The Impact of Technology Trust on Mobile Banking Utilization

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Abstract

The aim of this study is to investigate the relationship between technology trust and mobile banking utilization. Three groups of technology trust namely, the mobile network, the mobile banking website and the mobile phone (i.e. smart-phone) are examined against mobile banking utilization. Adopting a survey research methodology involving 312 of mobile banking consumers in Malaysia, the findings suggest that all of the three technology trusts have positive influence on mobile banking utilization. The finding further emphasizes the importance and significance of technology trust in determining utilization among users. The significance of this study could be viewed from both theoretical and practical perspectives.

Keywords: Mobile banking utilization, technology trust, network, websites, Malaysia

1. Introduction

Over the last decade, the world has witnessed the infusion and diffusion of mobile technologies into banking businesses. Many banks all over the world has embraced the mobile technologies and created new mode of banking known as mobile banking. Drexelius & Herzig (2001) described mobile banking as the ability to conduct bank transactions via a mobile device, or more broadly to conduct financial transactions via a mobile terminal. On the other hand, Barnes & Corbitt (2003) described mobile banking as "a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital

assistant (PDA)". Mobile banking provides many benefits not only to end-users but also to the banking providers. According to Sohail & Shaikh (2008), the convenience of mobile banking is that the banks undertake the banking transaction outside of the working hours and is accessible from anywhere and indeed has become of the customer preference. With mobile banking, consumers can do banking services 24 hours a day using their mobile phones without having to visit the traditional bank branches or to find a computer with broadband connection for personal transactions (Daud et al, 2011). Zhou (2011) noted that mobile banking frees users from spatial and temporal limitations, and enables them to conduct ubiquitous transactions.

Many studies have shown that there is a growing interest among users to adopt mobile banking. Apart from investigating the level of adoption, researchers have also studied the determinants or predictors of adoption among users. Models such as Theory of Reasoned Actions or TRA (Fishbein and Ajzen, 1975), Theory of Planned Behaviour or TPB (Ajzen, 1991), Technology Acceptance Model or TAM (Davis, 1989), Diffusion of Innovations or DOI (Rogers, 1995), Unified Theory of Acceptance and Use of Technology or UTAUT (Venkatesh et al., 2003) and Information Systems Success Model (Delone & Mclean, 1992; 2003) are among the popular frameworks which have been used by researcher. Drawing upon these frameworks, researchers have also investigated the issue of user trust in mobile banking. According to Lin (2011), the lack of trust is one of the most frequently cited reasons for customers not using mobile banking. Mayer et al. (1995) defined trust as a person's (the trustor) willingness to be vulnerable to another person (the trustee) on the basis that the trustee will act according to the trustor's confident expectations. In the context of electronic banking, Yousafzai, Pallister & Foxall (2005) defined trust as willingness of customers to perform on-line banking transactions, expecting that the bank will fulfill its obligations, irrespective of their ability to monitor or control banks' actions. According to McKnight et al. (2011), in order to gain a more nuanced view of trust's implications for IT use, MIS research needs to examine how users' trust in the technology itself relates to value-added post-adoption use of IT. By focusing on the technology itself, trust researchers can evaluate how trusting beliefs regarding specific attributes of the technology relate to individual IT acceptance and post-adoption behavior. Following the suggestion of McKnight et al. (2011), this study attempts to explore the influence of technology trust on mobile banking utilization.

2. Literature Review

2.1 Overview of Mobile Banking

Mobile banking, which is also referred to as cell phone banking is "the use of mobile terminals such as cell phones and personal digital assistants (PDAs) to access banking networks via the wireless application protocol (WAP)" (Zhou, Lu & Wang, 2010). Mobile banking services can be categorized based on the originator of a service session, either "push" or "pull" (Infogile Technologies, 2007). 'Push' is when the bank sends out information based upon an agreed set of rules, for example the banks sends out an alert when the account balance goes below a threshold level. On the other hand 'Pull' is when the customer explicitly requests a service or information from the bank, for instance requesting the last five transactions statement. The other way to categorizing the mobile banking services is based on the kind of services, either transaction-based or enquiry-based (Infogile Technologies, 2007). A request for the bank statement is an example of enquiry-based service while a request for our fund's transfer to some other account is an instance of transaction-based service.

Goswami & Raghavendran (2009) noted that based on best practices in mature mobile-banking markets, the advantages of mobile banking to end-users include (i) secure authentication, transaction and data transmission, and easy deleting of content in event of handset loss (ii) icon-driven, user-friendly interface (iii) contactless payment that offers quicker checkout at the point-of-sale and replaces all current payment solutions (iii) dynamic credit facility and innovative point-of-sale offers (iv) dynamic account monitoring and around-the-clock alerts (v) convenience of micro-payments (parking meters, vending machines) (vi) real-time access to account information, outstanding debt, and bill payment (vii) ubiquitous access to banking services (personal ATM).

2.2 Mobile Banking in Malaysia

Just as the conventional banking services, the services provided through mobile banking are almost similar. Due to this reason, the number of users adopting mobile banking has steadily increased not only in

Malaysia, but other countries as well. Recent report by the Central Bank of Malaysia unveiled that as of March 2012, mobile banking subscribers recorded at 1.73 million equivalents to only 4.7% of total mobile phone users in Malaysia (Bank Negara Malaysia, 2012). InMobi (2011), the world's largest independent mobile ad network, reported that out of 1,091 Malaysians surveyed, 57% of the respondents primarily or exclusively accessed the web via their mobile devices. The study also unveiled that mobile was the top media choice for Malaysians using the web and mobile banking in particular was expected to increase all across demographics. In Malaysia, as of January 2012, the banks that offer mobile banking are Al Rajhi Banking & Investment Corporation (Malaysia) Berhad, AmBank (M) Berhad, Bank Islam Malaysia Berhad, Bank Simpanan Nasional, CIMB Bank Berhad, Citibank Berhad, Hong Leong Bank Berhad, Malayan Banking Berhad, OCBC Bank (Malaysia) Berhad, Public Bank Berhad, RHB Bank Berhad, and Standard Chartered Bank Malaysia Berhad (Central Bank of Malaysia, 2012).

2.2 Mobile Banking Utilization

The mobile banking is similar to Internet banking in that it provides a fast and convenient way of performing common banking transactions (Bank Negara Malaysia, 2012). In order to reap the benefits of mobile banking, a user needs a mobile phone that is equipped with the features required by the bank that provides this service (Bank Negara Malaysia, 2012). Once a user obtained a registered account for mobile banking from the banking institution, the user would be able to do banking transactions from anywhere. The mobile banking can be done either by accessing the bank's web page through the web browser on the mobile phone, via text messaging, or by using an application downloaded to the mobile phone (Board of Governers of Federal Reserve Systems, 2012). Mobile banking allows customers to perform three fundamental transactions: (i) storing money in an account that is accessible by the mobile device (ii) completing cash-in and cash-out transactions with the stored account, and (iii) transferring money among different accounts. In the US, the most common use of mobile banking is to check account balances or recent transactions (90% of mobile banking users). In addition, the study also found that transferring money between accounts is the second most common use of mobile banking (42% of mobile banking users).

2.3 Technology Trust in Mobile Banking

Belanger & Carter (2008) explained that trust has been explored extensively and defined differently in numerous research studies. Soderstrom (2009) identified 29 different types of trust, all of which somewhat different, and relating to each other in a variety of ways. Accordingly, Soderstrom (2009) had categorized trust into three groups of trustee namely, organization, person and technology. McKnight et al. (2011) noted that trust in technology refers to individuals depending on, or being willing to depend on the technology to accomplish a specific task because the technology has positive characteristics. Muir & Moray (1996) posited that trust in technology is based primarily on user perceptions of capabilities of the technology. Therefore, in the context of mobile banking, if customers believe that the technologies that are being used are reliable and trustworthy, then they will be more likely to evaluate overall services favorably, which in turn lead toward better utilization. Koo & Wati (2010) defined trust in mobile banking as the belief that allows individual to willingly become vulnerable either to the bank or e-banking technology after having taken the bank's characteristic embedded in its technology artifact. They argued that this definition captured both traditional view of trust in "a specific party" and trust in "the integrity of technology artifact" where its process is built the same way as trust in people. In a mobile banking context three groups of technologies are jointly involved which are the network technology, the websites and the mobile phone. In order for the mobile banking to be fully utilized, users must have strong level of trust on these technologies. Empirical studies done by Meng, Min & Li (2008); Min, Meng, Zhong, (2008); Lu et al. (2011); and McKnight et al. (2011) have shown the influence of these technology trusts on utilization behavior.

2.4 Theoretical Framework and Hypotheses

Studies on information systems (IS) including mobile banking adoptions and acceptance have investigated numerous determinant or antecedent factors. Jeyaraj et al., (2006), identified four groups of determinants of any IS or IT which are individual, organizational, technology (innovation) and environmental characteristics. Individual characteristics include factors such as demographics, self-efficacy, attitude,

personal IT innovativeness etc. Organizational characteristics relate to organizational attributes or features such as top management support, user support, user training, and IT facilities. Technology or innovation characteristics relate to the features of the technology itself such as perceived ease of use, information quality, and systems quality etc. Environmental characteristics relate to factors external to the users such as peer influence, supplier and customer pressure etc. As mobile banking systems is also an information systems, hence, all the aforementioned determinants are also applicable. However, instead of addressing all the four groups of determinants, this study will only focus on the technology characteristics. The evaluation of the technology characteristics will be integrated with the concept of trust. Figure 1 shows the framework used in the study. The framework is drawn from the work of Jeyaraj et al., (2006) and supported by empirical studies done by McKnight & Chervany, (2002); McKnight et al. (2002); Meng, Min & Li (2008); Min, Meng, Zhong, (2008); Lu et al. (2011); and McKnight et al. (2011). The constructs of the framework are based on the three categories of trustee namely the mobile phone technology (i.e. the Phone such as smart phones used by the trustee to engage in mobile banking transactions), the mobile telecommunication provider and the mobile banking provider (i.e. the retail bank that provides the mobile banking services i.e. the websites). Each of this categories of trustee are posited to have bearing in shaping utilization of the mobile banking. To this effect, the following hypotheses are derived:

H1: Network trust is positively related to mobile banking utilization

H2: Website trust satisfaction is positively related to mobile banking utilization

H3: Mobile phone trust utilization is positively related to mobile banking utilization

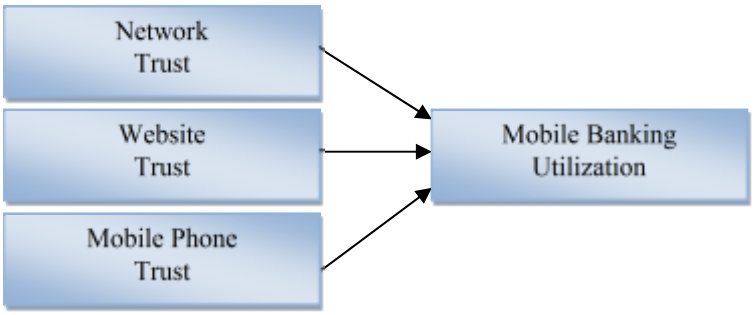

Figure 1. Theoretical Framework

3.0 Research Method

The study employed the survey research methodology. The population of the study was the mobile banking users living in the Klang Valley located within the state of Selangor and Federal Territory Kuala Lumpur Malaysia. Simple random sampling was employed for selecting the sample of the study. A personally administered questionnaire was used to collect the data. Prior to actual data collection, the questionnaire was pre-tested with a group of experts and also perspectives respondents so as to ensure that the questionnaires is well understood by the respondents and also fulfills the validity and reliability requirements. Several items were used to measure all variables and for each item, a corresponding Likert Scale with anchors ranging from 1 as “Strongly Disagree” and 5 as “Strongly Agree” was used. However, for the utilization variable, the anchors used are labeled as 1 for “Never Use” and 7 for “Extensively Use”. For each item listed, the respondents were required to mark any of the five options available. The collected data were analyzed using statistical computer programs known as IBM SPSS version 20 and Analysis of Moment Structures (AMOS) version 20. SPSS was used for descriptive analysis while AMOS was used for Structural Equation Modeling (SEM). Following the two step-approach suggested by Anderson & Gerbing (1988), the study first assessed the measurement model to test reliability and validity and followed by the structural model to test research hypotheses. Altogether a total of 450 questionnaires were distributed and 356 were returned. However, upon further scrutiny, only 312 were found usable for data analysis.

4.0 Findings

4.1 Demographic Profiles of Respondents

A total of 312 respondents involved in this study and out of this number, 101 or 32.4% are males while the remaining are female. In terms of age of the respondents, the majority reported to be aged between 21 and 25 (44.6%) while the minority (1.9%) reported to be aged between 6 and 20. With regard to their mobile banking experience, the majority indicated they have been using mobile banking for the about one year (31.4%) while the rest reported for about three years (19.3%) and less than one year (16.3%).

4.2 Reliability and Validity of Measurement Items

Construct validity is an indicative to which a set of items measure the theoretical construct it was designed to measure Two most commonly used techniques for examining construct validity is using Exploratory Factor Analysis (EPA) and Confirmatory Factor Analysis (CFA). In this study, CFA was used to examine the construct validity which is further divided into two, namely, convergent validity and discriminant validity. Convergent validity is the extent to which the scale correlates positively with other measures of the same constructs (Malhotra, 2002). Following Anderson & Gerbing (1988), this study employed factor loadings, composite reliability (CR) and average variance extracted (AVE) to measure the convergent validity. Standardized factor loadings are indicative of the degree of association between scale items and a single latent variable. Composite reliability (CR) measures the degree to which items are free from random error and therefore yield consistent results. Average Variance Extracted (AVE) estimates are measures of the variation explained by the latent variable to random measurement error (Netemeyer, Johnston, & Burton, 1990). Suh & Han (2003) recommended that the level of factor loadings should be above the value of 0.6 and as illustrated in Table 1, all the factor loadings met this requirement. In terms of composite reliability, all the scores are well above the cut off value of 0.7 as recommended by Hair et al. (2010). Fornell & Larcker (1981) suggested that the acceptable level of AVE should be more than 0.5 which is also fulfilled in this study as illustrated in Table 1.

Table 1: Convergent Validity

Construct	Items	Standardized Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Mobile Banking Utilization	MBU1	0.761	0.788	0.554
	MBU2	0.717		
	MBU3	0.754		
Network Trust	MNT1	0.825	0.912	0.721
	MNT2	0.865		
	MNT3	0.869		
	MNT4	0.837		
Website Trust	MWT1	0.722	0.807	0.583
	MWT2	0.810		
	MWT3	0.756		
Phone Trust	MPT1	0.716	0.829	0.619
	MPT2	0.832		
	MPT3	0.807		

As noted previously, besides assessing the convergent validity, the study also evaluated the discriminant validity. According to Malhotra (2002) discfriminant validity is the extent to which a measure does not correlate with other constructs from which it supposed to measure. Fornell & Larcker (1981) noted that AVE can also be used to determine discriminant validity. To this effect, the discriminant validity of the construct is determined by comparing the square root of AVE of the construct with the correlation between the constructs and all other constructs. As displayed in Table 2, the AVE values are well above the correlation values, hence suggesting good discriminant validity.

Table 2: Discriminant Validity

	Mean	Standard Dev.	MNT	MWT	MPT	MBU
Network Trust (MNT)	3.37	0.71	**0.721**			
Website Trust (MWT)	3.09	0.71	0.360**	**0.583**		
Phone Trust (MPT)	3.53	0.58	0.343**	0.523**	**0.619**	
Banking Utilization (MBU)	3.48	0.66	0.306**	0.414**	0.388**	**0.544**

** *Correlation is significant at 0.01 level*

4.3 Assessment of Overall Model Fit

The first thing many researchers look for upon obtaining the results of the SEM analysis is the output related to goodness-of-fit (Bowen & Guo, 2012). Hair et al. (2010) noted that the goodness-of-fit of the SEM is indicated by how well it reproduces the observed covariance matrix among the indicator items and can be divided into following four categories, namely, (i) Chi-square measures including chi-square, degree of freedom (df) and probability, (ii) measures of absolute fit which include the Goodness-of-Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA) and Root Mean Square Residual (RMR) (iii) incremental fit measures which include the Normed Fit Index (NFI) and the Comparative Fit Index (CFI) and (iv) parsimony fit measures which include the adjusted Goodness-of-Fit index (AGFI),and the Parsimony Normed Fit Index (PNFI).

Iacobucci (2010) noted that among the SEM fit indices, the Chi Square ($\chi^{2)}$ is the only inferential statistic while all the others are descriptive. The author also described that only Chi Square ($\chi^{2)}$ provides significance or hypothesis testing while for the others only suggest "rules-of-thumb" to assess goodness-of-fit. As shown in Table 3, the χ^2 statistic suggests that the data do not fit the model well ($\chi^2 = 100.284$, df = 59, p-value < 0.05). However, because χ^2 is easily influenced by sample size (Gerbing & Anderson 1985). the χ^2 statistic is not always an appropriate measure of a model's goodness-of-fit. Therefore other fit indices as shown in Table 3 are used to examine the model's goodness-of-fit. Apparently, all of the recorded indices surpassed the fit criteria suggesting that the SEM model fits the data very well.

Table 3: Fit Indices of Structural Model

Fit Index	Description	Fit Criteria	SEM Value
Chi Square ($\chi^{2)}$	Measures the magnitude of difference between the initial observed covariance matrix and the reproduced matrix.		100.284
Degrees of freedom	The difference between the number of non-redundant elements of the variance-covariance matrix and the number of model parameters to be estimated		59
P-value (probability)		≥ 0.5	0.001
Absolute fit measures			
CMIN (χ^2)/DF	The ration between Chi Square and degrees of freedom	3	1.700
GFI (Goodness of Fit Index)	Measures the proportion of variance and covariance that the proposed model is able to explain.	≥ 0.9	0.953
RMSEA (Root Mean Square Error of Approximation)	Measures the average amount of misfit in the model per degree of freedom	≤ 0.05	0.047
RMR (Root Mean Square Residual)	Reflects the average discrepancy between observed and predicted covariances	≤ 0.05	0.016
Incremental fit measures			
NFI (Normed Fit Index)	Compares the proposed model to the null model	≥ 0.9	0.952
CFI (Comparative Fit Index)	Compares the fit of a target model to the fit of an independent model	≥ 0.9	0.980

Parsimony Fit Measures			
AGFI (Adjusted Goodness of Fit Index)	Provides information about one model in relation to another in terms of which has the best fit given the difference in estimated parameters	≥ 0.8	0.927
PNFI (Parsimonious Normed Fit Index)	Reflects both the fit and the parsimony of the model simultaneously	≥ 0.5	0.720

4.4 Testing The Hypothesized Structural Model

As all the fit indices of the structural model meet the recommended criteria, the study proceeds by examining the path coefficients of the structural model which is shown in Table 4. As for H1, the hypothesis is accepted, justified by the p-value which is less than 0.05. The R^2 value is 0.313 which suggest that 31.3% variance in utilization is explained by network trust. With regard to H2, the hypothesis is also accepted because the p value is also less than 0.05. The recorded squared multiple correlation is 0.139 denoting that 13.9% variance in utilization is explained by website trust. The p-value for the path between phone trust and utilization is also less than 0.05 suggesting that the relationship between both of these variables is also significant. Hence, the formulated hypothesis H3 is also accepted

Table 4: Results of Path Analysis

Hypothesis	Path	Estimate	S.E.	C.R.	P value	Hypothesis Testing
H1	Utilization ◻ Network	0.454	0.139	3.266	p < 0.05	Accepted
H2	Utilization ◻ Website	0.142	0.069	2.057	p < 0.05	Accepted
H3	Utilization ◻ Phone	0.277	0.107	2.584	P < 0.05	Accepted

5. Discussion

The utilization of mobile banking, just as other computer-based information systems are being determined by various factors which include organizational characteristics, technological characteristics and even the users characteristics. The focus of this study has been on the technological characteristics, which is measured from the trust perspective. Without doubt, access to network plays a very critical role in ensuring the success of any mobile services including mobile banking. Reliable network, which provides continuous access to the Internet will enable users to conveniently engage in mobile banking transactions. When access to the network is easily interrupted, it will cause great difficulties to users as they cannot initiate any transaction or it may also disrupt an on-going transaction. Besides reliability, the coverage of the network is equally important. One of the reason why users adopt mobile banking is because mobility factor. Mobile banking users expect that irrespective of their geographical location, access to the network must be readily available. As revealed in this study, the higher is the trust on the network services, the higher would be the mobile banking utilizations.

Trust in mobile banking websites is the extent to which users have confidence with the website for indulging in mobile banking transactions. The mobile banking websites are provided by the retail bank that offers the mobile banking services. The well cited IS Success Model by Delone & Mclean (1992, 2003) suggests that both information quality and systems quality of the computer based information systems have strong influence on systems usage. The model also suggests that service quality of the information systems has influence of systems usage. Thus, mobile banking websites characteristics which may include systems quality, system quality, and service quality are critical in shaping user confidence or trust which will in turn translate into better utilization.

The third technology trust which is being investigated in this study is the mobile phone or the smart-phone used by users when engaging in mobile banking transactions. Simply defined, the mobile Phone trust refers to users' level of confidence with the mobile Phone for doing mobile banking transaction. While the focus of websites trust focuses on the software, mobile Phone trust on the other hand, focuses on the hardware features. Technology Acceptance Model or TAM (Davis, 1989) for instance indicates that technology features such as ease of use and usefulness has strong effect on usage or utilizations. Therefore as indicated in this study when users have strong trust on the technology, it will lead towards better utilization.

6. Conclusion

The conduct of this study has been to investigate the relationship between technology trust and mobile banking utilization. Three groups of technology trust namely, the mobile network, the mobile banking website and the mobile Phone (i.e. smart-phone) are examined against mobile banking utilization. The findings have shown that all of the three technology trusts have positive influence on mobile banking utilization. The finding further emphasizes the importance and significance of technology trust in determining utilization among users. The value of this study could be viewed from both theoretical and practical.

From the theoretical perspective, the study has developed an empirical based framework which should capture the interest of researchers investigating topics of trust in mobile banking. Coupled with the framework is the developed instrument which has undergone rigorous processes including the pre-test and pilot test. This framework together with the instrument can be re-used to study similar topic but in a different mobile banking implementation setting. The findings obtained from such study can be compared against the findings of this study. Alternatively, future study should also consider extending the framework by integrating the outcome of utilization.

Viewed from the practical perspective, the findings of the study should assist mobile banking practitioner to reevaluate their mobile banking technologies so as to increase the intensity of utilization among mobile banking subscribers. Based on the developed framework and the corresponding instrument, mobile banking providers can evaluate the level of user trust on their mobile banking technologies. The outcome of the assessment can be used to further improve the quality of mobile banking services.

Just as in other studies, this study also has its own limitations. Firstly, this study employed perceptual measures to gauge the level of technology trust among users. Though the instrument has showed strong reliability, it is still fall short in terms of accuracy when compared against objective measures. Secondly, the cross-sectional method used for data collection suggests that the accuracy of findings may not be as accurate when compared with data collected using longitudinal approach.

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