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The adoption of e-banking among rural SME operators in Malaysia :

An integration of TAM and TPB

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Abstract

To enhance the growth of productivity among small to medium enterprises (SMEs) in Malaysia indeed is a challenging task. Several policies were introduced by the government to encourage the use of technology in rural areas. This study integrates the Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) models on rural SME operator's intention to adopt e-banking. Consistent with past studies, the present study results support the structural relationship among the constructs. Perceived usefulness (PU) and attitude play the primary roles in predicting the SME operators' intention to use e-banking. Attitude can be influenced by perceived usefulness (PU) and perceived ease of use (PEOU). Therefore, to encourage the use of e-banking, banks should (1) promote the usefulness of e-banking, and (2) educate more rural business operators to use e-banking so that they can learn to operate e-banking easily. The impact generated by subjective norms (SN) is relatively low because the rural business people are familiar with banks' operation affairs and is not computer illiterate. This corroborates the government's policy to educate the rural people on computer applications. In summary, the banks' management should consider the business operators' behavioural beliefs when strategizing their e-banking promotion plans.

Key Words: Integration between TAM and TPB, Behavioural belief, Normative belief, Ability to control skills and resources

Introduction

E-banking or online banking is composed of mobile banking and internet banking

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(Laforet & Li 2005; Sripalawat et al., 2011). Mobile banking can be accomplished by using both wired and wireless devices. E-banking provides various services, such as payments of bills, purchases of banks' products, monetary transfer between customers' accounts, viewing bank statements and account balances, and loan application. Usage of e-banking services is growing rapidly because the banks' customers can bypass the time-consuming counter service by using e-banking anytime and anywhere via online services.

In Malaysia, small and medium enterprises (SMEs) are defined as follows. According to Bank Negara Malaysia in its e-circular dated 6 Nov 2013, an SME is one in which the sales turnover of manufacturing SMEs is less than MYR50 million or employment less than 200 full-time employees. For services and other sectors, the sales turnover should not exceed MYR20 million or not more than 75 workers. The SMEs in Malaysia contributed 32% to the nation's gross domestic product in 2013 and the contribution is expected to rise to 41% by 2020, said Datuk Seri Mustapa Mohamed, the Minister of International Trade and Industry (MITI) (The Star online, Feb 18, 2014).

Multi-national companies have begun to include local SMEs in their global supply chain operation. In the near future, the local SMEs should be able to expand into the export market. Online financial services are expected to be one of the main instruments used in global business. Therefore, wide availability of online services could enhance rural SMEs' usage of e-banking for the development of local economic sectors such as manufacturing, agriculture and tourism. Nevertheless, encouraging the use of e-banking among rural SMEs indeed is a challenging task. Researches on investigating factors that can improve e-banking users' satisfaction and loyalty have long been studied. Yet, comprehensive research studying the relationships between e-banking adoption and the following variables among SME operators in Malaysia's rural areas — behavioural belief, normative belief, and ability to control skills or resources — are less common.

This article will examine the structural relationships between the six constructs from the perspective of rural SME operators' perception: namely, perceived usefulness (PU), perceived ease of use (PEOU), attitude (A), subjective norm (SN), perceived behavioural control (PBC) and intention to use e-banking through integrating the Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) model.

Generally, this article makes two contributions. From the perspective of management, the study's findings can assist bank management to develop adaptive promotional and management strategies in an online context. From the perspective of a theoretical contribution, it underlines the importance of integrating TAM and TPB to better understand the rural SME operators' intention to adopt a relatively new technology system in banking.

Theoretical Frameworks of Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB)

In the context of the adoption of e-banking in rural areas, TRA (Fishbein and Ajzen, 1975) is used in this study to explain the relationships between the SME operators' attitude towards the use of e-banking (intention to use e-banking will increase if perceptions of outcomes are positive), subjective norm (pressures from others to perform or not to perform certain behaviours), intention to use e-banking, and actual usage of e-banking.

However, additional constructs need to be included to better reflect the adoption of a new emerging technology. Davis (1989) suggested two new constructs be incorporated into his

revised TRA model, or TAM. The first construct, PEOU is used in this study to refer to individuals’ perceived worries, problems and restrictions that need to be faced upon using e-banking. If the persons feel that it is not difficult to use a new technology, they are expected to have a higher intention to adopt the e-banking system. The second construct, PU, is used in this study to assess individuals’ perception of the usefulness of e-banking. If the technology is perceived to be useful in their work or life, they may express greater intention to use e-banking. PU is not only expected to have a direct effect on individuals’ behavioural intention, but also partially mediates the effect of PEOU on the intention to adopt e-banking (Davis, Bagozzi, & Warshaw, 1989). Many past studies concluded that the TAM’s fundamental constructs, PU and PEOU, played an important role in explaining rural people’s intention to use e-banking (Luarn & Lin, 2005; Dasgupta et al., 2011).

Fishbein and Ajzen (1975) extended the TRA model as well by including a new variable, perceived behavioural control (PBC). PBC incorporates the factors that may encourage or inhibit individuals’ performance of certain actions. PBC is composed of two components: (1) individuals’ ability to use an e-banking computer application, termed as self-efficacy and (2) the availability of facilitating conditions such as government and technological supports that are required to engage individuals to use e-banking (Wadie Nasri & Lanouar Charfeddine, 2012).

The TAM and TPB models are integrated for this study because rural SME operator’s intention to adopt a relatively newly emerging technology depends not solely on their behavioural belief, but also on an individual’s normative belief, and their ability to control their skills and resources.

Current Research Model

The authors integrate the TAM and TPB model so that the current study can produce a more robust model to predict SME operator’s intention to use e-banking in the rural areas of Malaysia. Figure 1 shows the research model of the study.

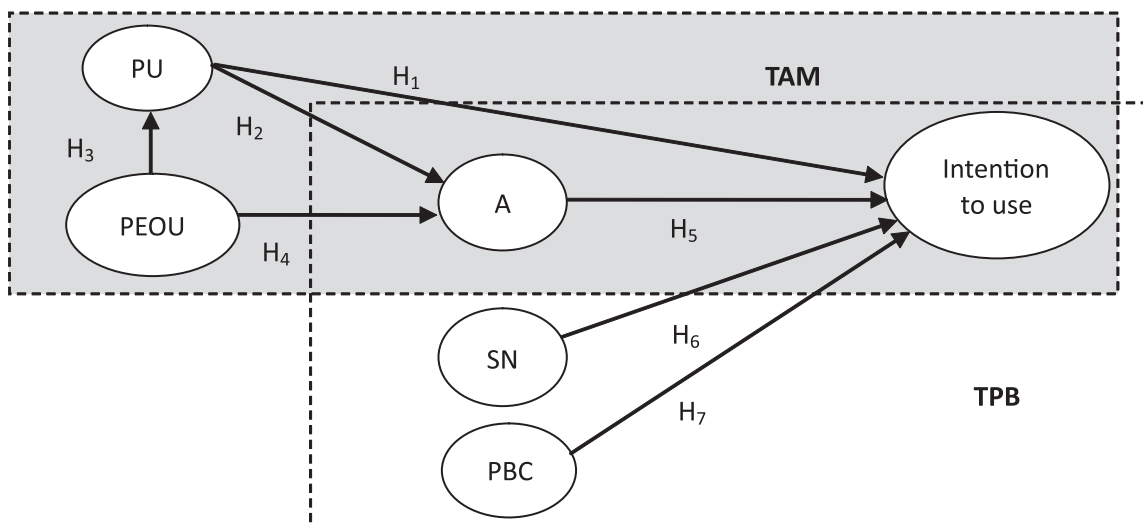


Fig. 1 Proposed research model

Development of study's hypotheses

PU reflects the degree to which a person believes that using a particular system would enhance his or her job performance (Davis et al., 1989). Many studies have supported the (1) direct effect of PU on individuals' behavioural intentions (Luarn & Lin, 2005; Pavlou & Fygenson, 2006; Gu, Lee, & Suh, 2009; Dasgupta et al., 2011); and (2) indirect effect PU could create (mediated by individuals' attitudes), on a person's intention to use e-banking as well (Lee, 2009; Wadie Nasri & Lanouar Charfeddine, 2012). Therefore, this study predicts that the tendency to use e-banking will increase if the users perceive that the self-serviced banking operation will improve.

- **H1:** PU can influence SME operators' intention to use e-banking positively
- **H2:** The attitudes of SME operators can mediate the effect of PU on their intention to use e-banking

PEOU refers to the degree to which the customer feels a particular technology will be easy to learn and use (Davis et al., 1989). TAM explains that the effect of PEOU on individuals' intention to use e-banking is mediated by their PU and attitudes toward the service (Davis et al., 1989). The indirect relationships between the three constructs are supported by studies conducted by Lee (2009), and Wadie Nasri and Lanouar Charfeddine (2012). This implies that if e-banking is perceived as easy to use, (1) the users' performance in completing the banking affairs will improve, and (2) the person will develop favourable attitudes which will lead to higher intention to adopt the system. Therefore, this study proposes the following hypotheses:

- **H3:** The effect of PEOU on consumers' intention to use e-banking is mediated by PU
- **H4:** The attitudes of SME operators can mediate the effect of PEOU on their intention to use e-banking

In forming an attitude towards the use of e-banking, individuals will first view and evaluate the alternative outcomes that can be generated from their behaviour. Individuals will have a positive attitude toward e-banking if they favour the outcome generated by using e-banking, such as the time saved. Many past studies (Pavlou & Fygenson, 2006; Lee, 2009; Wadie Nasri & Lanouar Charfeddine, 2012) supported the hypothesis; therefore we tested the following hypothesis:

- **H5:** A favourable attitude positively influences a user's intention to use e-banking

Studies conducted by Pavlou and Fygenson, (2006); Lee, (2009); and Wadie Nasri and Lanouar Charfeddine, (2012) showed that subjective norm (SN) had a direct positive effect on consumers' intention to use e-banking. SN assesses the influence of referents' opinions on motivating an individual's behavioural intention to use e-banking based on somebody's opinions or feelings rather than on facts or evidence. If a person's social network such as relatives, friends and acquaintances imposes a stronger pressure, that person is expected to have a higher intention towards a specific behaviour. Therefore, it is reasonable to conclude that SN can affect an individuals' intention to use e-banking.

- **H6:** Subjective norm positively influence user's intention to use e-banking

Perceived behavioural control (PBC) is composed of two dimensions: self-efficacy (SE) and controllability (Pavlou & Fygenson, 2006). Self-efficacy refers to a person's capability to use the online system for banking matters. If the person feels that he or she could use the online application to complete their banking affairs, the intention to use the system will increase (Luarn & Lin, 2005; Pavlou & Fygenson, 2006; Gu, Lee, & Suh, 2009; Lee, 2009; Wadie Nasri & Lanouar Charfeddine, 2012; Yu, 2012). Controllability refers to an individual's ability to manoeuvre the technological support given by the public and private sector. If the person feels that his or her ability to complete the e-banking application will be enhanced after getting technical support from these resources, the behavioural intention to use e-banking will be positive. Therefore, it is expected that the relationship between PBC and the intention to use e-banking is as follows.

- **H7:** Perceived behavioural control positively influences a user's intention to use e-banking

Research Methodology

Measuring the constructs

To ensure content validity, the items used to measure the study's constructs were adapted from past studies for the context of online banking in this study. Items for PEOU and PU were modified from the following past studies, Lee (2009), and Wadie Nasri and Lanouar Charfeddine (2012). Each of the three items for PBC and SN were adapted from Lee (2009). The four items used to measure the construct of attitude were adopted from Wadie Nasri and Lanouar Charfeddine's (2012) study. The items of the construct of intention to use were adopted from Gu, Lee, and Su (2009).

The items' proposition was designed by using a seven-point Likert scales, ranging from "strongly disagree" to "strongly agree". Pilot tests were undertaken to test selected SME operators' understanding of the questionnaire's propositions.

Data collection procedure

The study data was gathered in November, 2013 from a sample of SME respondents who live in two rural areas. A questionnaire was prepared in two languages, English and the national language; Bahasa Malaysia. This is to ensure the Malay respondents (the main ethnicity in Malaysia) could understand the questionnaires better. Questionnaires were distributed to the respondents by visiting small and medium enterprises located in the study areas.

Quota sampling is employed in this study. First, two rural areas were selected for data collection: Pendang, located in Kedah state and Felda Ijok, in the state of Perak. The determining factors for the selection of the research locations are that the locations comprise economic development corridor zones in rural areas and that they have internet connections. Secondly, in each location, questionnaires were distributed using convenience sampling in order to gather data from various sectors of SME operators.

Data Analysis

To analyse the current research model, structural equation modelling (SEM) is used to investigate the relationships among the multiple interrelated constructs and dependent

construct simultaneously. Smart PLS software is used to estimate the partial least squares (PLS) regression. This analysis method is less restrictive and suitable for smaller sample size studies and in the situation when collinearity may exist among factors. The constructs validity is tested using convergent and discriminant validity analyses. Cronbach’s alpha and composite reliability were conducted to test the constructs’ reliability.

Data Findings

Descriptive analysis

The study collected 124 answered questionnaires. 85.6% of the respondents were aware of the availability of e-banking services. This finding corroborates banks’ decisions to promote the application of e-banking in rural areas of Malaysia. However, only 67.8% of the respondents were using e-banking although 84.7% of them trust that their e-banking transaction can be done properly. Although the findings show that respondents were aware of and trust the e-banking service, only a small portion has chosen to use the services even though, almost all SME respondents owned a computer and/or mobile phone. Consequently, it is useful to find the reasons that have impeded the respondents’ intention to use e-banking.

Validity, reliability and multicollinearity analyses

Convergent validity is a test conducted to assess whether the items used to measure a construct provide a similar or convergent result. Three criteria can be used to measure the convergent validity of items (Fornell & Larcker, 1981). (1) The factor loading score of each item of a construct should be significant — at least at 0.5, (2) The Cronbach’s alpha score of each construct should be at least 0.8, and (3) the average variance extracted (AVE) from each construct should be at least 0.5. The convergent validity of the construct is questionable if the AVE is less than 0.5 because the variance due to measurement error is greater than the variance due to the construct. Table 1 shows that the three criteria are fulfilled.

Table 1 Validity and Reliability Analyses

| Construct | Item | Factor loading | Average Variance Extracted (AVE) | Composite Reliability | Cronbach’s alpha |
|----------------------------|-------|----------------|----------------------------------|-----------------------|------------------|
| Perceived Usefulness | PU1 | 0.890 | 0.727 | 0.914 | 0.867 |
| | PU2 | 0.888 | | | |
| | PU3 | 0.870 | | | |
| | PU4 | 0.753 | | | |
| Perceived Ease of Use | PEOU1 | 0.938 | 0.791 | 0.919 | 0.869 |
| | PEOU2 | 0.802 | | | |
| | PEOU3 | 0.922 | | | |
| Attitude | At1 | 0.822 | 0.798 | 0.940 | 0.915 |
| | At2 | 0.875 | | | |
| | At3 | 0.937 | | | |
| | At4 | 0.935 | | | |
| Subjective norm | SN1 | 0.917 | 0.861 | 0.949 | 0.919 |
| | SN2 | 0.929 | | | |
| | SN3 | 0.938 | | | |
| | SE4 | 0.797 | | | |
| Perceived behavior control | PBC1 | 0.910 | 0.766 | 0.907 | 0.838 |
| | PBC2 | 0.914 | | | |
| | PBC3 | 0.796 | | | |
| Intention to Use e-banking | BI1 | 0.903 | 0.830 | 0.936 | 0.895 |
| | BI2 | 0.907 | | | |
| | BI3 | 0.922 | | | |

Contrary to convergent validity, discriminant validity is used to assess whether the items used to measure one construct are different from the items used to measure other constructs. Table 2 shows that the correlation scores between the items of two different constructs were lower than the square root of the AVE scores shared by all items within a construct. Based on the convergent validity and discriminant validity results, the construct validity of this study thereby scored satisfactorily.

Table 2 Discriminant validity

| | PU | PEOU | Attitude | SN | PBC |
|----------|--------|--------|----------|--------|------|
| PU | .853 | | | | |
| PEOU | .596** | .889 | | | |
| Attitude | .649** | .562** | .893 | | |
| SN | .235** | .074* | .167* | .927 | |
| PBC | .600** | .532** | .533** | .372** | .911 |

* Significant at $p < 0.05$

** Significant at $p < 0.01$

The result of the study's reliability analysis can be checked via the following test. If a respondent is reliable, the score given to each item that is used to measure a construct should not be widely different. The internal consistency of measures can be reflected by the results of two tests, Cronbach's alpha and composite reliability. The composite reliability score reflects the overall reliability of items used to measure a construct. On the other hand, Cronbach's alpha is useful to measure the reliability of each item of a construct. From Table 1, as the scores of both composite reliability and Cronbach's alpha are more than the benchmark of 0.7, the construct reliability of the study's data was adequate (Fornell and Larcker, 1981).

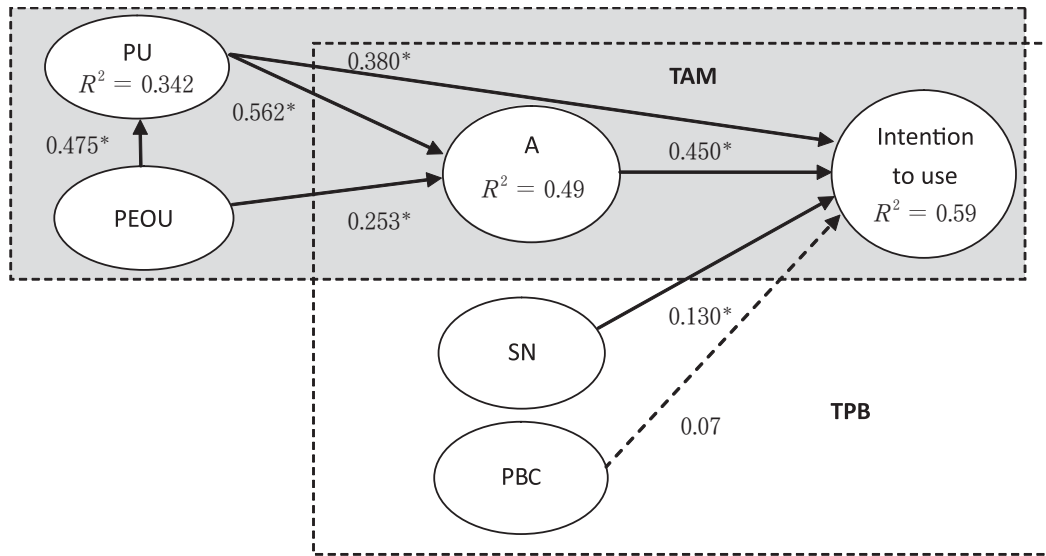
Multicollinearity analysis is conducted to check whether the independent constructs are closely related in some way. Two possible actions that can be carried out if the constructs are highly correlated: (1) reduce the number of collinear constructs, and (2) combine the collinear constructs to form a new construct. Table 2 shows that the correlations between the investigated constructs were low with a significance level of 0.05. Therefore, multicollinearity is not an issue in this study.

Structural model analysis

The structural relationship between investigated constructs is shown in Fig. 2. The intention to use digital banking is predicted by PU ($\beta = 0.380$), attitude ($\beta = 0.450$), and subjective norm ($\beta = 0.130$). The three constructs explained 59% of the variance in intention to use (shown by $R^2 = 0.59$, coefficient of determination). As a result, Hypotheses 1, 5, and 6 are all supported. However, PBC shows no significant relationship with intention to use e-banking. Thus, Hypothesis 7 is not validated.

The direct effect of PU is 0.380 on intention to use e-banking. On the other hands, the indirect effect caused by PU on intention to use e-banking via attitude is 0.562. Therefore, the total effect of PU on intention to use is 0.213. The result has confirmed the primary role played by PU on the SME operator's intention to use e-banking in Malaysia's rural areas and validates Hypothesis H2.

The respondents' attitude is predicted by PU ($\beta = 0.562$) and PEOU ($\beta = 0.253$). The constructs explained 49% of the total variance in attitude. PU is predicted by PEOU ($\beta = 0.475$) and the variable explained 34.2% of the total variance in PU. The result



* $p < 0.05$

Dotted lines reflect no significant relationship

Fig. 2 Result of structural modelling analysis

validates H3.

Figure 2 also shows that the SME operators' intention to use e-banking is predicted indirectly by PEOU via PU. The indirect effect caused by PEOU on intention to use e-banking via PU is 0.181 and the significant result at $p < 0.05$ has validated Hypothesis 3. The respondents' intention to use e-banking is predicted indirectly by PEOU via attitude as well. The indirect effect caused by PEOU via attitude is 0.114 and the significant result validates Hypothesis 4.

Discussions

The data findings support the directional linkages among the current research model's constructs. Overall, the result suggests that the integrated model can explain 59% for intention to use e-banking and 49% for attitude towards e-banking among SME operators in rural areas of Malaysia. Intention to use e-banking is influenced positively primarily by respondents' perceived usefulness of e-banking. The result is consistent with the following previous researchers' findings, Pavlou and Fygenon, (2006); Lee (2009); and Wadie Nasri and Lanouar Charfeddine (2012). Similarly, subjective norms affect the total variance in intention to use at the same magnitude ($\beta = 0.130$). The significant positive impact is consistent with studies conducted by Pavlou and Fygenon, 2006; Lee, 2009, Wadie Nasri and Lanouar Charfeddine, 2012.

The significant indirect effect of PU (via attitude) on intention to use e-banking is consistent with Luarn and Lin (2005), and Dasgupta et al., (2011) studies. Although PEOU does not explain the total variance in intention to use directly, PEOU can boast the influence of PU on SME operators' intention to use e-banking in rural areas. The finding is similar to studies conducted by Pavlou and Fygenon, 2006; Lee, 2009; Wadie Nasri and Lanouar Charfeddine, 2012.

Implications to Public and Private Sectors

Managerial implications

The results of this study indicate important issues related to SME operators' business transactions. PU is one of the main instruments in explaining rural SME operators' intention to use e-banking. In order to convince more SMEs to use e-banking, the banks should promote the benefits of e-banking aggressively. Various banking services such as payment of bills and monetary transactions between bank holders' accounts can be done instantly at anytime and anywhere if the online service is available. The users could use e-banking as a time-saving measure to perform other business or personal matters as well.

This study's result shows that respondents' attitude is also one of the prime factors that can influence e-banking adoption. Attitude can be predicted by PU and PEOU. Therefore, to encourage the use of e-banking, banks should (1) promote the usefulness of e-banking, and (2) educate more rural business operators to use e-banking so that they can learn to utilize technology e-banking easily. Banks should assign their staff to demonstrate how to use the new technology. If the bank consumers found that the banking transaction can be completed easily, their intention to use e-banking in the future will increase.

The relative low impact of the influence of subjective norm and the lack of significant impact of perceived behavioural control implies the following:

- (1) The rural SME operators are less keen to behave just to impress their relatives or acquaintances. This shows that they are independent in deciding on their banking affairs;
- (2) Most of the respondents are actually not computer illiterate. This corroborates the government's policy to educate the rural people on computer usage. Therefore, banks shouldn't invest too much time and resources to develop the websites' interface; and
- (3) The collaboration between the government and private sector on internet services has indeed encouraged better provision of broadband coverage in rural areas. As most of the SME operators are already using mobile phones and computer, this will make them feel that they can learn how to use, control and complete the e-banking transactions quickly and easily.

In summary, banks managements should consider the business operators' behavioural beliefs when strategizing their e-banking promotion plans.

Academician implications

TAM and TPB model are the most frequent behavioural theories used in e-banking literature. Many studies extend the models by adding one or more constructs. For example, Luarn and Lin (2005) extended the TAM by adding three constructs, perceived credibility, perceived self-efficacy, and perceived financial cost. Data were distributed to people who attended an e-commerce symposium. Meanwhile, Hanudin Amin et al. (2008) added the construct of perceived credibility in the TAM as well. On top of that, he had examined a private bank account holders' perception of the availability of online banking information and the impact of normative pressure on the respondents' behavioural intention.

Currently, more studies extend the literature by integrating the two behavioural models, TAM and TPB. For example, Lee (2009) collected data by distributing online questionnaire to a private bank user and 87.32% of Wadie Nasri & Lanouar Charfeddin's, (2012) respond-

ents were tertiary students and graduates.

In line with the current practice, this study has integrated the TAM and TPB. However, compared to past studies, the current study investigates a more defined bank user. The sampling method is clearly defined as well, so that the chosen sample can represent the population better. Collecting data using online devices is cost and time-saving, but cautious moves should be undertaken to reduce the sampling and non-sampling errors.

Various studies confirmed that an integrated model is better than relying solely on one theory or model. This implies that researchers should continue to integrate other technology acceptance and/or behavioural model(s) that are appropriate for the studied population.

Conclusions and future research

The study integrates the TAM and TPB models because the rural SME operator's intention to adopt a relatively new emerging technology depends not solely on their behavioural belief (reflected by the constructs of PU, PEOU, and attitude) but also on the persons' normative belief (SN construct) and their ability to control the skills or resources (PBC construct). Consistent with past studies, the result shows that the four constructs (except perceived behavioural control) have significant impact in predicting rural SME operators' intention to use e-banking. PU and attitude play the primary roles in predicting the SME operators' intention to use e-banking.

Care was undertaken to ensure the generalization of the study's result. Conducting probability sampling to reduce the bias of the result is always ideal. However, getting responses from chosen respondents is tough. Quota sampling is used so that the study locations can represent the SME operators in Malaysia's rural areas better. Collecting truthful data will generate more meaningful results; however, generalizability could be enhanced by surveying more study locations.

Finally, the finding shows that 59% of the respondents' intention to use e-banking can be explained by the four constructs. The authors believe that in future, it is worth continuing to confirm the impact of perceived behavioural control on intention to use e-banking among rural SME operators and investigate other factors that are not examined in this study.

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