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Causal Factors Affecting Mobile Banking Services Acceptance by Customers in Thailand

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Abstract

The study investigates the causal factors affecting mobile banking services acceptance by customers in Thailand. This study employs quantitative research methodology and non-probability sampling to draw 400 mobile banking users from the population who are the mobile banking users of commercial banks in Thailand. The online questionnaires were used as a research tool to collect data with the Cronbach's alpha coefficient as 0.931. By using the structural equation model to analyze data, the results have shown that service quality, perceived usefulness, perceived ease-of-use, safety in use, and social factors influenced mobile banking services acceptance by customers in Thailand.By checking the harmony with the statistics $\chi^2 = 108.618$, df. = 86, χ^2/df. = 1.263, p-value = .050, CMIN/DF =1.263, GFI = .989, AGFI=.962, TLI= .962, CFI = .976, RMSEA = .037,along with testing the weight factor. In conclusion, the research model was found to be harmonious with the empirical data at the significance level 0.05. The findings of this study suggest that the commercial banks should apply this research to understand the acceptance behavior of mobile banking users, also to determining marketing strategies, identifying opportunities and creating a competitive advantage for their services in the future.

1. Introduction

Nowadays, crypto currency is predicted to become the future currency that might disrupt the current paper currency worldwide (Fauzi et al., 2020). Moreover, commercial banks have also developed mobile banking services to support their financial and banking services that cover the needs and expectations of their customers. These services become popular, trendy and necessary for modern banking business.

The number of worldwide mobile banking users has increased dramatically. The technology used to provide services through the wireless network allowed the bank to respond to various transactions more quickly and conveniently for customers anywhere, anytime, without restrictions on time and location. These services also reduce restriction for customers both in terms of online shopping payment for goods or services, utilities, funds transfer, payment, application for credit service, using as an E-wallet etc. Therefore, traditional banking services for which customers must travel to the bank or ATM will be replaced. The result of rapid smartphone development has led the smartphone to become a technology tool that meets the needs of customers who want convenience and safety from banking services. These also changes in the structure and methods of service offered by commercial banks worldwide. Therefore, bank must accelerate the development of applications and platforms, including studies to understand acceptance and behavior for using the service via smartphone in order to support the provision of customer services and to create a competitive capability for the commercial banks themselves urgently (Laforet & Li, 2005).

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2. Literature Review

2.1. Mobile Banking

The rapidly growth of smartphone and mobile banking usage have increasing global financial transactions. Commercial banks aimed to develop new applications that were modern, convenient and quickly respond to various services. These would help the bank to expanding their customer base, building loyalty and increasing market share (Riquelme & Rios, 2010). There are several services such as payment for goods, services, utilities, money transfer, payment for application, and electronic wallet (E-wallet). These services can login via "Touch ID" service to increase security in online transactions. There is also QR payment and receiving money service features that come in to help facilitate buyers and online sellers. Also, advance payment transaction includes features with which users can specify the date and amount of money needed to be transferred in advance. Bank of Thailand conducted a survey of payment transactions via mobile banking services; the result showed that, at the end of March 2019, the number of customer accounts using mobile banking services totaled 43.882 million, the transaction volume 347.853 million, and the transaction value 1.875 billion baht. These show the increasing popularity of mobile banking service, which was a good sign for the steps towards Thailand 4.0 and cashless society (Bank of Thailand, 2019)

2.2. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a model proposed by Davis (1989) who provided a conceptual framework based on theories in social psychology. TAM was an information systems theory that modeled how users accept and use technology. TAM was the theory of behavioral science, which argued about the impact of perceived ease-of-use and perceived usefulness on individuals' use of IT (Lanlan et al., 2019). TAM consists of two main independent variables –perceived usefulness (PU) and perceived ease-of-use (PEOU) (Puriwat & Tripopsakul, 2017). David (1989) defined perceived usefulness (PU) as the degree to which a person believes that using a particular system would enhance his or her job performance. For perceived ease-of-use (PEOU), Davis (1989) defined as the degree to which a person believed in using a particular system would be free from effort. Many studies have been carried out to investigate the driving factors of M-banking acceptance, for instance, perceived ease-of-use (PEOU) and perceived usefulness (PU) (Zhou, 2011; Raza et al., 2017). However, only a few studies have been carried out in which adoption of M-banking is investigated in Thailand (Puriwat

& Tripopsakul, 2017). Some studies have investigated M-banking only in Bangkok (Rotchanakitumnuai, 2019). Therefore, perceived ease-of-use (PEOU) and perceived usefulness (PU) were significant factors that predict customers' acceptance of M-banking and, hence, it could be hypothesized that:

H1: *Perceived ease-of-use (PEOU) has a significant impact on customers' acceptance using M-banking.*
H2: *Perceived usefulness (PU) has a significant impact on customers' acceptance using M-banking.*

2.3. Service Quality

Service quality was mainly characterized by its intangibility (Hai et al., 2017), especially for the banking industry (Pakurár et al., 2019). Thus, the more offering of a high-quality service, the more differentiated from its rivals (Bahia & Nantel, 2000). Service quality was one of the most important success factor elements in which the businesses can achieve a competitive advantage, development and growth in the market (Li et al., 2011; Qutaishat et al., 2012). Service quality is defined as how companies override customer expectations (Pakurár et al., 2019), where the customer expectations concern their awareness toward products and services (Parasuraman et al., 2015). The originally proposed instrument has been revised and used in different service settings such as the hotel sector by Al-Khattab and Aldehayyat (2011), who have supported that the dimension of SERVQUAL: assurance, tangibles, responsiveness, reliability, and empathy, were important factors. Although previous research has focused on service acceptance model, just a few studies have tackled TAM (Technological Acceptance Model). In addition, there was a lack of study on SERVQUAL model related to mobile banking. Therefore, this study proposed that TAM can be combined for the development of service acceptance model, with the addition of service quality dimensions.

2.4. Service Quality and Perceived Usefulness

Prior studies have shown that service quality was related to perceived usefulness (Naidoo & Leonard, 2007; Park & Kwon, 2016). Perceived usefulness (PU) was a vital part of critical value in B2C (business-to-customer) transactions (Ahmad et al., 2019). Value was defined as "the customer's overall assessment of utility (Zethaml, 1988); since value was driven by service quality (Parasuraman & Grewal, 2000). Thus, there was a relationship between service quality and perceived usefulness. These have been supported by George and Kumar (2014), who have

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shown the finding that perceived usefulness has significant positive indirect effect on service quality on Internet banking. This paper expected that service quality would have a positive effect on perceived usefulness, therefore the following hypothesis:

H3: *There was a positive association between the service quality of mobile banking service and perceived usefulness*.

2.5. Service Quality and Perceived Ease-for-Use

In the study of customers' attitude to use web-based purchasing, Liao and Cheung (2001) found that service quality had impact on perceived ease-of-use (PEU); these has been supported by many studies such as Lin and Wu (2002), Kim et al (2008), Hilmi et al. (2012), Chen et al. (2016) who showed a positive correlation between service quality and perceived ease-for-use (PEU). For this reason, service quality was expected to impact customers' perceived ease-of-use as shown in the following hypothesis:

H4: *There was a positive association between service quality and perceived ease for use*

2.6. Social Influence

The limitation of TAM stems from the fact that many important factors such as social influence and mobile service quality (MSQ) were not included in the model. Thus, this research has extended TAM by adding these two variables. Social influence refers to the perceived pressure from the people who the customer thinks important. An extensive range of research in social psychology concerns this concept and the theory of planned behavior incorporates social influence as an independent predictor of behavioral

intention. To be socially recognized in a group, others must perceive an individual as a member, meaning that the person should act in ways consistent with the group norms (Hong et al., 2008; Venkatesh & Morris, 2000). In Pakistan, Kazi and Mannan (2013) found that customers' intention to adopt mobile banking services was significantly influenced by social influence. This result is similar to Yu's (2012) study in China. Thus, the following hypothesis has been developed:

H5: *Social influence has a significant impact on customers' acceptance using of M-banking*

2.7. Safety in Use and User Acceptance in Mobile Banking

There were several scholars who have studied the user acceptance of mobile banking. They have found that safety from technological use has played an important role in the user acceptance of mobile banking. Service provider must be able to maintain customer privacy and prevent hacking of customers' personal information (Goyal et al., 2012; Islam, 2014; Masamila, 2014; Arcand et al., 2017). Moreover, mobile banking technology has able to manage and maintain the privacy of customers as well as build trust in the use of mobile banking services (Venkatesh et al., 2003; Arcand et al., 2017).

H6: *There is a positive association between the security and technology acceptance of mobile banking*

2.8. Conceptual Framework

Based on results from an extensive literature review, a conceptual framework of the relationships of variable in this study was formulated in Figure 1.
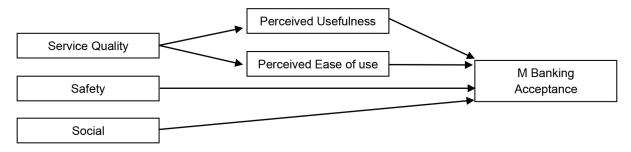

Figure 1: Conceptual Framework, applied from Davis,1989; Oliver,1996; Venkatesh, Morris and Davis, 2003; Dasgupta et al.,2011; Krishananetal, 2016

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3. Research Methods

Quantitative research methodology was used as a survey method. The online questionnaires were sent and used as a research tool to collect primary data. The researchers used non-probability random sampling method to select 400 mobile banking users from various commercial banks in Thailand. The structural equation model was used to analyze data. The questionnaire has passed the validity and reliability test. The researchers have checked the scale accuracy by five experts –three marketing, one information technology and one bank expert. The Cronbach's alpha coefficient is used to measure the reliability or internal consistency of the gauges used in this research. There is a mean correlation between the alpha values of .799 and .859. The 27 questions have the Cronbach's alpha coefficient of .845, which means that the questionnaire used in this research has a high level of reliability.

3.1. Populations and Samples

This research selected samples from mobile banking users of Thai commercial banks in Thailand. The sample size of 400 samples was calculated by the number of suitable samples according to the general rules for choosing the Alpha level of confidence and the acceptable error value is Alpha = 0.05 and acceptable error values of 5%, which are considered suitable values (Krejcie & Morgan, 1970) because in this research the exact population is unknown. Therefore, the proportion of the population that needs to be chosen is set at 20% or 0.2 at the confidence level of 95% and the error value of 5% or 0.05 by using the formula to calculate the suitable number of samples by using the Cochran formula (1977), which is 384 samples. This research used 400 sample sizes, which covered the appropriate number of samples according to Cochran's formula (1977), while also obtaining larger samples. This was an advantage in terms of reliability and representation based on the population of Newman (1997).

4. Results

In order to answer the questions put forward by this research, which is to study the causal factors affecting mobile banking services acceptance of customers in Thailand, several tools are used: the Structural Equation Model (SEM), Exploratory Factor Analysis (EFA) using the Common Factor Analysis, Principle Axis Factoring (PAF) method to analyze factors affecting the acceptance of the use of mobile banking services of customers in Thailand, including service quality, recognition of utilization, awareness, ease-of-use, safety in use, and social factors that affect the acceptance of the use of mobile banking services by customers in Thailand. The Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity.

KMO values are 0.899 and Sig = .000 <0.05, where values of $0 \leq KMO \leq 1$ are close to 1, meaning that all variables are related and can be grouped into factors to be used for further factor analysis. The common elements can explain the relationship between variables at a good level (Wanichbancha, 2013).

The values of $\chi2 = 108.618$, df. = 86, the values of $\chi2 /$ df. = 1.2630, p-value = .050, CMIN = 1263.045, and CMIN / DF = 1.766, which is less than 2.0. (Schumacker & Lomax, 2010) means the structural equation model is harmonized with empirical data. In addition, it was found that GFI = .989, TLI = .962, AGFI =.962 and CFI = .976 were greater than 0.95. All values showed good consistency. (Kelloway, 2015) and found that RMSEA = .037 and PCLOSE or p-value = 0.000. So, the assumption was that RMSEA was less than 0.05 (Kelloway, 2015). In conclusion, the index values check the consistency between the model and empirical data according to standard criteria and at a good level of conformity. The HOELTER 0.5 value was 213, which is more than 200, indicating that the sample set in this study was well suited. The regression coefficient from the hypothesis testing of the correlation coefficient obtained was p-value = P = *** = 0.050. In addition, when studying the weight of all factors, values are non-zero. All C.R. values were more than 1.96. Regarding the variables, quality of service factors, recognition of utilization, awareness, ease-of-use, safety in use, these are social factors that directly and indirectly affect the acceptance of the use of mobile banking services by customers in Thailand when the coefficients were added to the model using the values adjusted to the standard form (standardized) that shown in Figure 2

The study results of causal factors affecting mobile banking services acceptance of customers in Thailand, model consistency and the empirical data of factors influencing the usage, acceptance, and use of mobile banking services has shown that the causal model of factors influencing the adoption of mobile banking developed by the research team was in harmony with the empirical data. Table 1 shows the results of testing the path coefficient of factors that influence the acceptance of mobile banking usage by consumers in Thailand and of checking the consistency of the model with an empirical data.

In conclusion, the path coefficient testing of the causal factors that influence the consumer acceptance of mobile banking usage was shown in the following details: the path coefficient is between .056 to .442, which means service quality was the highest path coefficient, while the least path coefficient factors were social factors, the path coefficient of 0.56 to the consumer acceptance of mobile banking. Service quality factors were shown path coefficient with the consumer acceptance of mobile banking usage equal to .442, followed by the perceived ease-of-use that showed path coefficient equal to 0.261. And social factors had the least path coefficient equal

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to .056 per the consumer acceptance of mobile banking. The prediction coefficients were between 0.056 and 0.442. See the R^2 value from Table 1, in which the quality of service factor has the highest prediction coefficient, while the social factor had least prediction coefficient. In addition, each conceivable factor can predict 76% of the causal relationship between factors that influence mobile banking usage.

When considering the harmoniousness with the empirical data, it was found that the ratio between the chi-square and the degrees of freedom is 108.618, which are less than 2.

Comparative Fit Index (CFI) equal to .976, which is more than 0.95. Tucker-Lewis Index (*TLI*) equals to 0.962, which is more than 0.95. Root mean square error of approximation (RMSEA) equals to 0.037, which is less than0.05 (Vanichbuncha, 2013). Therefore, it can be concluded that the model of the causal relationship of factors influencing the adoption of technology in Thailand was consistent with the empirical data shown in Figure 1. Moreover, the examination of direct, indirect and collective influences on the acceptance of mobile banking is shown in Table 2
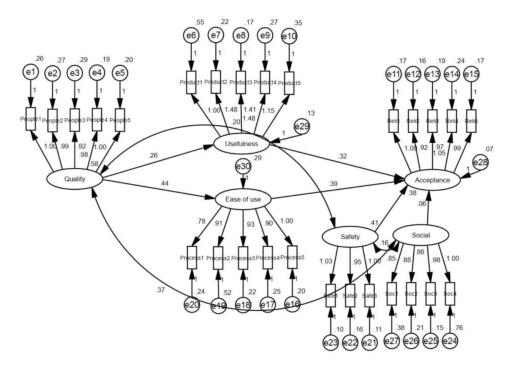

Figure 2: The structural equation model of the acceptance of the use of the mobile banking service of customers in Thailand which can be shown in the form of the following equationχ^2 = 108.618, df. =86, χ^2/df. = 1.263, p-value = .050, CMIN/DF =1.263, GFI = .989, AGFI=.962 , TLI= .962, CFI = .976, RMSEA = .037, Significant level at .05

Table 1: The results of variable path coefficient on the cause factors that influence the acceptance of mobile banking services of consumers in Thailand and the verification of the model consistency and empirical data

Observation variable	Effect variable	Estimate	S.E.	Z-test	p	R^2
Usefulness	Acceptance	.318	.059	5.380	.000	.76
Ease of use		.394	.038	10.402	.000	
Safety		.382	.123	10.914	.000	
Social		.056	.035	2.571	.010	
Quality	Usefulness	.261	.038	6.859	.000	.23
Quality	Ease of use	.442	.046	9.629	.000	.28

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Table 2: Influence coefficient of the causal relationship model and results related to the acceptance of Mobile Banking

Cause variable	Effect variable								
	X_2= usefulness			X_3 = ease of use			Y = (Acceptance)		
	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect
X_1 = Quality	.26	0	.26	.44	0	.44		.70	.70
X_2= usefulness	0	0	0	0	0	0	.32	0	.32
X_3 = ease of use	0	0	0	0	0	0	.39	0	.39
X_4 = Safety	0	0	0	0	0	0	.41	0	.41
X_5 = Social	0	0	0	0	0	0	.06	0	.06
Prediction coefficient(R^2)	R^2= 0.23			R^2 = 0.28			R^2 = 0.76		

The results of checking the direct influence, indirect influence and the combined factors influencing the acceptance of mobile banking usage by consumers in Thailand found that quality factors did not have a direct influence on the acceptance of mobile banking usage of consumers in Thailand, but indirectly influence the acceptance of the use of mobile banking, with indirect influences on two paths: 1) influenced the perceived variables for ease-of-use (influence size = .44), and 2) Influenced the perceived variables of usefulness (influence size = .26) and total influence (influence size = .70), according to the research hypothesis. Usefulness did have a direct influence on the acceptance of mobile banking usage by consumers in Thailand (influence size = .32) and ease-of-use has a direct influence on mobile banking acceptance (influence size = .39) according to the research hypothesis. Safety did have a direct influence on the acceptance of mobile banking usage by consumers in Thailand (influence size = 0.41), according to the research hypothesis. Social factors did have a direct influence on the acceptance of mobile banking usage by consumers in Thailand (influence size = 0.06), according to the research hypothesis.

4.1. Discussions

The results of the study found that quality of service factors, recognition of utilization, awareness, ease-of-use, safety in use, and social factors directly and indirectly affect the acceptance of the use of mobile banking services by customers in Thailand. The perceived uses of the factors influenced the acceptance of mobile banking service users of Thai commercial banks, which is consistent with the study results of Venkatesh et al. (2003) who found that, if the technology was designed to be easily accessible, and safe to use, these would be able to create awareness of the use and there was a chance that the technology would be successful in the market and industry.

While perceived ease-of-use was influencing the acceptance of mobile banking service users in Thai's commercial banks as well, which is supported by the study by Mallat et al. (2004) and Dasgupta et al. (2011), who was shown that ease-of-use and easy access to use of mobile banking were important factors of accepting mobile banking usage.

While service quality factors had a direct influence on acceptance of utilization and acceptance of direct ease-of-use, and service quality factors had an indirect influence on acceptance, involvement of mobile banking services (Le et al., 2020), also in line with research results of Liao and Cheung (2001) found that service quality had impact on perceived ease-of-use (PEU). These have been supported by studies such as Chen et al. (2016), who showed the positive correlation between service quality and perceived ease-of-use (PEU). The research result indicated that safety in use influenced the user acceptance of mobile banking in Thailand, which is consistent with the research by Dasgupta et al. (2011), who shown the finding that safety in using mobile banking was important factor in accepting mobile banking.

Service provider must be able to maintain customer privacy, trust also prevent hacking of customers' personal information (Masamila, 2014; Usman, 2015). Moreover, mobile banking technology has able to manage and maintain the privacy of customers as well as build trust in the use of mobile banking services (Venkatesh et al., 2003; Arcand et al., 2017). Social factors also influence the acceptance of the use of mobile banking services by consumers in Thailand as well. It was found that the influences of family members, reference groups, social classes, subcultures and cultures are social factors that influence the acceptance of the use of mobile banking services by consumers in Thailand. These were supported by many international studies such as Hong et al. (2008), and Venkatesh and Morris, 2000).

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5. Conclusion

The study results lead to recommendations that Thai commercial banks should be cognizant of factors such as awareness and utilization in designing mobile banking branches that are easily accessible and safe to use. There is a chance that the technology will be successful in marketing due to creating awareness of utilization in the minds of clients, which is usually caused by satisfaction or dissatisfaction, comparing the efficiency of the use of the product or service with the predefined standards of performance in accordance with the defined standard view and making the users aware that the mobile bank is useful and able to create value in the minds of customers who are customers. As regards factors of perception of ease of use, commercial banks must enable customers to apply for the service easily. The service must be fast and efficient and respond to customer satisfaction at all levels and ages in order to be able to access easily and conveniently when using services, such as modern technology systems that are easily accessible. The service processing must be highly secure, not complicated, fast to access and use. There ought to be a notification system for service results. The service can be used anytime, anywhere, be consistently reliable without limitations.

To provide convenience, speed, and security through the consolidation of financial transactions on mobile banking. The system must be reliable and, importantly, must make the application timely, easily accessible, easy to use, secure, always up-to-date, especially the design of technology and accessibility functions; the process must be simple. Security access procedures must meet the needs of the elderly when Thailand becomes an aging society. As regards safety factors, commercial banks must make mobile banking safe and easy to use. The service process must show high security and have a notification system at all stages of the transaction, which is a factor that mobile banking service users give priority to in accepting and deciding to use the service. As regards social factors, commercial banks must pay attention to individuals, reference groups, social classes, subcultures, and cultures of the users.

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