, although four predictors were included in this model.

In terms of the determination antecedents of behavioural intention, this study revealed the significant effect of performance expectancy, facilitating conditions and attitude on the Sarawak Pay users' behavioural intention and use behaviour. However, the negative significance influence of effort expectancy on behavioural intention was also reported in the modified model, but not in UTAUT. Moreover, both performance expectancy and effort expectancy had a significant association with attitude. The effects of facilitating conditions and behavioural intention on use behaviour was also proven in this study.

The performance expectancy was found to have a significant relationship with behavioural intention, thus H<sub>1</sub> was supported. The Sarawak Pay users acknowledged that the expected improvement on the payment transaction process by using mobile payment had significantly influenced their behavioural intention to use the mobile payment. This was in line with Patil et al. (2020), Liebana-Cabanillas et al. (2017), and Chawla and Joshi (2019) who also discovered the same findings. However, a reverse finding was found for effort expectancy, whereby the user perceived that the Sarawak Pay platform was not easy to use and it required a certain level of learning process before it could be applied. Thus, H<sub>3</sub> was supported, but in a negative direction. This was contradicting with the empirical evidence by Abdullah et al. (2020), Madan and Yadav (2016) and Gupta and Arora (2020).

Furthermore, the significant relationship between facilitating conditions and behavioural intention further signified the influence of technical support and backup, as well as the resources and physical environment required for the Sarawak Pay users to use the platform (H<sub>5</sub>). This implied that the users are more likely to use the Sarawak Pay when they believe the support and backup together with the resources provided by the Sarawak government are sufficient for them. The significant effect of facilitating conditions on behavioural intention was also consistent with previous studies (Abdullah et al., 2020; Madan & Yadav, 2016; Gupta & Arora, 2020; Patil et al., 2020). However, H<sub>7</sub> was rejected as the evidence found that social influence failed to influence the user's behavioural intention to use the Sarawak Pay. This showed that influences from the peer, family or someone in the social network had no impact on the user's behavioural intention to use the Sarawak Pay. However, this finding identified various results with some of the prior studies, which found that social influence had an impact on behavioural intention (Abdullah et al., 2020; Madan & Yadav, 2016; Patil et al., 2020; Kuciapski, 2017).

Subsequently, the results discovered that attitude was the most influential variable for the user's behavioural intention to use the Sarawak Pay ( $H_8$ ). This indicated that if an individual is likely or favourable to use the platform, then it will convert into actual behaviour. This finding was consistent with Liebana-Cabanillas et al. (2017), Patil et al. (2020) and Flavian et al. (2020). Lastly, the actual behaviour of the Sarawak Pay users was significantly influenced by the facilitating conditions and behavioural intention, and thus  $H_6$  and  $H_9$  were supported. This showed that the users tend to use the platform if they know that they are supported with sufficient resources and technical backup by the platform operators. Moreover, when the users have the intention to use the platform, they will use the platform in the near future. These findings were similar to Alalwan et al. (2017) and Susanto et al. (2020) who also acknowledged the significant association of facilitating conditions and behavioural intention on the use behaviour.

## **6.0 CONCLUSION, IMPLICATIONS AND LIMITATIONS**

In summary, this study examined the factors that significantly influenced the users' behavioural intention and use behaviour through the different conventional models and a modified model to offer new insights on the users' behavioural intention, especially from the Sarawak Pay, which is a mobile payment platform owned by the Sarawak government. By using the responses from the Sarawak Pay users, the results showed that the modified model that integrated TRA, TAM and UTAUT had the greatest explanatory and predictive power, compared to the conventional models. Furthermore, the findings also revealed that the users' performance expectancy, facilitating conditions and attitude were the significant determinants for behavioural intention and use behaviour. Although the effort expectancy also posited a significant impact but in a negative direction, which indicated that the effort expectancy impeded the users' behavioural intention and use behaviour. Besides, the findings also showed that social influence did not influence the users' behavioural intention.

This study applied the three conventional models and proposed a modified model to examine the users' behavioural intention to use the Sarawak Pay. The evidence showed that the proposed modified model had the greatest explanatory and predictive power compared to conventional models. However, although the TRA was not designed for the technology context, it appeared to have greater explanatory and predictive power than TAM and UTAUT that were introduced for technology acceptance behaviour. Moreover, the results also showed that attitude had the greatest impact on behavioural intention but social influence had failed to influence the user's behavioural intention. Furthermore, opposite findings of the effort

expectancy were reported, which signified that the complicated procedures of the platform would discourage or inhibit the users to use the platform. This study enriched the literature as the evidence was provided from a mobile payment platform that was provided by the government, as the owner of the platform. This might influence the behavioural intention towards the platform, which was the major difference with other mobile payment studies that mainly focused on platforms owned by private organisations.

For the managerial implications, this study had revealed the antecedents that influenced the behavioural intention of users to use the Sarawak Pay. Therefore, the operators of the Sarawak Pay platform should utilise this finding to better understand which factors are encouraging or impede the users to use their platform. For instance, attitude had the greatest influence, which indicated that nurturing the user's attitude could posit the user's intention and use behaviour to use the Sarawak Pay. Moreover, the advantages or the projected ease of use of the platform would raise the behavioural intention and use behaviour on the platform. Furthermore, sufficient support, or technical backup and resources provided by the operator of the platform also inspired the users to use the mobile payment platform. However, in this study, the users acknowledged that the Sarawak Pay was complicated and not easy to use and they need to go through a certain learning process before performing the transactions. Thus, the effort expectancy had constrained the users to use the Sarawak Pay as their mobile payment platform. Therefore, the Sarawak government should simplify the platform to nurture the usage as this could be the factor that caused the low level of users' registered rate. Therefore, with these findings, the operator is now well-informed about the drivers and inhibitors that could influence the behavioural intention to use the Sarawak Pay.

The limited generalisability is one of the limitations of this study as the responses of the samples were collected only from the Sarawak Pay users who resided in Sarawak. It is suggested that future studies should have a larger geographical focus that could include the users of different mobile payment platforms that are widely used in Malaysia to provide a better generalisability of the research findings. Moreover, this study assumed the respondents were homogenous and it did not investigate on the possible influence of the different generation, such as the young and older users, or even the influence of the income level, such as the users in the M40 and B40. Therefore, the moderation effect of age, income level or even gender could offer more interesting findings on the behavioural intention to use the mobile payment platforms. Furthermore, the difference of the Sarawak Pay from other mobile payment platforms is that it is a mobile payment platform owned by the state government. Thus, the

possible influence of government-related factors could be included to understand the determinants of the users' behavioural intention and use behaviour of the Sarawak Pay.

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## APPENDIX

### Measurement Items

#### EFFORT EXPECTANCY

- EE1: My interaction with *Sarawak Pay* would be clear and understandable.
- EE2: It would be easy for me to become skilful at using *Sarawak Pay*.
- EE3: I would find *Sarawak Pay* easy to use.
- EE4: Learning to operate *Sarawak Pay* would be easy for me.

#### PERFORMANCE EXPECTANCY

- PE1: I would find *Sarawak Pay* is useful in my daily life.
- PE2: Using *Sarawak Pay* would enable me to accomplish payment more quickly.
- PE3: Using *Sarawak Pay* would save my time.
- PE4: If I use *Sarawak Pay*, I will increase my chances of getting a higher quality of service.

#### ATTITUDE

- ATT1: I like the idea of using *Sarawak Pay*.
- ATT2: Using *Sarawak Pay* is a pleasant experience.
- ATT3: Using *Sarawak Pay* is a good idea.
- ATT4: Using *Sarawak Pay* is a wise idea.

#### SOCIAL INFLUENCE

- SI1: People who influence my behaviour think that I should use *Sarawak Pay*.
- SI2: People who are important to me think that I should use *Sarawak Pay*.
- SI3: Using *Sarawak Pay* would reflect my personality to others.
- SI4: I would use *Sarawak Pay* because my friends do so.
- \*SI5: I will use *Sarawak Pay* if the service is widely used by people in society.

#### FACILITATING CONDITIONS

- FC1: I have the resources (e.g. internet access, smartphone etc) necessary to use *Sarawak Pay*.
- FC2: I have the knowledge necessary to use *Sarawak Pay*.
- \*FC3: *Sarawak Pay* is compatible with other systems I use.
- \*FC4: A specific person (or group) is available for assistance with *Sarawak Pay* difficulties.

### **BEHAVIOURAL INTENTION**

BI1: I intend to increase the use of Sarawak Pay in the future.

BI2: I intend to use *Sarawak Pay* when the opportunities arise.

BI3: I would like to use *Sarawak Pay* for purchasing instead of traditional payment methods.  
(e.g. Cash)

BI4: I will strongly recommend to others to use *Sarawak Pay*.

### **USE BEHAVIOUR (ACTUAL USE)**

UB1: I have used *Sarawak Pay* a lot in the past.

UB2: I have been using *Sarawak Pay* regularly in the past.

\*Items have been deleted due to the low outer loading.