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Original Article

Mobile Banking Adoption in Thailand: The Moderating Role of Hedonic and Utilitarian Consumer Types

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Abstract

Mobile banking in Thailand faces challenges in attracting customers that demonstrate different behaviors based on consumer values. This study aimed to understand the adoption of mobile banking in Thailand with the moderating effect of hedonic and utilitarian consumers on the relationship between the determinants and the intention to adopt mobile banking. A survey questionnaire collected data from 1088 Thai mobile banking users and was analyzed with structural equation modeling. The results indicate that perceived usefulness (β = .58, *p* = .01), perceived ease of use (β = .33, *p* = .01), mobile banking service quality (β = .54, *p* =. 01), and reference groups (β = .11, *p* = .0) significantly affected mobile banking adoption. Moreover, the impact of perceived usefulness was significantly greater among utilitarians (β= .16, *p* = .00) than hedonists (β= .08, *p* = .01). Perceived ease of use was also significantly higher among utilitarians (β =.14, *p* =.01) than among hedonists (β =.01, *p* =.00). However, the influence of mobile service quality on mobile banking adoption was significantly stronger among hedonists (β = .70, *p* = .01) than utilitarians (β = .45, *p* = .01). Reference groups were significant for hedonists (β = .20, *p* =.01), but not for utilitarians (β = .6, *p* = .08). This study contributes to behavioral science by first investigating the moderating effects of hedonic and utilitarian consumers on mobile banking adoption. The findings have practical implications for marketers to develop appropriate marketing strategies to fit two distinct types of consumer needs. Future research should be replicated in other countries to increase generalization.

The evolution of technological innovation has had a major effect on the banking industry. Banks have begun to offer mobile banking services to improve the effectiveness of distribution channels through reducing transaction costs and increasing the speed of services. Mobile banking applications offer a combination of payments, banking, real time two-way data transmission, and abundant access to financial information. Both financial institutions and consumers are benefiting from the advantages it brings (Agyei et al., 2020). The COVID-19 pandemic has caused a significant shift to digital banking worldwide. Mobile banking has played an important role in implementing safety and preventive measures to minimize the spread of COVID-19 and save people's lives (Rafdinal & Senalasari, 2021).

In developing countries, mobile banking services have experienced rapid growth. There is an increasing number of people across all age groups, both young and old, actively using mobile banking services to conduct financial transactions in developing countries (Ho et al., 2020). With the increasing popularity of mobile banking services in developing countries, mobile banks have already engaged in increased rivalry in the banking sector in many developing countries in their efforts to expand customer base and loyalty. Rapid digital customer growth is challenging for banks and financial services companies as they must persuade customers to use their mobile banking applications (Tiwari et al., 2021). In Thailand, mobile banking has grown rapidly over the years. The volume of mobile and digital banking transactions in Thailand increased by almost 80 percent in 2020, which is staggering increase in one year (World Bank, 2021). Consumers' payment behavior has pivoted to the electronic payment channel to minimize the risk of spreading COVID-19. According to the data of the Bank of Thailand (2021b), the total number of mobile banking registrations in Thailand is about 74 million accounts. However, the total number of

deposit accounts in Thailand in 2021 is about 110 million accounts (Bank of Thailand, 2021a). This shows that there is an opportunity for mobile banking services to grow in Thailand.

For the banking industry, customers perceive mobile banking service quality as already has become a prerequisite for the success of mobile banking service providers in developing countries (Arcand et al., 2017). However, very few studies have attempted to integrate mobile banking service quality (MBSQ) with the technology acceptance model (TAM) to explain mobile banking adoption behavior. This study provides insights into the role of mobile banking service quality in mobile banking adoption behavior.

Moreover, existing marketing studies have pointed out the importance of the distinct types of consumers on the acceptance of technology (Komulainen & Saraniemi, 2019; Scarpi, 2012). A review of the extant literature has classified types of consumers into two groups: utilitarian and hedonic consumers (Babin et al., 1994; Batra & Ahtola, 1991). When deciding to adopt new products, utilitarian and hedonic consumers consider different factors and exhibit distinct behaviors (Babin et al., 1994; Hoonsopon & Puriwat, 2016). Some consumers may use mobile banking primarily for hedonic reasons, while others may be motivated to achieve more utilitarian reasons. When consumers intend to purchase new products, each type of consumer uses different stimuli and a different set of values when they decide to adopt a product (Arnold & Reynolds, 2003; Komulainen & Saraniemi, 2019). Based on a review of the available research, the moderating role of consumer types (utilitarian and hedonic customers) has not been empirically investigated in the mobile banking adoption context in developing countries. Understanding the distinct types of consumers can provide useful information for service providers and banks to design appropriate marketing strategies and participate in the rapid digital customer growth. In Thailand, the mobile banking industry is highly competitive, as it deals with two distinct types of potential customers: utilitarian and hedonic consumers. To the best of knowledge, this paper advances our understanding of how utilitarian and hedonic customers moderate the relationship between the determinants of mobile banking adoption and behavioral intentions.

The purpose of this research was to understand adoption behaviors of mobile banking among current users of mobile banking in Thailand; more specifically, it investigates the role of consumer type (utilitarian and hedonic consumers) as a moderating variable in the context of the technology acceptance model (TAM) and mobile banking service quality (MBSQ).

Literature Review and Hypotheses Development

The section contains a literature review on mobile banking acceptance and the main variables studied. Moreover, the research hypotheses and the proposed research model are presented.

Technology Acceptance Model (TAM)

The TAM introduced by Davis (1989) is one of the most cited theoretical frameworks to predict the acceptance and use of new information technology with two primary factors influencing an individual's behavioral intentions to use new technology: perceived ease of use (PEU) and perceived usefulness (PU). TAM has been used by researchers to investigate factors that affect the acceptance and adoption behavioral intentions of mobile banking (Agyei et al., 2020; Alalwan et al., 2016; Akdim et al., 2022). According to the TAM, whether an individual performs a certain goal behavior depends on his or her behavioral intentions to perform the behavior.

Perceived Usefulness

Perceived usefulness (PU) is defined as "the degree to which a person believes that use of the system will enhance his or her performance" (Davis, 1989, p.320). Consumers may adopt innovative technology such as mobile banking when they find it useful for their daily banking needs. There is extensive research providing substantial evidence that perceived usefulness positively influences behavioral intentions to use mobile banking (Agyei et al., 2020; Alalwan et al., 2016; Ho et al., 2020). Therefore, the following hypothesis is proposed:

H1: The perceived usefulness of mobile banking services has a positive effect on consumer behavioral intentions to use mobile banking services.

Perceived Ease of Use

Perceived ease of use (PEOU) is defined as "the degree to which a person believes that using a particular technology would be effortless" (Davis, 1989, p.320). To use mobile banking, customers do not need to make a significant effort as mobile banking services are user-friendly interfaces

(Alalwan et al., 2016; Venkatesh & Davis, 1996). It is likely that customers see the application features of mobile banking as easy to understand and operate. Past studies have also proved the relationship between ease of use and behavioral intentions to use mobile banking services (Farah et al., 2018; Kumar et al., 2020; Makanyeza, 2017). Therefore, it is hypothesized that:

H2: The perceived ease of use of mobile banking services has a positive effect on consumer behavioral intentions to use mobile banking services.

Although the basic TAM presents a rigorous explanation of the prediction of the user's acceptance of technology. In order to provide better explanations and predictions of an individual's adoption intentions and behavior, past research indicated the need for integrating additional variables to improve the explanatory power of the technology acceptance model (Alalwan et al., 2016). Consequently, this study extends the TAM with mobile banking service quality and a reference group enhance the prediction of behavioral intentions to use mobile banking in the context of Thailand.

Mobile Banking Service Quality

Mobile banking service quality (MBSQ) is regarded as the quality of an application system's performance, which can be evaluated by the users' perception (Delone & Mclean, 2003). Perceived quality is considered to be an important factor and the key determinant for customer satisfaction and adoption (Cronin et al., 2000). Service quality has been studied for a long time, and SERVQUAL has become a popular method for measuring service quality (Cronin et al., 2000; Parasuraman et al., 1988). The SERVQUAL has five key dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Although SERVQUAL is an excellent model for measuring service quality in general, the dimensions of SERVQUAL and other relative methods are inadequate because they do not fully explain the criteria that are important to customers of emerging markets in mobile banking (Huang et al., 2015). Previous research has explored the dimensions of mobile banking service quality and motivations for using and adopting mobile banking. However, as pointed out by Huang et al. (2015), the number and dimensions of service quality vary depending on the context and culture involved. Malhotra and Kubowicz-Malhotra (2013) proposed five factors, namely, technical reliability of service, in-store responsiveness, on-phone responsiveness, online self-service facilitation, and flexibility of service. Kumar (2017) developed an MSQ measure with six dimensions, including mobile application design, functionality, assurance, customization, fulfillment, and service recovery. Arcand et al. (2017) proposed that mobile banking service quality is composed of five dimensions in the context of mobile banking services. Furthermore, they suggested that these dimensions will influence customer satisfaction and adoption behavior. These five dimensions are defined as follows (Arcand et al., 2017).

Security and Privacy refers to the extent of security against possible losses occurring due to the use of mobile banking. It is the primary dimension driving mobile banking services. Consumers must perceive them as safe to use.

Practicity refers to utilization and supports interactivity to improve self-efficacy with the medium. It is defined as a composite of perceived ease of use and usefulness of content and function by the users of mobile devices (Arcand et al., 2017).

Design and Aesthetics is defined as the aesthetic quality of content and function presented in a mobile device. Design and aesthetics indirectly impact user loyalty behavioral intentions towards mobile services.

Sociality is defined as the social benefits derived from interacting with others such as banking clients and representatives through a mobile device. In the mobile banking services environment, connectedness enables users to chat online with a customer service representative whenever they need.

Enjoyment is defined as perceived intrinsic motivation based on the pleasure or fun experienced when using a mobile phone. The perception of enjoyment plays an important role in motivating the adoption behavior of mobile banking platforms.

Indeed, there is a growing need to understand the service quality of mobile banking in rapidly expanding mobile banking services in developing countries. Despite its importance, only a few have assessed the impact of mobile banking service quality (MBSQ) on the behavioral intentions to use mobile banking services (Puriwat & Tripopsakul, 2017). Puriwat and Tripopsakul (2017) first created an integrated mobile banking service quality (MBSQ) with the technology acceptance model (TAM) to explain consumers' behavioral intentions to use mobile banking services. In light of the

limitations of previous studies, this study measured mobile banking service quality (MBSQ), following Arcand et al. (2017) who proposed that MBSQ construct consists of five dimensions. The researcher has suggested that perceived mobile banking service quality is a vital factor determining the success of mobile banking services. Thus, the following hypothesis is suggested:

H3: Mobile banking service quality has a positive effect on consumer behavioral intentions to use mobile banking services.

Reference Groups

A reference group is an individual or group of persons who significantly influence an individual's behavior (Bearden & Etzel, 1982). These influences are mainly based on the fact that individuals will take the group as the reference and allow themselves to be guided by the group to improve their attitude, knowledge, and behaviors (Childers et al., 2001; Ding et al., 2020). In making the decision to adopt the new product, consumers may seek information and recommendation from friends, family, celebrities, or influencers as references to evaluate information. Otherwise, they may simply observe the behavior of individuals in the reference groups, which they then use in their decisions to adopt a new product. Consumer may believe that others' opinions are reliable (Hoonsopon & Puriwat, 2016). Previous studies have focused on the impact of reference groups on the adoption behavior of new technology products (Alkawaldeh et al., 2020; Mattila et al., 2001). Therefore, it is expected that reference groups influence the behavioral intentions to use mobile banking services. Consequently, the following hypothesis is proposed:

H4: A reference group has a positive effect on consumer behavioral intentions to use mobile banking services.

Behavioral Intentions to Actual Usage

According to the TAM, individual behaviors are predictable and are influenced by individual behavioral intentions variables (Davis, 1989). Previous studies found the relationship between behavioral intentions to use and actual behavior of mobile banking (Kwateng et al., 2019). Given that the ultimate goal is to predict and understand an individual's behavior, the present study measured actual behavior, which is in line with the TAM (Venkatesh et al., 2012). Therefore, the following hypotheses are established:

H5: Behavioral intentions to use has a positive influence on the actual use of mobile banking services.

Moderating Roles of Utilitarian and Hedonic Consumers

The behavior of the consumer is a result of attitudes, motives, and values and maybe evident in purchase and consumption behavior. The previous literature on consumer behavior has classified consumers into two groups: utilitarian and hedonic consumers who demonstrate different purposes and values in purchasing behavior or adopting products (Arnold & Reynolds, 2003; Babin et al., 1994; Batra & Ahtola, 1991). Utilitarian and hedonic values are considered fundamental to understanding consumer shopping behavior. Each type of consumer has a unique set of values and purposes for decision-making (Babin et al., 1994). Utilitarian values represent consumers who are concerned with rationales, consequences, task-related issues, and benefits. Utilitarian consumers, also known as utilitarians, are generally defined as individuals who are related to a certain business, more task-related, and rational. The goal is preference and/or ease of usage (Babin et al., 1994; Batra & Ahtola, 1991; Holbrook & Hirschman, 1982). Hedonic values represent shoppers who focus on the enjoyable, exciting, social, and pleasurable feelings that they experience while shopping (Batra & Ahtola, 1991; Holbrook & Hirschman, 1982). Hedonic consumers, also known as hedonists, are defined as individuals who look for pleasure and social experience, and happiness is the sole or chief goal in life, this way of life is based on the principle of hedonism (Sener et al., 2018).

Utilitarian and hedonic consumers use different factors and sets of values when they decide to adopt a product (Babin et al., 1994). Previous research studies found that utilitarian and hedonic consumer types influence online technology adoption behavior (Scarpi, 2012; Akdim et al., 2022). Hedonic consumers may use mobile banking primarily for hedonic reasons, while utilitarian consumers may be motivated to achieve more instrumentally oriented goals (Babin et al., 1994). Lassar et al. (2005) found that utilitarian and hedonic consumers influence online banking adoption. Moreover, scholars have generally agreed that

reference groups affect the purchase behavioral intentions of certain types of consumers (Bearden & Etzel, 1982). Hoonsopon and Puriwat (2016) found the interaction effect between reference groups and types of consumers on consumer purchase behavioral intentions. Childer et al. (2001) suggested that perceived eased of use and perceived usefulness result in hedonic and utilitarian consumers, and both are predictors of technology adoption behavior. Kim and Hwang (2012) stated that hedonic and utilitarian consumers may have different expectations regarding mobile service quality for mobile internet usage. Thus, the previous findings shed some initial light in that there is an interaction effect of consumer types (hedonic and utilitarian consumers) in the adoption behavior of mobile banking. Therefore, this study hypothesizes as follows:

H6: Utilitarian and hedonic consumer types will moderate the relationships between (a) perceived usefulness (PU), (b) perceived ease of use (PEU), (c) mobile banking service quality (MBSQ), and (d) reference groups (RG) and consumer behavioral intentions to use mobile banking services.

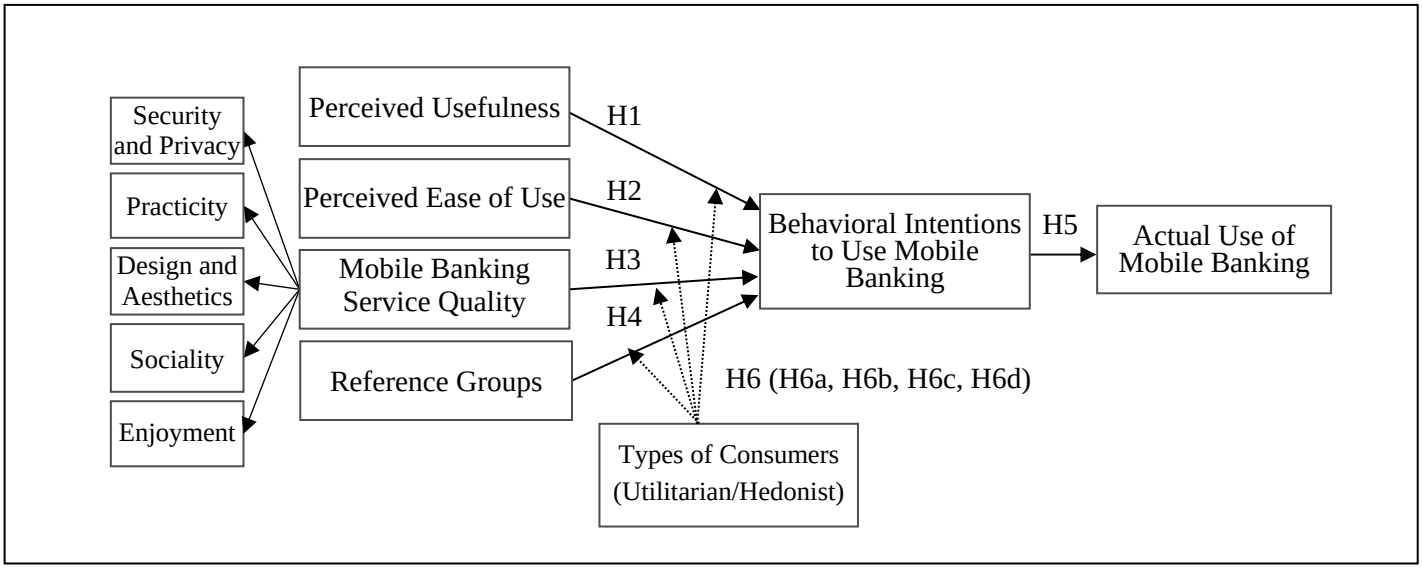
Based on the literature review, a model indicating the adoption behavior of mobile banking was developed. This study combined the TAM and MBSQ with a reference group to explain consumers' behavioral intentions and actual usage of mobile banking services. Types of consumers (utilitarian and hedonic consumers) were included in the proposed model as factors moderating the effect of dependent and independent variables. The proposed research model in this study is shown in Figure 1.

Research Methodology

Sample and Data Collection

The statistical population of the study consisted of customers who were using mobile banking services in Thailand. A purposive sampling technique was adopted for the study. The survey was conducted from February to April 2021, to collect responses from Thai bank customers that currently use the mobile banking services of four major banks in Thailand. They were chosen because they are Thailand's top four mobile banking providers. Bank clients were approached and requested permission to fill out the self-administered questionnaires in the banks' headquarters. The study followed the ethical guidelines in accordance with American Psychological Association (2017). The procedure of this study had been reviewed and approved by the research ethics committee of the King Mongkut's University of Technology Thonburi, with the number KMUTT-IRB-COE2022019. All participants in the research were given consent forms and information sheets that clearly explained the purpose of the current study. Respondents were also made aware of their rights to withdraw participation at any time during the study. The primary data were collected using a structured questionnaire from 1180 respondents. After screening incomplete data (e.g., missing values and inconsistent information) out of the analysis, the number of usable respondents was 1088 (92.2%).

Figure 1
Proposed Research Model



Research Instruments

The research instrument was a self-administrated questionnaire. The content validity was examined to check the appropriateness of the measures by asking five customers who are experts in mobile banking services to perform a review. After the measurement items were adjusted following the recommendations, the items were tested in a pilot study conducted on a sample of 50 before starting the data collection to check the reliability and understanding of the questions and to obtain valuable comments. The items of the construct were measured using a 5-point Likert scale, with answer choices ranging from (1) "strongly disagree" to (5) "strongly agree". The items to measure the constructs were borrowed from previously published studies. The items were modified to match the context of this study related to mobile banking in the context of Thailand. Mobile banking service quality (MBSQ) in this study was adapted from Arcand et al. (2017). MBSQ was conceptualized as a second-order construct consisting of five dimensions, namely, security and privacy (SP), practicity (PR), design and aesthetics (DA), sociality (SO), and enjoyment (EN). Each dimension had three items reflecting its construct. PU and PEU were measured with four items adapted from Davis (1989). A reference group (RG) with three items was adapted from Kim and Shin (2015). Behavioral intentions (BI) to use with three items was adapted from Alalwan et al. (2016). Actual use (ACT) with three items was adapted from Venkatesh et al. (2012). Utilitarian consumers were measured with six items, and hedonic consumers were measured with six items adapted from Rintamaki et al. (2006) and Sweeney and Soutar (2001).

Data Analyses

Structural equation modelling (SEM) with the maximum likelihood estimation method (MLE) was employed to test the measurement model and structural model. We examined the measurement model to assess reliability and validity. Furthermore, hypotheses were tested in the structural model. Next, multi-group analysis was conducted to examine the moderating effect of consumer types (utilitarian and hedonic consumers) with regards to the relationships between the latent variables of the proposed model. The sample was divided into two groups in order to perform a multi-group analysis. All of the participants answered the questions for both types of consumers in the questionnaire. The score ranged from 1 to 5. Participants who were assigned to the utilitarian consumer group had a higher utilitarian mean score than that of the hedonic consumers. Similarly, the participants who were assigned to the hedonic customer group had a higher hedonic mean score than the utilitarian consumers. Participants who had almost the same mean score in both the utilitarian construct and the hedonic construct were eliminated from this analysis. This resulted in 561 participants being classified in the utilitarian consumer group and 527 participants being classified in the hedonic consumer group.

Results

The normality of all variables was examined with skewness and kurtosis and was found to be within acceptable levels. The data analysis was realized with a two-step procedure of structural equation modeling (SEM). First, we conducted a confirmatory factor analysis (CFA) to assess the measurement model. Second, we examined the structural model to investigate the strength and direction of the relationships among the theoretical constructs. Next, a multi-group structural equation modeling (SEM) analysis was applied to evaluate the moderating effect of consumer types with regard to the relationships between the latent variables of the proposed model.

The Measurement Model

The measurement model was first examined to test the reliability and validity in the proposed model. To assess the reliability of constructs, Cronbach's alpha (α) and composite reliability (CR) were used. Cronbach (1951) revealed that a Cronbach's alpha (α) statistic above .7 indicated internally consistent reliability. The findings showed that the Cronbach's alpha (α) for all constructs ranged from .84 to .93, suggesting a strong reliability. This research followed the guidelines of Hair et al. (2010) to measure composite reliability and validity of all latent variables. For composite reliability (CR), the cut-off CR value should be .7 or above when assessing reliability. The finding showed that all constructs had a CR higher than .7, which provided good reliability. For convergence validity, all constructs had an average variance extracted (AVE) greater than .5, which met the criteria of convergence validity. The results of the CFA show that all factor loadings were above .5 for all 25 items, thus

indicating convergent validity for all latent variables. Lastly, the value of AVE should exceed .50 to adequate convergent validity. Based on the analysis, the value of AVE ranged between .54 and .94, which means that all constructs met the criteria of convergence validity. The results of factor loading, CR, and AVE are summarized in Table 1. Next, discriminant validity was examined. Fornell and Larcker (1981) suggested that the square roots of AVE are significantly higher than the correlations below the diameter, indicating discriminant validity. As shown in Table 2, all constructs have square root of AVE value larger than any correlation among any pair of constructs, showing satisfied discriminant validity. Moreover, the correlation between the first-order constructs was positive and ranged between 0.44 and 0.84, which was well below the suggested cut-off value of 0.90, demonstrating that the factors are distinct from one another.

Table 1

Reliability and Validity Analysis

Construct	Items	Standardized Loading	CR	Cronbach'sAlpha	AVE
Security and Privacy	3	.71-.75**	.71	.93	.86
Practicity	3	.76-.84 **	.72	.91	.88
Design and Aesthetics	3	.78-.82**	.71	.88	.90
Sociality	3	.75-.79**	.72	.86	.92
Enjoyment	3	.74-.77**	.74	.84	.94
Perceived Usefulness	4	.71-.83**	.73	.91	.57
Perceived Ease of Use	4	.70-.75**	.81	.93	.67
Reference Group	3	.72-.77**	.70	.92	.54
Behavioral intentions to Use	3	.71-.74**	.80	.85	.59
Actual Use of Mobile Banking	3	.72-.76**	.76	.89	.92

Note. Significance: ***p*<.01

Table 2

Discriminant Validity Test

Variables	SEC	PRAC	DSGN	SOC	NJOY	PU	PEU	RG	BI	ACT
SEC	**.92**									
PRAC	.76*	**.94**								
DSGN	.64*	.84*	**.95**							
SOC	.72*	.81*	.80*	**.96**						
NJOY	.58*	.67*	.65*	.73*	**.97**					
PU	.49*	.63*	.58*	.62*	.66*	**.76**				
PEU	.48*	.59*	.62*	.55*	.64*	.71 *	**.82**			
RG	.54*	.58*	.49*	.45*	.63*	.58*	.64*	**.73**		
BI	.57*	.59*	.62*	.48*	.55*	.63*	.61*	.59*	**.77**	
ACT	.44*	.56*	.54*	.47*	.54*	.53*	.61*	.65*	.67*	**.96**

Note. The Correlation Between the Study Variables, Values in bold typeface along the diagonal indicate the square root of AVE, **p*< .05

Moreover, mobile banking service quality (MBSQ) was conceptualized as a second-order latent construct. MBSQ is the second higher order factor of SP, PR, DA, SO, and EN. The second-order confirmatory factor analysis (CFA) was conducted to check the reliability and validity of this construct. As shown in Table 3, each first-order construct factor loading strongly and significantly correlated with the second-order constructs. The findings showed that the overall fit statistics suggest that the model has sufficient model fit (χ^2/df =1.80; RMSEA = .00; AGFI=.97; GFI =.98; CFI =1.00). The research results validated that mobile banking service quality is composed of the five key dimensions: security and privacy, practicity, design and aesthetics, sociality, and enjoyment dimensions.

The Structural Model

After the researcher processed the data in SEM and adjusted the model, the results revealed an adequate fit between the model data and the suggested values (χ^2/df =1.18; RMSEA = .01; AGFI=.98; GFI =.99; CFI =1.00). Therefore, the overall fit statistics suggested that the model had sufficient model fit. Next, structural equation modeling was used to test the hypotheses. Figure 2 depicts the structural model's hypothesis testing results. All hypothesis links were statistically significant and appeared to be in the right direction. Hypotheses 1-5 were supported. The results showed that perceived usefulness (β = .58, *p* = .01), perceived

Table 3

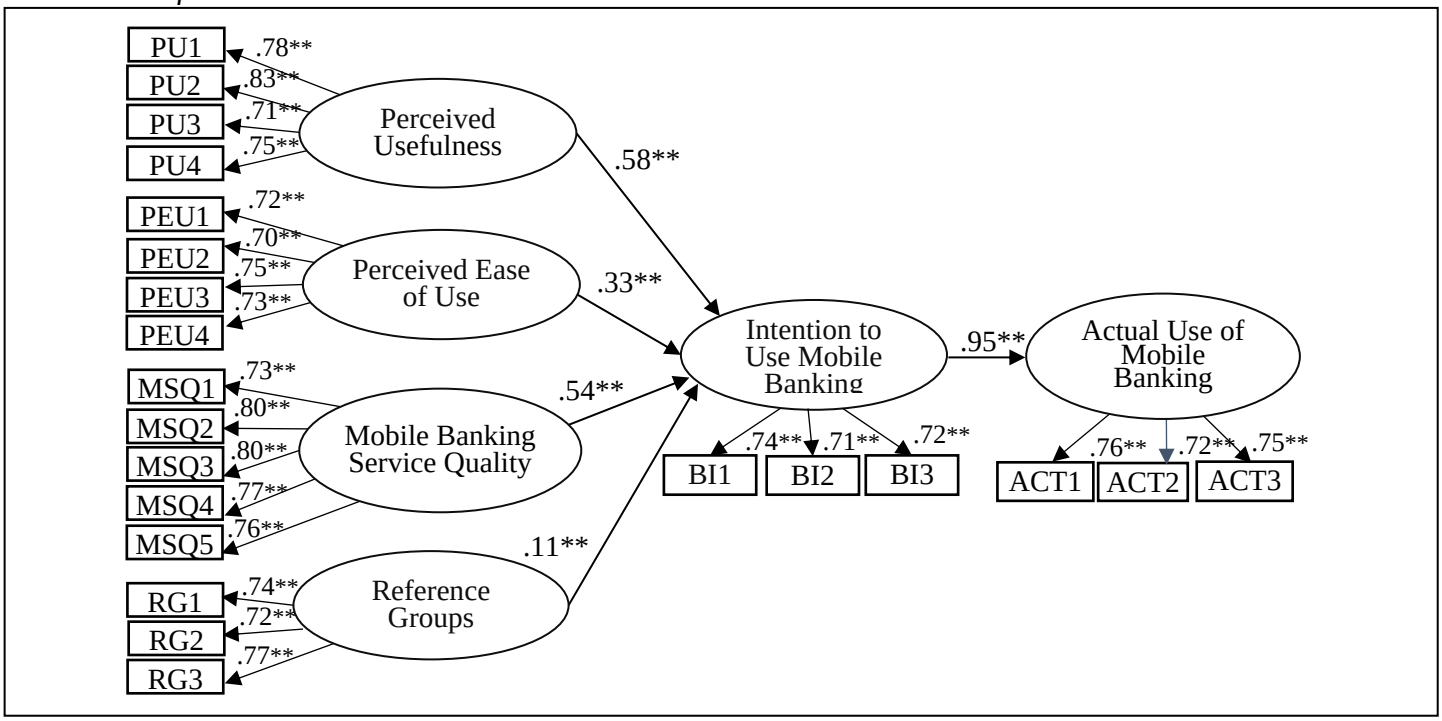
Second-Order Mobile Banking Service Quality Construct

Second-order Factor	First-order Factor	Loadings	CR	AVE
Mobile Banking Service Quality (MBSQ)	Security and Privacy	.86**	.89	.64
	Practicity	.88**		
	Design and Aesthetics	.81**		
	Sociality	.76**		
	Enjoyment	.79**		

Note. Significance: **$p < .01$

Figure 2

The Results of the Structural Model



Note. PU= Perceived Usefulness, PEU= Perceived Ease of Use, MSQ= Mobile Banking Service Quality, RG=Reference Groups, BI= Behavioral Intentions to Use Mobile Banking, ACT= Actual Use of Mobile Banking, Significance: **$p<.01$

ease of use (β= .33, p = .01), mobile banking service quality (β = .54, p = .01), and reference groups (β = .11, p = .00) had a positive and significant effect on behavioral intentions to adopt mobile banking services. The study also found that behavioral intentions to adopt mobile banking services (β = .95, p = .00) had a positive and significant effect on actual use of mobile banking services. The hypotheses testing results of the structural model are presented in Table 4.

Invariance Analysis and Moderating Effects of Consumer Types

Before testing the moderating role of utilitarian and hedonic consumer types, two groups were included to test measurement invariance. Measurement invariance is a prerequisite to testing structural coefficients across groups (Sass & Schmitt, 2013). First, measurement invariance test was examined. Unconstrained models demonstrated a good fit to the data (χ^2 = 105.34, df = 132, p > .05, RMSEA = .05). Unconstrained models were compared with constrained models in which all path estimates (factor loadings) were fixed to be equal. As outlined in Table 5, the Chi-square difference between the models (Δ χ^2) was 6.15 with seven degrees of freedom. The difference was not significant (p > .05). This indicated that constraining the path estimates to be equal between groups did not cause significant changes in model fit (Sass & Schmitt, 2013). This result demonstrates that the full-metric invariance was supported ($\Delta\chi^2$ (7) = 6.15, p > .05). This analysis shows that the factor structure was the same for both groups of respondents.

Next, multi-group analysis of structural invariance was performed to examine the moderating role of consumer types as shown in Table 6. A two-group structural model was set up as previously carried out on the measurement model. An unconstrained model was generated by adding paths among variables rooted in the full-metric invariance model. The unconstrained model demonstrated the adequate fitness of the data (χ^2 = 190.91, df = 172, p < .05, RMSEA = .02). Furthermore, the unconstrained model was estimated, and it presented acceptable fit indices, and it was compared to the constrained model. The Chi-square difference between the models (Δ χ^2) was 36.76 with 14 degrees of freedom; the significant differences were identified (p < .05). The results indicated that there were significant path differences between the two groups, and further analysis was carried out to estimate the hypotheses for the moderating effect. The multi-group analysis results and the hypotheses results are listed in Table 7. The results showed that the influence of perceived usefulness on mobile banking adoption were significantly stronger among utilitarians (β= .16, p = .00) than hedonists (β= .08, p = .01). Perceived ease of use was also significantly higher among utilitarians (β = .14, p = .01) than hedonists (β = .01, p = .00). However, in terms of mobile service quality, hedonists (β = .70, p = .01) had a higher level of behavioral intentions to use mobile banking

Table 4

The Hypotheses Testing Results of the Structural Model

Path	All consumer Types Beta	p-value	Result
H1: PU ⟶ BI	.58	.01**	Supported
H2: PEU⟶ BI	.33	.01**	Supported
H3: MBSQ ⟶ BI	.54	.01**	Supported
H4: RG ⟶ BI	.11	.00**	Supported
H5: BI ⟶ ACT	.95	.00**	Supported

Note. Significance: **p< .01

Table 5

Results of Measurement Invariance

Model	χ^2	df	p-value	RMSEA	CFI
Unconstrained Model	105.34	132	.37	.05	1
Constrained Model	111.49	139	.96	.02	1
Comparison Test	6.15	7	.59		

Note. Significance: *p< .05

Table 6
Structural Invariance

Model	χ^2	*df*	*p*-value	RMSEA	CFI
Unconstrained Model	190.91	172	.02*	.02	1.00
Constrained Model	153.15	158	.02*	.02	1.00
Comparison Test	36.76	14	.01**		

Note. Significance: *p< .05, **p< .01

Table 7
Multi-Group Analysis with Utilitarian and Hedonic Consumers as a Moderator

Path	Utilitarian Consumers		Hedonic Consumers		Results
	Beta	*p*-value	Beta	*p*-value	
H6a: PU ⟶ BI	.16	.00**	.08	.01**	Supported
H6b: PEU ⟶ BI	.14	.01**	.01	.00**	Supported
H6c: MBSQ ⟶ BI	.45	.01**	.70	.01**	Supported
H6d: RG ⟶ BI	.06	.08	.20	.01**	Partially Supported

Note. Significance: **p< .01

services than utilitarians (β = .45, p = .01). Moreover, reference groups were found to be significant only for hedonists (β = .20, p = .01) but not for utilitarians (β = .6, p = .08). Hence, hypothesis 6(d) was partially supported. H6(a), H6(b), and H6(c) were supported and with statistical significance present at the .01% level.

Discussion and Conclusion

The primary objective of the study was to understand the adoption of mobile banking services in Thailand, with the moderating effect of hedonic and utilitarian consumers on the relationship between the factors and the intention to adopt mobile banking. The proposed model was developed based on two well-known theories, namely, the technology acceptance model (TAM) and mobile banking service quality (MBSQ), along with a reference group. Mobile banking service quality was treated and analyzed as the higher order factor of security and privacy, practicity, design and aesthetics, sociality, and enjoyment. Overall, the strongest factors affecting consumer behavioral intentions towards mobile banking services were perceived usefulness, followed by mobile service quality, perceived ease of use, and the reference group, respectively. Consumer types, as posited, moderated the effects of consumer behavioral intentions to use mobile banking in developing countries. The results from the data analysis provide support for our proposed conceptual model.

The findings in the study show that perceived usefulness had the most significant influence on behavioral intentions to use mobile banking services. This is in line with the previous findings of Agyei et al. (2020), Alalwan et al. (2016), and Ho et al. (2020), in that perceived usefulness effects the adoption of mobile banking services. This result implies that if mobile banking is useful and beneficial, consumers are more likely to adopt mobile banking services. Similarly, the perceived ease of use was found to have a positive correlation with a respondent's behavioral intentions to adopt mobile banking services. This study shows congruent results with past research that found a positive association between perceived ease of use and behavioral intentions to use mobile banking service. When customers perceive that the mobile banking is easier to understand and implement, they have the behavioral intentions to adopt it (Farah et al., 2018; Kumar et al., 2020; Makanyeza, 2017). Additionally, this study found that behavioral intentions to use was a stronger predictor of actual use of mobile banking services. This is in line with the previous findings of Venkatesh et al. (2012) and Kwateng et al. (2019), who found a significant relationship between behavioral intentions to use and actual use of mobile banking services.

Furthermore, the results show that reference groups have a significant effect on behavioral intentions to use mobile banking services. The result was confirmed by the studies of Hoonsopon (2016)

and Mattila et al. (2001), in that reference groups influence the behavioral intentions to adopt new technology products. Consumers use reference groups as guidelines for decision making, which results in the adoption of mobile banking services (Alkawaldeh et al., 2020). Thus, if the effect of reference groups is high, it can create a higher level of customer behavioral intentions to adopt mobile banking services.

Regarding mobile banking service quality, the research findings reveal that mobile banking service quality has a positive impact on customer behavioral intentions to use mobile banking services. There are very few studies that have examined the impact of mobile banking service quality on customer behavioral intentions to use mobile banking. This is supported by Puriwat and Tripopsakul (2017) who first revealed that mobile banking service quality was a significant predictor of mobile banking service adoption behavior. If the service quality offered by mobile banking was higher, the more it would increase mobile banking adoption. The research results validated the original dimensions of mobile banking service quality developed by Arcand et al. (2017), in that mobile banking service quality is based on five-dimensions. This research found that the most valuable dimension of mobile banking service quality in mobile banking is practicity, followed by security and privacy, design and aesthetics, sociality, and enjoyment.

Regarding the moderating effect of consumer types, the findings of this study fill the gap in the existing literature by empirically examining the moderating effects of consumer types on mobile banking adoption. Utilitarian and hedonic consumers respond differently in their concerns about perceived usefulness, perceived ease of use, mobile banking service quality, and reference groups in mobile banking adoption. The effects of perceived usefulness and perceived ease of use on mobile banking adoption are stronger among utilitarian consumers compared to hedonic consumers. Childer et al. (2001) stated that perceived eased of use and perceived usefulness interacts with hedonic and utilitarian consumers and are both predictors of online retail shopping behavior. In contrast, the impact of mobile banking service quality in mobile banking adoption is higher among hedonic consumers than among utilitarian consumers. This study shows results in accordance with those of the previous literature in that each type of consumer (utilitarian and hedonic consumers) exhibits dissimilar expectations of mobile service quality regarding mobile internet adoption (Kim & Hwang, 2012). Since each type of consumer has distinct perceptions on mobile service quality, this leads to diverse impacts on mobile banking adoption. Finally, reference groups partially moderate the adoption behavior of mobile banking services. The impact of reference groups was significant only for hedonic consumers but not for utilitarian consumers. The explanation might be that utilitarian customers use rational thought to accomplish their goals to serve their needs, which is their greatest priority (Batra & Ahtola, 1991). Therefore, they do not follow reference groups when they adopt mobile banking. Another possible explanation might be that different types of reference groups have different effects on individuals such as families, friends, influencers, and celebrities (Childers & Rao, 1992). Future study should examine the impact of different types of reference groups on mobile banking adoption behavior.

This research also contributes to behavioral science knowledge and practice. For theoretical implications, first, to the best of our knowledge, this study is one of the first studies to examine the moderating role of different types of consumers on the acceptance and use of mobile banking in developing countries. This research furthers the understanding of the interacting role of consumer types (utilitarian and hedonic consumers) on consumer behavioral intentions to use mobile banking services, while the previous literature has examined the direct effects of consumer types on purchase behavioral intentions (Scarpi, 2012). The findings verify how types of consumers can moderate the effects of perceived usefulness, perceived ease of use, mobile banking service quality, and reference groups on mobile banking adoption. Second, no study has yet integrated the TAM and MBSQ with a reference group to explain consumers' behavioral intentions and actual usage of mobile banking services. The proposed model contributes to the knowledge by extending the TAM model with mobile banking service quality and reference groups, which provide unique insights and a better understanding of the success factors in improving consumers' acceptance of mobile banking in Thailand. The results show that this proposed model is a valid model and has increased the predictive power of the theoretical framework. Finally, this research contributes to behavioral science by revealing that utilitarian and hedonic

consumers have diverse impacts on their behavioral intentions to use and adopt mobile banking services according to different motives or factors.

As well as the theoretical implications above, this research provides practical implications for banks and other financial institutions regarding the key drivers that influence mobile banking adoption behavior and the important role of consumer differences. First of all, perceived usefulness was the strongest predictor of behavioral intentions to adopt mobile banking services. Thus, financial marketers should promote the benefits of using mobile banking such as faster transactions, convenient and contactless payment technology, and lower costs for customers in their promotional campaigns. It is particularly important to emphasize that mobile banking services greatly facilitate business activities and improve working performance (Agyei et al., 2020). Second, as mobile banking service quality was found to be the second most influential antecedent of acceptance, banks should focus on all five attributes of mobile banking service quality (Arcand et al., 2017), especially practicity as the highest dimension, followed by security and privacy, design and aesthetics, enjoyment, and sociality in order to effectively enhance the rate of mobile banking adoption. Service providers are recommended to improve the design, content, and features of mobile banking applications to secure and make it practical for consumers to appreciate using it. Third, perceived ease of use was also one of the important aspects that was deemed to affect the adoption of mobile banking services (Kumar et al., 2020). Marketers should promote the ease of using mobile banking services and inform potential users about the technical support available to assist them if certain problems occur, such as SMS and online messaging support via applications such as a chatbot and live chat. Training and online tutorials can stimulate customer curiosity and innovativeness while improving their usage skills for mobile services. Fourth, the research also found reference groups to be a significant determinant of mobile banking adoption. Therefore, marketers should stimulate consumers' reference groups through mass media and individual interactions. Efforts made in this regard should involve social media marketing as well as e-WOM and viral marketing to persuade consumers to use mobile banking services. Favorable opinions from friends, colleagues, relatives, and also digital influencers, shared via social networks or otherwise, are a powerful means to promote a mobile banking service (Alkawaldeh et al., 2020).

Lastly, marketers might use different marketing communication strategies based on the segments resulting from the moderating effect of customer types. From the results of this study, marketers should use all four factors in creating marketing communication strategies but should give priority to the first two factors that have the most impact on the two distinct groups of customers (utilitarian and hedonic consumers). If an action targets utilitarian consumers, marketers should focus on the mobile banking service quality and the relative advantage of using mobile banking. The mobile banking application should be a useful and well-designed mobile application in terms of the application's appearance, layout, structure, and available functions (Saprikis et al., 2022). If the campaign targets hedonic consumers, it should focus on mobile banking service quality and reference groups. Marketers should promote and pay careful attention to the functional quality and the hedonic components in mobile banking applications, such as promotional features (e.g., coupons and point collection and redemption) and lifestyle features (e.g., shopping online, e-wallets, and QR code payments), which must not be neglected in order to satisfy hedonic customers. Moreover, openly expressed, positive experiences of peers and influential opinion leaders also increase potential hedonic consumers and encourage them to adopt mobile banking services.

For limitations and directions for future behavioral science research, data collection was limited to the bank customers who live in Thailand. A replication study in a developed country or a comparative study in another country should be able to shed more light on the role of consumer differences in mobile banking adoption behavior in different settings. Moreover, this study measured the actual use of mobile banking with the level of agreement in the questionnaire. Future research is recommended to measure this variable with the frequency of action. Lastly, this study conducted a cross-sectional study. Therefore, a longitudinal study is recommended so as to provide more insights into mobile banking adoption behavior over time.

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