# Understanding the determinants of mobile banking continuance usage intention

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## Abstract

**Purpose** – The quality of people life and efficiency of banks can be improved by mobile banking (m-banking). The long-term success of m-banking depends on its constant use. The purpose of this paper is to investigate the determinants of m-banking continuance intention to use, using the technology continuance theory (TCT) by including the self-efficacy and channel preference.

**Design/methodology/approach** – Empirical data from 369 Malaysian users who had prior experience with mobile banking were analysed, using partial least squares technique.

**Findings** – The results confirmed that the TCT model had a high exploratory power in explaining users' perceived usefulness (PU), satisfaction, attitude and intentions to continue to use m-banking. Furthermore, self-efficacy and channel importance were important drivers of continuance intention in the context of m-banking. According to the results, perceived ease of use has no effect on PU and attitude in the post-adoption stage.

**Practical implications** – The findings help bank managers to understand the importance of meeting customers' needs and expectations as a prerequisite in enhancing their satisfaction and favourable attitude towards m-banking and consequently their continuance intention.

**Originality/value** – Based on the TCT model, this study contributes to the limited body of research on continuance intention to use m-banking. Furthermore, self-efficacy and channel preferences were added to the TCT model and the results confirmed the importance of enriching the TCT model to explain continuance intention to use information systems by adding contextual factors.

**Keywords** Malaysia, Mobile banking, Continuance intention, Technology continuance theory

**Paper type** Research paper

## 1. Introduction

Nowadays, self-service technologies (SSTs) reshape the relationships between organisations and customers and are widely used by firms in order to better serve their customers and inherently gain a competitive edge (Vakulenko *et al.*, 2018). The banking industry is the leading sector in providing SST (Chaouali and El Hedhli, 2019) and offers various SSTs such as automated teller machines (ATMs) and online banking, and more recently mobile banking (m-banking). Particularly, banks have started to provide m-banking to enable customers to perform banking services – including transferring money, making transactions and checking bank accounts – at anytime and place via portable technologies such as smartphones and tablets (Arcand *et al.*, 2017; Baabdullah *et al.*, 2019). M-banking has considerable value for both banks and customers. It benefits banks by reducing their operating costs and improving service quality (Giovanis *et al.*, 2019; Malaquias and Hwang, 2019) and it also benefits customers through great convenience and interactivity, instant connectivity, immediate information and time optimisation (Malaquias and Hwang, 2016; Yuan *et al.*, 2016; Zhou, 2012).

Recognising the benefits of m-banking, banks around the world have invested about $115bn in this SST (Baabdullah *et al.*, 2019) and have devoted tremendous efforts to

persuade customers to adopt m-banking. The initial adoption of m-banking has been closely dependent on the diffusion rate of smartphones (Sharma and Sharma, 2019). According to Statista (2018), around 3.7bn people across the world now use smartphones. With the encouraging increasing trend in the number of smartphone users, there is no doubt that the m-banking penetration rate will also increase. Juniper Research predicted that 1.8bn people worldwide would be using m-banking by 2019 (KPMG Analysis, 2015). In following the global trend, according to the Central Bank of Malaysia, the number of m-banking subscribers has increased significantly, from 7.3m in 2015 to 12.7m in 2018 (Thaker *et al.,* 2019). The monetary value of m-banking financial transactions in Malaysia doubled to $25bn in 2018 from 12.6bn in 2017, while the number of transactions jumped from 107.7m to 257.4m (Shankar and Jebarajakirthy, 2019). Although the adoption rate of m-banking in Malaysia is high, the long-term viability of an information system (IS) and its success depends on its continued use rather than first-time adoption (Bhattacherjee, 2001). Banks can only achieve success and recover their heavy investment in m-banking by retaining users (Yuan *et al.*, 2016). If users' enthusiasm over the initial adoption diminishes after they have gained usage experience, the m-banking services will suffer from decreased usage and may even fall into disuse. It is thus crucial for banks to understand what factors may lead to intentions to continue to use m-banking. Nevertheless, in comparison to the abundant research on the drivers of intention to adopt m-banking, the continuance intention of m-banking has seldom been examined in the literature. This study thus aims to answer the question: what are the drivers of m-banking users' continuance usage intention?

Prior studies have drawn on three theories to explain the drivers of continuance intention to use m-banking, namely, the technology acceptance model (TAM), the task-technology fit model (TTF) and the expectance-confirmation model (ECM) (Mohammadi, 2015; Susanto *et al.*, 2016; Yuan *et al.*, 2016). TAM is primarily used to explain users' pre-adoption behaviours and has several limitations in explaining the users' continuance behaviours in the post-adoption stage (Joo *et al.*, 2018). This could be explained in that the determinants of pre-adoption are not the same as the post-adoption ones (Gilani *et al.*, 2017). In contrast to the TAM, the ECM focusses on factors that affect continuance intention (Bhattacherjee, 2001) and explains continuance intention in terms of perceived usefulness (PU), perceived ease of use (PEU) and satisfaction, while users' continuance intention is not only determined by their perceptions and satisfaction, but also by attitude. The cognitive model (COGM) proposed that continuance behavioural intention should be defined as a function of both satisfaction and attitude (Oliver, 1980). Considering this, technology continuance theory (TCT) (Liao *et al.*, 2009), which incorporates TAM, ECM and COGM, was used in this study in order to provide a more comprehensive understanding of the continuance intention towards m-banking services. Although the TCT has been tested in various contexts, such as such as online learning (Dağhan and Akkoyunlu, 2016), the healthcare industry (Gilani *et al.*, 2017) and mobile taxi booking (Weng *et al.*, 2017) and has shown considerable explanatory power in explaining continuance intention, self-efficacy and channel preference were also added to the model to offset the limitations of the TCT in considering perceived behavioural control and psychographic factors and to further our understanding of the determinants of m-banking continuance intention. The importance of these two factors in explaining the continuance intention to use m-banking was discussed in the studies by Susanto *et al.* (2016), Kang, Oh and Sivadas (2012) and Kang, Lee and Lee (2012). TTF was not considered in this study, as previous studies have shown that confirmation of expectations, as a construct of the TCT, is the outcome of TTF (Cheng, 2018) and consequently including it in the model would not enhance its power in explaining continuance intention.

This study contributes to the literature in different ways. First, we used the TCT to explain continuance intention to use m-banking. This extends previous studies that used the theory of reasoned action (TRA), TTF and ECM by integrating attitude from the COGM. The main strength of the TCT is that it combines two central constructs of satisfaction and

attitude into one continuance model while retaining the well-established constructs of PEU, PU and confirmation as first-level antecedents (Gilani *et al.*, 2017). By extending the TCT to m-banking, we were able to validate the value of the model in a new technological context. Furthermore, the study attempted to enrich the TCT in the context of m-banking by including self-efficacy and channel preferences. Our findings provide a better understanding of m-banking users' continuance intention behaviour, which will help practitioners to formulate more effective strategies to retain m-banking users.

The paper has been organised as follows. In the next section, the literature review and theoretical background of the study are provided. The research model and hypotheses development are introduced in Section 3. This is followed by the key findings of this research, a detailed discussion of the results, implications and finally directions for future research.

## 2. Literature review and theoretical background

### 2.1 Technology continuance theory

The main purpose of the present study is to shed light on the post-adoption attitude towards m-banking. COGM, Expectation-Confirmation Model (ECM) and TAM are considered as the most common models that elaborate continuance intention to use ISs. Davis *et al.* (1989) developed TAM based on the TRA (Fishbein and Ajzen, 1975). According to Davis *et al.* (1989), PEU and PU are two external parameters that encourage the clients' behavioural intention to rely on IS. The TAM mainly focusses on IS initial acceptance, and has limitations in explaining the post-adoption stage (Joo *et al.*, 2018). Thus, several studies have concluded that TAM can have an enhanced explanatory power when used in combination with more factors (Lee *et al.*, 2003; Lin *et al.*, 2012).

The ECM has recently been used to explain individuals' attitudes in the continued use of IS (Choi *et al.,* 2019; Gong *et al.,* 2018; Nascimento *et al.,* 2018). The ECM was mainly employed to examine a user's continuance intention to use a system, suggesting that users' satisfaction could be regarded as the most vital parameter that determines a user's intention for continuous use. ECM is derived from the literature of clients' behaviour and it was then interwoven with empirical and theoretical outcomes from former IS use research in order to develop a new model for IS continuance (Kumar *et al.,* 2018). According to this model, users' continuance intention could be identified by their satisfaction with the PU of continued IS use and the IS use. Users' satisfaction, in turn, is readily impacted by confirmation of expectation from previous PU and IS use. Unlike TAM, ECM pays attention to factors that influence constancy and retention since it is believed that the long-term success and viability of an IS are determined by continued use rather than initial usage alone (Alraimi *et al.,* 2015; Ambalov, 2018; Wang *et al.,* 2019). Oliver (1980) developed COGM arguing that an individual's behavioural intention could be described as a function of both satisfaction and attitude.

Liao *et al.* (2009) suggested TCT as an enhanced model which explains IS continuance use. TCT is an integration of three models, namely, TAM, ECM and COGM. TCT has six variables including PEU, PU, confirmation, attitude, satisfaction and continuance intention. What specifies TCT as a good model is that it blends the two main features of satisfaction and attitude into one continuance model as it tries to gain the well-established variables of PEU and PU as first-stage antecedents (Liao *et al.,* 2009). The previous studies have indicated the significance of TCT in explaining the high proportion of continuance intention variance (e.g. Iranmanesh *et al.,* 2017; Gilani *et al.,* 2017; Weng *et al.,* 2017). The present study was based on TCT model due to its higher explanatory power in elaborating the post-adoption stage (Peng *et al.,* 2019).

### 2.2 Self-efficacy

Self-efficacy refers to an individual's determination in his or her ability to independently act a purposeful behaviour (Ajzen, 2002; Zailani *et al.,* 2014). M-banking self-efficacy describes a

person's determined decision to use m-banking system. The relationship between continuance intention to use ISs and self-efficacy has been extensively studied (Bhattacherjee *et al.,* 2008; Susanto *et al.,* 2016). Although there is a conceptual similarity between effort expectancy and self-efficacy, self-efficacy could be justifiably integrated into our extended model of TCT due to the growing significance of self-efficacy as an important part of perceived behavioural control in current theory of planned behaviour studies as well as the lack of effort expectancy in the TCT model. Self-efficacy refers to clients' individual abilities and skills that they are cognisant of after first-time use but before making a sensible decision about their continuance behaviour. It is possible to witness the reflection of self-efficacy perceptions in continuance intention (Bhattacherjee *et al.,* 2008). For example, if a client thinks that he or she is able to use m-banking system after their initial use, the client can innately be reticent towards exploiting m-banking. Accordingly, this study integrated self-efficacy into TCT construct model.

### 2.3 Channel preferences
In a multichannel service environment, such as m-banking, where users can obtain similar services through multiple alternative channels (ATM and PC-based e-banking), potential customers will have little, if any, incentive to make an investment (e.g. service fees, new mobile devices and learning effort) to have an access to the additional service channels (Wu and Wang, 2005). Channel preferences refer to the degree of freedom to choose a mobile system instead of offline or (wired) online systems, especially when choosing a hedonic purpose (Kang, Oh and Sivadas, 2012; Kang, Lee and Lee, 2012). The personal preferences have not received any attention in any post-adoption theories probably because personal preferences are irrelevant when the IS in question is the only option for potential users. Similarly, website or web-based service acceptance studies that compare one website to another do not require the consideration of the users' preferences among different channels (Kang, Oh and Sivadas, 2012; Kang, Lee and Lee, 2012). However, when various channels can be used to offer the same service, the attributes of the channels can significantly affect a customer's experience (Xu and Jackson, 2019), which will cause customer to prefer some attributes (and therefore channels) to others. Hence, channel preferences are added to the TCT construct in this study to provide a better explanation of users' continuance intention.

## 3. Model conceptualization and hypotheses development
Using TCT (Liao *et al.,* 2009), current research investigates the factors influencing the continuance usage intention of m-banking services in Malaysia (Figure 1). According to TCT, PU, satisfaction and attitude are the predictors of continuance intention. PEU, PU and satisfaction are the drivers of attitude. Satisfaction is influenced by confirmation and PU. Self-efficacy and channel preference were added to the model to extend its explanatory power.

Satisfaction refers to "a positive affective state resulting from a global evaluation of performance based on past purchasing and consumption experience" (Szymanski and Henard, 2001). Based on the ECM, the confirmation of the initial expectations of m-banking services contributes to subsequent users' satisfaction, whereas the reverse causes dissatisfaction and discontinuance intention. Previous studies identified that confirmation was positively related to satisfaction (e.g. Fu *et al.,* 2018; Peng *et al.,* 2019). For example, the study by Susanto *et al.* (2016) on smartphone banking services revealed that users' confirmation after the initial use of services had a significant effect on users' satisfaction. Based on the above discussion, the following hypothesis is developed:

*H1.* Users' confirmation of expectations on m-banking services positively affects their satisfaction with that service.

Confirmation experience can modify PU of IS, particularly when the users' primary PU is not concrete because of the uncertainty over what to expect from IS (Tsai *et al.,* 2014).
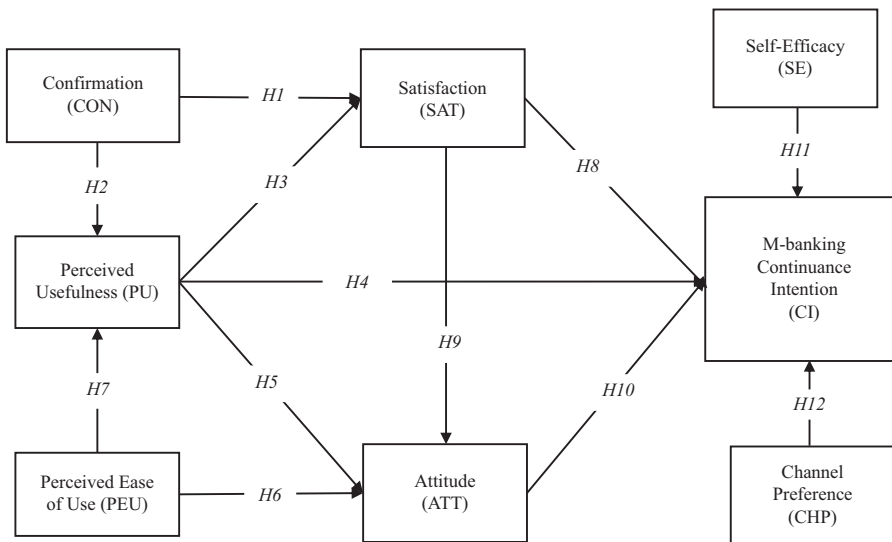
Figure 1.
Research model

For instance, clients may poorly perceive the advantage of a new technology only because they are not sure about what to expect from that technology. Nevertheless, clients are still willing to accept it so that they could build their usage experience as a basis for forming more tangible perceptions. Although in the initial stage of using IS, perception of usefulness is likely to drop, such perceptions could possibly change because of the confirmation experience as users find out that their initial perceptions seem unrealistically low. In other words, users' PU is increased by confirmation, and disconfirmation indeed is more likely to lower such perceptions which is in line with the finding of prior studies (e.g. Mou *et al.,* 2017; Sarkar and Khare, 2018; Tam *et al.,* 2018). Accordingly, we suggest the following hypothesis:

*H2.* Users' confirmation of expectations on m-banking services positively affects their PU with that service.

PU can be defined as the perception of individuals regarding the improvement of the performance by using a specific technology (Rauniar *et al.,* 2014). PU is an important predictor of behavioural intention in many contexts including the internet banking (Martins *et al.,* 2014), the web (Mou *et al.,* 2017), mobile commerce (Shaw and Sergueeva, 2019) and healthcare industry (Gilani *et al.*, 2017). The positive relationship between users' satisfaction and PU has been determined by several studies (Kumar *et al.*, 2018; Lim *et al.,* 2019; Rezvani *et al.,* 2017). Moreover, it is demonstrated that PU is a key factor to form individuals' attitude and usage intention towards use of m-banking services (Shaikh and Karjaluoto, 2015). It means that the greater the PU of m-banking services, the more positive is the attitude and the intention towards its continuous usage; thus the greater the likelihood that it will be used:

*H3.* PU significantly influences user's satisfaction.

*H4.* PU positively affects m-banking users' intention to continue using that services.

*H5.* PU significantly affects user attitudes.

PEU represents an assessment of the degree to which an individual believes that using a specific technology would be free of mental effort (Davis, 1989; Zailani *et al.,* 2015).

The results of previous studies revealed that PEU had a positive effect on attitude in context of m-banking services (Chitungo and Munongo, 2013; Munoz-Leiva *et al.*, 2017; Shaikh and Karjaluoto, 2015), which is in line with TRA. On the other hand, it is argued that PEU is a key determinant of PU in the context of mobile shopping (Hubert *et al.*, 2017; Natarajan *et al.*, 2018) and online shopping environment (Pengnate and Sarathy, 2017). It is then expected that PEU plays a significant role in users' attitude to use m-banking and has a positive relationship with PU. Therefore, the following hypotheses are developed in the current research:

*H6*. PEU has a significant effect on users' attitude.

*H7*. PEU has a significant effect on PU.

According to ECM, Bhattacherjee (2001) argues that satisfaction, which typically results from past usage, could easily affect IS continuance intention. According to the marketing literature, the level of customers' satisfaction with a product could be the primary reason for making repurchase decision, which is in fact the same concept as continuance intention towards using IT (Tran *et al.*, 2019). The positive influence of users' satisfaction on their continuance intention has been demonstrated by several studies in mobile-related research areas such as m-banking (Yuan *et al.*, 2016), mobile social networking services (Hsu and Lin, 2018) and mobile shopping (Shang and Wu, 2017). In m-banking services, users' satisfaction reflects the level of their expectation, which matches experience. Accordingly, we propose that:

*H8*. Users' satisfaction with m-banking is positively related to their continuance intention to use m-banking.

The majority of research indicates that satisfaction and attitude are distinct from a conceptual perspective, whereas some studies consider them synonymous (Gilani *et al.*, 2017). Satisfaction is defined as a transient and experience-specific affection, while attitude is relatively more enduring and transcends all preceding experiences (Taylor and Todd, 1995). Attitude is individual's perceptual evaluation of a service or product while satisfaction refers to individuals' post-purchase evaluation of a service or product (Venkatesh and Davis, 2000). It is argued that satisfaction positively influences attitude towards specific technology usage (Iranmanesh *et al.*, 2017; Yang *et al.*, 2017). Thus, we hypothesise that:

*H9*. Users' satisfaction has a positive effect on their attitude.

Attitude is defined as "the degree of a person's positive or negative feelings about performing a target behaviour" (Davis, 1989, p. 984). Based on TAM, users' behaviour towards technology use is determined by their attitude. Many studies have confirmed a positive relationship between attitude and intention to continue technology usage (Hamari and Koivisto, 2015; Manser Payne *et al.*, 2018; Wu and Chen, 2017). Therefore, attitude is expected to be a significant determinant which predicts users' intention towards the usage of m-banking. Accordingly, we propose the following hypothesis:

*H10*. Attitude has a positive effect on users' continuance intention to use m-banking.

Previous studies on ISs have shown that self-efficacy has a positive role in driving one's intention to continue using an IS (e.g. Susanto *et al.*, 2016; Thakur, 2018). Individuals with higher m-banking self-efficacy are more likely to use m-banking to do their banking tasks. It means an individual with high m-banking self-efficacy is expected to have higher intention to continue using m-banking. As such, the following hypothesis is developed:

*H11*. Self-efficacy has a positive effect on users' continuance intention to use m-banking.

At the post-adoption stage, the channel that will be preferred is most likely the one that the customer is most comfortable with (Richard and Purnell, 2017). For those who enjoy using mobile devices more than other activities and the ones that use mobile device more than interacting with others, m-banking may be the preferred channel, whereas for others PC-based e-banking or ATM banking may be the preferred channels. As such, the following hypothesis is developed:

*H12.* Channel preferences have a positive effect on users' continuance intention to use m-banking.

## 4. Methodology
### 4.1 Measurement of constructs
To test the hypotheses, a survey with two parts was used. The first part comprises a set of items to measure the theoretical constructs in the research framework, and the second part identifies the demographic information of the sample. The survey items were adapted from previously published sources to ensure content validity. Scales of PEU and PU were taken from Venkatesh and Davis (1996, 2000). To measure confirmation and users' satisfaction, three and four items were drawn from Bhattacherjee (2001). Measurement indicators related to the attitude were derived from Schierz *et al.* (2010). The items of self-efficacy and channel preferences were adapted from Susanto *et al.* (2016), Kang, Oh and Sivadas (2012) and Kang, Lee and Lee (2012), respectively. The three items of users' continuous usage intention was adapted from Cheng *et al.* (2006). The items were measured using a five-point Likert scale anchored by "strongly disagree" and "strongly agree". The measurement items can be found in Table II.

### 4.2 Sampling and respondents' profile
The study used non-probability convenience sampling to recruit the target respondents. Data were collected at branches of two selected banks in Kuala Lumpur, chosen based on the number of their m-banking users – Maybank and CIMB Bank. Using a survey, data were collected within two weeks in June 2018. Permission to approach bank customers was requested from each of the bank's branch managers prior to data collection. Target subjects were individual customers based on their experience in m-banking services. Participants were approached in person in the bank branches and asked to fill in the questionnaires. A token of appreciation was given to those who successfully completed the survey. A total of 392 responses were received, of which 369 seemed usable for further analysis (23 responses were excluded because the respondents indicated that they had no experience in making transactions using m-banking). Among them, 59.1 per cent were female and 40.9 per cent were male. As for age, most of respondents were in their 30s (39 per cent) followed by 20s (28.7 per cent). Regarding their educational level, most of them (71.5 per cent) were at the university level. Furthermore, the majority of respondents (73.2 per cent) had more than two years of experience in m-banking services. Table I illustrates a detailed description of the respondents' demographic characteristics.

### 4.3 Data analysis
We used partial least squares (PLS) with SmartPLS 3.0 software to test the hypotheses (Ringle *et al.*, 2015). PLS is chosen in preference to the covariance-based SEM technique for the current research due to the prediction-oriented feature of the current research, which aims to evaluate how well the exogenous constructs can predict the endogenous constructs (Kim *et al.*, 2019; Minh *et al.*, 2019). Based on Anderson and Gerbing's (1988) suggestion, this study followed a two-step analytical approach in which the measurement model was tested first, followed by the structural model (see Ali *et al.*, 2019; Foroughi *et al.*, 2019).

| Demographic factors | Category | Frequency | Percentage |
|---|---|---|---|
| *Gender* | | | |
| | Male | 151 | 40.9 |
| | Female | 218 | 59.1 |
| *Age (in years)* | | | |
| | Below 20 | 25 | 6.8 |
| | 21–30 | 106 | 28.7 |
| | 31–40 | 144 | 39 |
| | 41–50 | 64 | 17.3 |
| | Above 50 | 30 | 8.1 |
| *Marital status* | | | |
| | Single | 175 | 47.4 |
| | Married | 194 | 52.6 |
| *Education* | | | |
| | Secondary school | 33 | 8.9 |
| | High school or diploma | 72 | 19.5 |
| | Bachelor degree | 185 | 50.1 |
| | Postgraduate qualifications | 79 | 21.4 |
| *Experience in m-banking services (in years)* | | | |
| | Less than 2 | 99 | 26.8 |
| | Above 2 | 270 | 73.2 |

**Table I.**
Respondents'
demographic profile

## 5. Results

### 5.1 Measurement model

Initially, the measurement model was tested to evaluate convergent validity using factor loadings, average variance extracted (AVE) and composite reliability (CR). As can be seen in Table II, all the item loadings were more than 0.70; AVE values were well above 0.5, and CR values were higher than the commonly used 0.70 threshold, thus supporting the measures' convergent validity (Hair *et al.*, 2017).

To test the discriminant validity, current research draws on currently introduced Heterotrait–Monotrait (HTMT) criterion (Henseler *et al.*, 2015) instead of traditional approaches (Fornell and Larcker, 1981). The results of Table III demonstrated that all the HTMT values were lower than 0.85 (Kline, 2016) and that the criterion for discriminant validity was fulfilled.

### 5.2 Structural model

To assess structural model, current research followed Wetzels *et al.*'s (2009) suggestion by looking at the path coefficient and their corresponding *t*-statistics via bootstrapping procedure with a resample of 2000 (see Nikbin *et al.*, 2014; Zailani *et al.*, 2019), and the values of $R^2$ for endogenous constructs. Based on the analysis, PU and confirmation contributed to user satisfaction, while confirmation affected PU. However, the impact of PEU on PU and attitude was not supported. Users' attitude was found to be strongly predicted by the role of both satisfaction and PU. The findings of this study demonstrated that self-efficacy, channel performance, attitude, satisfaction and PU are supported in having a significant effect on continuance use intention. Satisfaction, attitude, PU, self-efficacy and channel performance explain 67.1 per cent of users' continuance intention to use m-banking services ($R^2 = 0.671$). In addition, the results show that the model is capable of explaining 36.3 per cent of variance in satisfaction, 36.5 per cent of that in attitude and 16.6 per cent of that in PU. By running a

| Constructs/IDs | Items | Loadings | CR | AVE | Sources |
|---|---|---|---|---|---|
| Confirmation (CON) | My experience with using m-banking was better than what I expected | 0.855 | 0.856 | 0.665 | Bhattacherjee (2001) |
| | The service level provided by m-banking was more than what I expected | 0.794 | | | |
| | Overall, most of my expectations from using m-banking were confirmed | 0.796 | | | |
| Perceived usefulness (PU) | Using m-banking enables me to access banking services more quickly | 0.779 | 0.909 | 0.667 | Venkatesh and Davis (1996, 2000) |
| | Using m-banking makes it easier to access banking services | 0.862 | | | |
| | Using m-banking enhances the effectiveness of my banking activities/services | 0.838 | | | |
| | Using internet banking would improve the quality of the banking transactions performed | 0.828 | | | |
| | I find m-banking to be useful for my banking needs | 0.774 | | | |
| Perceived ease of use (PEU) | Learning to operate m-banking is easy for me | 0.784 | 0.911 | 0.671 | Venkatesh and Davis (1996, 2000) |
| | It is easy to use m-banking to accomplish banking services | 0.794 | | | |
| | Interaction with m-banking does not require a lot of mental effort | 0.902 | | | |
| | My interaction with m-banking is clear and understandable | 0.825 | | | |
| | I find it easy to get m-banking to do what I what it to do | 0.787 | | | |
| Satisfaction (SAT) | I am satisfied with the m-banking | 0.764 | 0.863 | 0.612 | Bhattacherjee (2001) |
| | I am pleased with the m-banking | 0.797 | | | |
| | I am contented with m-banking | 0.808 | | | |
| | I am delighted with m-banking | 0.760 | | | |
| Attitude (ATT) | Using m-banking services is a good idea | 0.820 | 0.876 | 0.702 | Schierz et al. (2010) |
| | Using m-banking services is a beneficial | 0.833 | | | |
| | Using m-banking services is a wise idea | 0.859 | | | |
| M-banking continuance intention (CI) | I would continue to use the IB for my banking needs | 0.800 | 0.849 | 0.652 | Cheng et al. (2006) |
| | Continuing to use the IB for handling my banking transactions is something I would do in the future | 0.823 | | | |
| | I would continue to see myself using the IB for handling my banking needs | 0.799 | | | |
| Self-efficacy (SE) | I can perform my banking needs using mobile banking even if there is no one around to help me | 0.736 | 0.852 | 0.590 | Susanto et al. (2016) |
| | I can perform my banking needs using mobile banking if I have adequate time to complete them | 0.747 | | | |
| | I can perform my banking needs using mobile banking using only a simple manual or online help for reference | 0.796 | | | |
| | I am confident enough in my ability to perform my banking needs using mobile banking | 0.791 | | | |
| Channel preference (CHP) | I prefer to use mobile devices over other communication devices | 0.823 | 0.866 | 0.682 | Kang, Oh and Sivadas (2012) and Kang, Lee and Lee (2012) |
| | I enjoy using mobile devices more than other activities | 0.836 | | | |
| | I enjoy using mobile devices more than interacting with other people | 0.819 | | | |

**Notes:** CR, composite reliability; AVE, average variance extracted

| | ATT | CHP | CON | CI | PEU | PU | SAT | SE |
|---|---|---|---|---|---|---|---|---|
| ATT | | | | | | | | |
| CHP | 0.644 | | | | | | | |
| CON | 0.475 | 0.476 | | | | | | |
| CI | 0.803 | 0.832 | 0.612 | | | | | |
| PEU | 0.226 | 0.221 | 0.324 | 0.217 | | | | |
| PU | 0.626 | 0.782 | 0.496 | 0.788 | 0.163 | | | |
| SAT | 0.689 | 0.802 | 0.540 | 0.804 | 0.263 | 0.678 | | |
| SE | 0.827 | 0.795 | 0.536 | 0.815 | 0.256 | 0.822 | 0.815 | |

**Table III.**
Hetrotrait–Monotrait
ratio (HTMT) test

**Notes:** ATT, attitude; CON, confirmation; CI, continuance intention; PEU, perceived ease of use; PU, perceived usefulness; SAT, satisfaction; SE, self-efficacy; CHP, channel performance

blindfolding procedure, the finding shows that $Q^2$ value for PU, satisfaction, attitude and continuance intention was not less than 0 specify acceptable predictive relevance (Fornell and Cha, 1994) (Table IV and Figure 2).

## 6. Discussion and conclusion

Founded by TCT, the present study investigated the determinants of users' continuance intention in the context of m-banking services. The findings indicated that satisfaction, attitude, PU, self-efficacy and channel preferences had the power to explain 67.1 per cent of the variance in continuance intention, thus providing evidence that the extended model of TCT has a high explanatory power to explain the continuance intention to use m-banking system. The results demonstrated that all the proposed hypotheses were accepted, except for the impacts of PEU on attitude and PU.

The results showed that users' confirmation of expectations regarding m-banking services had a positive effect on their satisfaction with m-banking. This result is in line with the findings of Iranmanesh *et al.* (2017) and Yuan *et al.* (2016). However, the relationship between PEU and PU was not supported, which is contrary to our expectation and to the results of Hubert *et al.* (2017) and Natarajan *et al.* (2018). There are three potential reasons for the non-significant relationship between PEU and PU. First, since most of the respondents in our study were young consumers, who are generally regarded as an IT-savvy group, they would not usually face any difficulties in using technologies such as m-banking systems. Second, the user-friendly interface design of the current m-banking systems and the similarity of their interface to the banks' websites with which customers have experience

| Hypotheses | Relationships | Std. $\beta$ | $t$-Statistics | Decision | $Q^2$ | $R^2$ |
|---|---|---|---|---|---|---|
| H1 | CON → SAT | 0.230 | 4.043** | Supported | 0.208 | 0.363 |
| H2 | CON → PU | 0.395 | 8.256** | Supported | 0.104 | 0.166 |
| H3 | PU → SAT | 0.471 | 9.931** | Supported | | |
| H4 | PU → CI | 0.313 | 5.847** | Supported | | |
| H5 | PU → ATT | 0.311 | 5.654** | Supported | 0.240 | 0.365 |
| H6 | PEU → ATT | −0.068 | 1.364 | Not supported | | |
| H7 | PEU → PU | −0.041 | 0.842 | Not supported | | |
| H8 | SAT → CI | 0.224 | 4.391** | Supported | 0.412 | 0.671 |
| H9 | SAT → ATT | 0.352 | 6.086** | Supported | | |
| H10 | ATT → CI | 0.167 | 4.176** | Supported | | |
| H11 | SE → CI | 0.118 | 1.942* | Supported | | |
| H12 | CHP → CI | 0.165 | 3.178** | Supported | | |

**Table IV.**
Structural model
path analysis
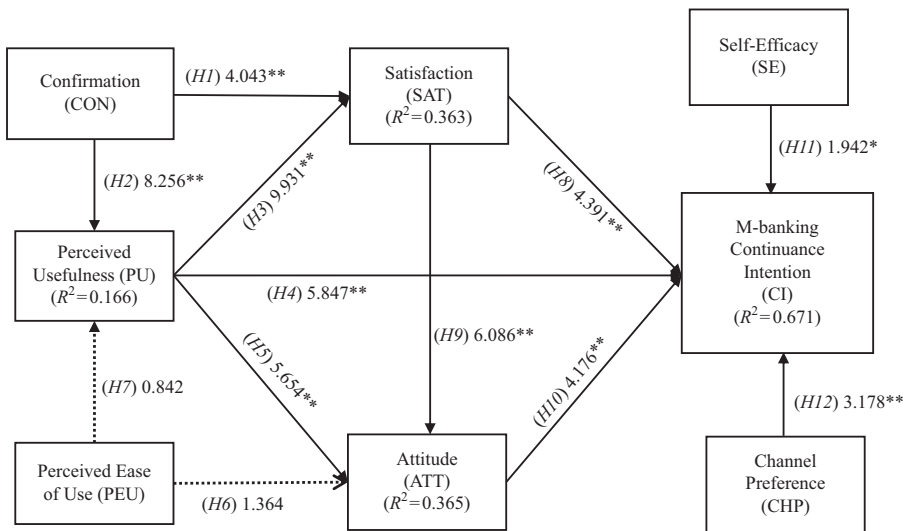
**Notes:** *$p < 0.05$; **$p < 0.01$

**Notes:** The dotted lines indicate non-significant paths. *$p<0.05$; **$p<0.01$

mean that PEU might lose its importance in shaping customers' perceptions of usefulness. Third, the data were collected from individual customers who had experience with the m-banking system and consequently were familiar with the features of m-banking, meaning that ease of use might not be a concern for them. The non-significant impact of PEU and the significant effect of confirmation on PU suggested that banks should try to understand their clients' expectations of m-banking services, and upgrade these services in terms of users' requirements in order to better satisfy their needs.

According to these results, both PU and confirmation had a positive effect on users' satisfaction with m-banking systems, which is consistent with the findings of Iranmanesh *et al.* (2017) and Gilani *et al.* (2017). These results suggest that greater satisfaction is gained through beliefs that an IS system is useful, and also through meeting the pre-experience expectations. Therefore, banks need to establish and maintain close relationships with their customers in order to understand their needs and expectations from an m-banking system (Hwang *et al.,* 2016; Jie *et al.,* 2015). Furthermore, a close and long-term relationship between banks and m-banking vendors is needed to ensure that these identified needs and expectations are reflected in the m-banking system. Through establishing close relationships with both customers and vendors, the customers' expectations are kept consistent with the vendor's ability to meet the customers' needs, as the meeting of expectations is correlated with customer satisfaction (Yu *et al.,* 2013). As such, it is reasonable to expect that customer satisfaction will rise if close relationships are built with customers and vendors and mutual knowledge is created.

The results showed that attitude was predicted jointly by two factors, namely; PU and satisfaction. Previous studies emphasised the indisputable role of satisfaction and PU in building attitude (Hsu *et al.,* 2014; Huang *et al.,* 2012). The relationship between PEU and attitude was not supported, which is not consistent with the findings of Munoz-Leiva *et al.* (2017) and Chitungo and Munongo (2013), who studied the relationship between these two constructs in the m-banking pre-adoption stage. Gilani *et al.* (2017) studied the impacts of PEU in both pre- and post-adoption stages and found that although PEU is an important driver of attitude in the pre-adoption stage, it has no effect in the post-adoption stage. Experience and

familiarity with the system is the potential reason why PEU played an insignificant role in shaping m-banking users' attitudes. These results imply that m-banking users would have a positive attitude towards this IS if they perceive that using m-banking could facilitate their transactional and banking activities and are satisfied with their post-usage experience. Therefore, banks should understand the expectations of customers to enhance their perceptions of usefulness, satisfy their needs and assist them in developing a positive attitude.

The results showed that m-banking continuance usage intention was positively influenced by PU, satisfaction, users' attitude, self-efficacy and channel preferences. The significant effects of PU, satisfaction and users' attitude on continuance usage intention were also confirmed in the study of Gilani *et al.* (2017). This means that users are willing to continue using m-banking if they find it useful for their banking and transactional activities, are satisfied with their usage experience, and have positive attitudes towards using m-banking system; otherwise, they will switch to traditional or online banking. Hence, banks need to provide service accurately with high speed, provide new m-banking features opportunely and ensure stability of the system in order enhance users' PU, satisfaction and attitude towards using m-banking (Yuan *et al.*, 2016). The significant impact of self-efficacy on continuance intention reflects the results of Susanto *et al.* (2016). As suggested by the extended TAM, self-efficacy has a positive effect on customers' behavioural intentions. The present findings suggest that compared to those with higher self-efficacy, clients with low confidence in using m-banking are more likely to have lower continuance intention. As such, the banks need to strategize properly to develop the customers' self-efficacy in m-banking. For instance, m-banking service providers can provide training videos to increase customers' familiarity with different features of the system. Furthermore, banks can also provide a "frequently asked questions and answers" section related to the available features of the m-banking system, the security of the system and the process of using m-banking features. The significant impact of channel preferences on continuance intention to use m-banking services reflects the results of Kang, Oh and Sivadas (2012) and Kang, Lee and Lee (2012). It means that the individuals who prefer mobile to other communication devices and enjoy using mobile more than other activities are more likely to continue using m-banking in comparison to other customers. Customers' beliefs in performance-related outcomes and perceived risks towards m-banking are important drivers of users' m-banking preference (Looney *et al.*, 2008). Thus, m-banking service providers need to enhance performance-related outcomes by offering more features. Furthermore, the banks need to prioritise the security of m-banking systems and provide a statement of guarantees to enhance users' perceptions of security. In addition, appropriate marketing and communication strategies are needed to demonstrate the usefulness and security of m-banking systems.

## 7. Theoretical and managerial implications

The present study has several theoretical implications. First, to the best of the authors knowledge, this study was the first attempt in using TCT in explain users' continuance intention to use m-banking. The results indicate that TCT is a powerful model in explaining not only m-banking users' continuance intention, but also users' attitude, satisfaction and PU. Second, the insignificant effect of PEU on both PU and attitude towards m-banking supports the ideas that PEU will lose its importance in the case that the users have experience with the system and consequently become familiar with it. Third, self-efficacy and channel preference were two additional identified constructs relevant to m-banking continuance intention. The two constructs are absent in TCT model. It was found that both factors significantly increased the variance in continuance intention towards m-banking.

The present study has also a number of implications for m-banking service providers. A thorough understanding of the determinants of the users' continuance intention towards

m-banking will help the service providers to identify the factors that contribute to continuous m-banking use. With such understanding, the m-banking service providers can improve their system and to ensure its continued use after the first adoption. The significant impact of self-efficacy on m-banking continuance intention suggests that m-banking service providers should provide training videos and "frequently asked questions" sections to enhance users' familiarity with the system and consequently improve their self-efficacy. The significant effect of channel preference on continuance intention suggests the need to enhance the m-banking system's features and security and communicate its usefulness and security to customers to address the performance-related outcomes and customers' concerns and ensure that m-banking is their preferred channel. The significant impacts of PU, satisfaction and attitude on continuance intention to use m-banking, the effects of PU and satisfaction on attitude, the effects of PU and confirmation on attitude, and the impact of confirmation on attitude highlight the important roles of confirmation and PU in the process of deciding to continue using an m-banking system. As such, m-banking service providers need to establish and maintain relationships with customers and vendors to ensure that the system is able to meet customers' needs and expectations. M-banking service providers should meet their users' pre-adoption expectations, which will result in satisfaction and affect continuance intention. In contrast, if m-banking service providers do not meet users' pre-adoption expectations, then it is possible that they will experience a continuing loss of users. As Sripalawat *et al.* (2011) mentioned, many users who select the m-banking channel do so because of its convenience. So banks should promote the benefits in terms of doing transactions conveniently, anytime and anywhere. It is worth highlighting that prior studies have found that user expectations change over time (Liao *et al.,* 2009). The external environment and competitors can influence user expectations (Hsu *et al.,* 2014). Practitioners should pay attention to identifying changes and respond quickly to these changes. The findings of this study could be useful for the other countries where the m-banking penetration rate is high and where banks want to maintain their current m-banking users.

## 8. Limitations and future research
Although this study successfully accomplished its objectives, its limitations should be considered before generalising the results. First, the majority of respondents in this research (67.8 per cent) were aged between 20 and 40 years old, so the findings might be biased and have limitations in explaining the continuance behaviour of users older than 40 years. Although the distribution of the respondents' ages is representative of the Malaysian population, future studies should test the model of this study among older individuals to shed light on the determinants of their intention to continue to use m-banking systems. Second, the study proposed a number of practices including, communicating security and new features to customers, providing training videos and frequently asked questions, and integration with customers and vendors, in order to enhance m-banking users' intention to use m-banking. Future empirical research is needed to test the impacts of these practices on continuance intention to use m-banking.

## 9. Conclusions
Users' continuance intention is important for the further and full success of an m-banking system. In this study, an extended version of the TCT incorporating self-efficacy and channel preference was used to investigate the drivers of m-banking continuance intention. The findings of this study demonstrated that self-efficacy, channel performance, attitude, satisfaction and PU had an important influence on continuance use intention. Satisfaction and PU played significant roles in shaping customers' attitudes towards m-banking. Furthermore, the results demonstrated the impacts of confirmation and PU on customers' satisfaction with m-banking systems. Finally, the relationship between confirmation and PU

was confirmed. However, the results indicated that PEU is not a predictor of attitude and PU in the post-adoption stage. The findings of this research not only contribute to the literature on m-banking, but also provide valuable information to enable banks and their marketing managers to understand the factors that may motivate m-banking users to continue to use this system.

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