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A Comparative Study of Trust in Mobile Banking:
An Analysis of U.S. and Thai Customers

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ABSTRACT

With the rapid growth of mobile phone usage, mobile services have influenced many industries including banking. Mobile banking has become a popular service as it offers a convenient channel for customers to perform banking transactions. Nevertheless, not all customers feel safe performing financial transactions online. Trust has become a crucial element on whether customers choose to use mobile banking. As a comparative study, this research examines factors and bank customers' characteristics that influence trust in mobile banking between U.S. and Thai mobile banking customers. Three hundred and eight USA consumers and two hundred and fifty-two Thai consumers participated in this study. The results found multiple significant factors influencing trust and usage of mobile banking. This study expands on previous trust and mobile banking usage research and provides practical implications for cross-cultural strategies in mobile banking.

KEYWORDS

Attitude Towards Mobile Banking Use, Cross-Cultural Study, Mobile Banking, Thailand, Trust, USA

INTRODUCTION

Emerging technologies often result in new opportunities, choices, and possibilities, which allow businesses to open new channels for offering products or rendering services to suit their customers' needs (Bhattacharjee et al., 2006; Hajli and Featherman, 2017). The availability of new online services has affected the survival or success of organizations (Bapna et al., 2014). Banking is one industry that has needed to significantly expand their online services through the use of new technologies, adapting to meet the needs of their customers. The rapid adoption of mobile technology has led to the growth of mobile banking services (Al-Otaibi, 2018). Delivering online services through mobile

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banking apps shifts the interaction with customers to mobile devices and can be a key component of customer satisfaction, customer retention, and ultimately, banking success (Sampaio et al., 2017).

Empirical data has determined that a customer's perception of value is one of the factors that will indicate user loyalty. This factor affects whether a customer stays with a company and is a critical element to the banking sector as it affects company earnings (Liebana-Cabanillas et al., 2016). Mobile banking is a banking channel which provides value to customers and may potentially influence the loyalty of customers as it combines the conveniences of Internet banking and processing transactions through a generally easy to use mobile interface (Song, 2015). In addition, mobile banking has been shown to increase the commitment and allegiance of bank customers (Liebana-Cabanillas et al., 2016).

Recently, the number of consumers owning sophisticated mobile handheld devices, i.e., smart phones, has rapidly increased (Gerpott et al., 2013; Kim et al., 2013). However, despite a rapid increase in smartphone users, not all banking customers are ready to embrace this mobile banking channel (Changchit et al., 2018). Banks still face challenges when deploying the technology because a good number of customers are reluctant to use mobile banking for a variety of reasons (Hong, 2019). One reason for this is the lack of trust. Trust plays a crucial role in determining the success of E-commerce, not only attracting new customers but also retaining customers so they continue making purchases (Angriawan and Thakur, 2008). In a survey conducted by Center for International Governance Innovation, 52% of global users are now more concerned about privacy than a year ago and 81% expressed cybercriminals as their primary source of concern (CIGI-Ipsos, 2018). In Malaysia, 91% of online users did not shop online because of lack of trust with online shopping (Samuel et al. 2015). Trust is a major determinant in the success of E-commerce, and there is a need for companies providing services through the Internet to increase the level of trust that their customers have (Wingreen et al., 2018). In the banking industry, trust is related to security and privacy. These factors are even more important for mobile banking and are the major hurdles that impede customers to adopt mobile banking (Yousafzai et al., 2009; Masrek, 2018).

Both antecedents and consequences of trust have been widely examined in E-Commerce research (Angriawan and Thakur, 2008; Wingreen et al., 2018). However, most of the studies on trust have focused on E-commerce rather than online banking. In addition, few studies have explored the motivations for mobile banking adoption in a cross-cultural manner (Yu and Chantatub, 2015). Although prior studies have examined the impact of social influences on trust in mobile banking (Malaquias et al., 2017; Malaquias et al., 2019), the results are inconclusive. In addition, the impact of culture on trust in mobile banking has not been examined. Therefore, it seems fruitful to study trust in the mobile banking context to investigate the impact that culture and normative beliefs have on trust. This study investigates the determinants of trust specifically in the mobile banking context and examines the impact trust has on the attitude towards the use of mobile banking. As the concept of trust is likely to vary across cultures (Austin et al., 2006), this study explores mobile banking trust in two different cultures, the U.S. and Thailand. The comparison between the U.S. and Thailand was chosen because both countries show a high percentage of mobile banking usage (64% in Thailand and 42% in the U.S.) (Statista, 2018), yet these countries vary greatly on their cultural dimensions (Hofstede, 1984).

For this study, we compare the U.S. and Thai mobile banking customers and investigate the question: What is the role of trust in mobile banking for these two nationalities? As a comparative study between these two nationalities, we examine antecedents to trust and the influence that trust in mobile banking has on bank customers' attitude towards using mobile banking. There are several contributions of this research. This study contributes to system adoption theory, showing that trust is an influencing factor on attitude towards use, particularly for Internet/mobile financial transactions. Furthermore, this study expands on the body of literature of trust in online and mobile settings. Also, as this study cross-examined users in the U.S. and Thailand, the results contribute to the literature of the cultural impact on system adoption and provides practical implications for cross-cultural strategies in mobile banking and global markets. The responses were gathered from subjects experienced with

mobile banking and the practical implications should help banks better understand the needs of their customers.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

With the rapid growth of mobile phones, mobile services have become a promising alternative for many industries including banking (AlSoufi and Ali, 2014). Banks have realized that mobile banking is a useful tool to connect with customers, which in turn positively affects profits (Yu and Chantatub, 2015). The adoption of this technology allows bank customers to conduct the financial transactions conveniently without the time and space constraints (Khan, 2018). However, despite many benefits of mobile banking, the use of mobile phones or tablets to conduct bank transactions or access financial information is not as widespread as expected (Dineshwar and Steven, 2013; Shaikh et al., 2015; Shih, Hung, and Lin, 2010). Whether or not customers use mobile banking will depend on a few variables such as whether they trust the website or app, the ease of use, and the compatibility with a customer's lifestyle (Boateng et al., 2016).

Trust

Trust has always been an important factor in influencing consumer behavior (Gefen and Straub, 2003; Jarvenpaa and Tractinsky, 1999). There have been numerous attempts to define and provide meaning to the concept of trust. Moorman, Deshpande, and Zaltman (1993, p. 82) define trust as "a willingness to rely on an exchange partner in whom one has confidence." Trust can be explained as a willingness to rely on an exchange partner for desired benefits (Lee and Turban, 2001; Ba and Pavlou, 2002).

Many customers are reluctant to adopt mobile banking for their bank services because of their concerns with uncertainty and security (Islam, 2014). Social media has greatly influenced customers' habits by posting their positive or negative experiences with companies for others to see. Customers' fear of a potential breach of data or identity theft is perhaps a major concern and a factor in the acceptance of mobile banking. It is vital for financial institutions to give the customer a sense of trust so they can accept and use mobile banking (Song, 2015).

In regard to trust, there are many studies that have examined trust in E-commerce. A recent meta-analysis on this found that in Ecommerce, the antecedents for trust are perceived security, disposition to trust, perceived reputation, perceived risk, perceived system quality, perceived information quality, perceived usefulness, perceived privacy, and perceived service quality (Kim et al., 2017). Consumer trust in Internet transactions has been difficult to develop and maintain due to privacy and security issues (Coupey, 2001; Srinivasan, 2004). The lack of physical contact between customers and online businesses usually causes customers to perceive online transactions as having a higher risk and more uncertain. It is crucial for customers to know that their transaction information will be kept confidential and secure before they are willing to make transactions online. Austin et al. (2006) examined the key indicators of trust and suggested six dimensions as being of critical importance in enhancing consumer trust within the online travel marketplace: order facilitation effort, website presentation and navigation, customer information exchange, customer control and collaboration, transactional security and prior knowledge of vendor. In regard to the effects of culture on trust, one study that examines this found that the national culture explained 23% of the variance of trust (Hallikainen et al., 2018).

There are also studies that have examined trust in the context of mobile banking. Studies have found various categories of factors that influence trust in mobile banking. In Table 1 below, we have categorized the various factors that been found in prior studies that have been shown to have a significant relationship on mobile banking trust. As shown in Table 1, there are various characteristics of the user that have shown to significantly affect trust (gender, age, self-efficacy, personal innovativeness, and propensity to trust). In addition, a user's perception about the bank reputation has been shown to affect trust (structural assurance, risk perceptions, bank reputation, bank integrity, and service quality). In addition, a user's perception about the mobile banking system (perceived

Table 1. Factors Affecting Trust in Mobile Banking

Category	Factor	Studies Finding Significant Relationships
User Characteristics	Gender	Malaquias et al., 2016
	Age (negative relationship)	Malaquias et al., 2016; Malaquias et al., 2017
	Self-Efficacy	Zhou, 2012
	Personal Innovativeness	Malaquias et al., 2016; Malaquias et al., 2017
	Propensity to Trust	Kim et al., 2009
Bank Reputation Factors	Structural Assurance	Zhou, 2011; Zhou, 2012; Kim et al., 2009; Sun et al., 2017; Yu, 2015
	Risk Perceptions (negative relationship)	Malaquias et al., 2016
	Bank Reputation	Zhou, 2012; Chaudhry et al., 2016
	Bank Integrity	Van Deventer et al., 2017
	Service Quality	Zhou, 2012
	Perceived Credibility	Chaudhry et al., 2016
Perceptions of Mobile Banking System	Information Quality	Zhou, 2011; Zhou, 2012; Sun et al., 2017
	System Quality	Zhou, 2012; Chaudhry et al., 2016
	Perceived Ease of Use	Sun et al., 2017
	Perceived System Satisfaction	Sun et al., 2017
Planned Mobile Banking Tasks	Task Characteristics	Malaquias et al., 2016
	Utilitarian Value	Malaquias et al., 2017
	Relative Benefits	Kim et al., 2009
Influence of Others	Social Influences*	Malaquias et al., 2016; Malaquias et al., 2017; Malaquias et al., 2019

* Significant relationship not always found

security, perceived privacy, information quality, system quality, perceived ease of use, and perceived system satisfaction) has been shown to affect trust. Studies have also found factors regarding the task that a user's plan on accomplishing through mobile banking (task characteristics, utilitarian value, and relative benefits) has an effect on trust. The last area that studies have found to be an influencing factor on trust in mobile banking is the influence of others, usually referred to as social influences.

However, social influences have not been shown to be a factor that consistently affects trust. Malaquias et al. (2019) found that social influences significantly affected trust in Brazilian respondents, but not in U.S. respondents. This suggests that there may differences between countries in how trust perceptions are affected. Perhaps the culture of a country could influence trust perceptions or perhaps the normative beliefs may influence users in different ways depending on their culture. For this study, we seek to better understand the impact that culture has on trust. Although the concept of trust is situation-specific, it also may vary across cultures (Austin et al., 2006). In the following section, we address the role that culture and normative beliefs may play in affecting the perceptions and behaviors of users.

Culture and Normative Beliefs

Culture has long been recognized as an important factor shaping consumer behavior (Changchit et al., 2014). Hofstede (1984) defined culture as, "the collective programming of the mind which distinguishes the members of one group from another" (1984, p. 21). According to Hofstede (1984),

culture refers to a "collective phenomenon," as it is at least partly shared with people who have lived within the same social environment where it was learned. It is the collective programming of the mind that distinguishes the members of one group or category of people from another. Culture, therefore, affects people, practices and attitudes. Culture-related studies mostly adopted the cultural framework developed by Hofstede (1984) to their studies as it is well-validated (Chung et al., 2012). This framework consists of four cultural indexes namely individualism versus collectivism, masculinity versus femininity, power distance, and uncertainty avoidance.

While Hofstede's work was first applied to human resource management, it is now increasingly used in business and marketing studies (Yoon, 2009). Culture has been considered a factor influencing IT adoption (Harvey, 1999; Palvia, 1998). Straub, Keil, and Brenner (1997) found that the technology acceptance model (TAM) could not predict technology use across all cultures. The study examined TAM across three countries, Japan, Switzerland, and the U.S. and found that TAM could not explain subjects' behavioral intention in Japan while the model was found to be a good explanation for IT use in Switzerland. The difference in the results was explained to be the influence of national culture. Results in another study also suggested that culture could impede IT implementation efforts because of differences in the way IT was interpreted and given meaning (Robey et al., 1989). Baker et al. (2010) conducted a study with Saudi subjects to examine the cultural effect on technology adoption behavior. The result reported that collectivist culture and the worker's focus on the managerial father figure influences the individual acceptance of technology.

Hofstede's cultural dimensions which may affect the perception of privacy and security among people are the collectivism/individualism and masculinity/femininity dimensions (Chen et al., 2013). There is also evidence that consumers from an individualistic culture have greater tolerance for risk and a greater propensity for virtual transactions than those from collectivistic cultures (Jarvenpaa and Tractinsky, 1999). People from a high uncertainty avoidance culture take less risks because they are motivated by a fear of failure or loss and are consequently more cautious about new innovations.

Thus, it is not surprising that mobile banking studies have found that culture influences usage. One study on a Jordanian bank (Alalwan et al., 2017) found that the adoption rate of mobile banking in Jordan is very low and trust is found to be the most significant factor forecasting the customers' intention to adopt Mobile banking. In Pakistan, adoption happened more quickly, with approximately 140 million users and revenue over $300 million in 2016 (Afshan and Sharif, 2016). With very few bank branches in this country, customers who live in rural areas not in close proximity to a bank often used mobile banking thus not needing the inconvenience of traveling (Afshan and Sharif, 2016). On the other hand, in India in rural areas, adoption has been slow as the rural population was unaware of the banking services available and the appropriate infrastructure was not available in these areas (Gupta et al., 2017). In addition, 41.3% of the Indian population did not have a bank account and there is a more complex process to setup a bank account, which hinders the growth of mobile banking (Gupta et al., 2017).

In Brazil, data from 2014 shows that smartphone usage rate was estimated to be around 75%-80% (Malaquias and Hwang, 2016). A slightly later study examined the impact of social influences on mobile banking trust and found a significant relationship for respondents from Brazil, but did not find a significant relationship for respondents from the U.S. Thus, the relationship between social influences and trust remains inconclusive. Furthermore, mobile banking studies have not focused on the impact that culture has on mobile banking trust. Thus, we seek to examine this issue further.

A related issue is that previous studies have not examined the impact of normative beliefs on mobile banking trust. Normative beliefs represent a social pressure to perform certain behaviors, usually influenced by the culture (Ajzen, 1991). However, it is different from culture as it can be defined as an individual's perception about a particular behavior influenced by the judgment of significant others such as parents, a spouse, friends, teachers, coworkers, and a boss. Normative beliefs can also be defined as the degree of agreement among the opinions of key reference groups

such as friends, peers or colleagues, superiors, and subordinates in an organizational environment (Hernandez and Mazzon, 2007).

According to a recent public opinion boom and widespread use of new technology such as smartphones or tablet devices, people are influenced to adopt technologies used by their relatives and friends. Normative beliefs have become an important factor shaping the direction on how to do business. For instances, Kamal et al. (2013) reported that the adoption of electronic implementation by the government (e-Government adoption) was affected by the existing social structure in Pakistan. Sprott et al. (2003) stated that normative beliefs can lead to a socially desirable behavior in a specific situation, and thus should be included as a fundamental component of any predictive variables. So, the decision to trust or not trust appears to be influenced by others' thoughts. Mobile banking trust will likely have been influenced by the normative beliefs of mobile banking users.

Internet Banking and Mobile Banking in Thailand and the U.S.

In Thailand, the Internet dates back to 1987. While the Internet was initially not used much for banking, after the 1997 financial crisis, operations in Thai banks shifted towards being automated and Internet-based to reduce costs and enhance service competency (Hamid et al., 2007). Although there are increasing numbers of Thai customers using Internet banking, there are still many who are not ready to adopt this channel of banking services (Intana et al., 2013). Esichaikul and Janecek (2009) revealed that the lack of customer service was a major reason preventing customers from using Internet banking in Thailand. Another study reported that trust was a critical factor leading to the adoption of Internet banking for Thai banks (Namahoot and Laohavichien, 2015).

Security of the Internet is a major factor inhibiting the wider adoption of Internet banking in Thailand (Rotchanakitumnuai and Speece, 2003). Subjects revealed they did not trust making financial transactions via Internet channels. Another study conducted by Namahoot and Laohavichien (2015) showed that information quality (i.e. the accuracy of the online transaction recorded) of online banking in Thailand was negatively correlated with the lack of trust in Internet banking. Trust was also found to be the critical factor leading to adoption of using Internet banking in Thailand.

Smartphone applications have had a large growth in Thailand and by 2014, of the 62.3 million of the Thai population ages 6 years and over, 48.1 (77.2%) million were mobile users (National Statistical Office, 2014). This increasing trend of smartphone users has forced banks in Thailand to offer banking services via a mobile channel. It is obvious that smartphones have become part of Thai consumers' life with sixty-four percent (64%) of Thai consumers using mobile banking apps in Thailand (Statista, 2018).

In the U.S., online banking was available since 1981 using a modem, but it wasn't until the late 1990s that there was a significant growth, and by 2010 online banking was growing faster than the internet (Sarreal, 2019). From 2010 to 2016, the number of mobile banking users increased from 35 million to 111 million, which is 51% of banking customers (Statista, 2018). Trusting the security of the app and connection remains a significant hindering factor, but the convenience draws many users (Statista, 2018).

RESEARCH MODEL AND HYPOTHESES

In this study, our research model includes eight constructs. Based on the Hofstede cultural dimension, the two nationalities (U.S. vs. Thai) examined in this study may not have the same level of trust in mobile banking (Hofstede, 1984). We thus believe that it is important to compare their mobile banking trust to investigate whether such difference exists. The next two constructs are age and gender. Age and gender were included as demographic characteristics of respondents. Gender differences can influence the behavior of people in a wide variety of situations (Venkatesh & Morris, 2000), especially in the context of online or mobile services (Yuan et al., 2014). Regarding age, a prior study observed that younger respondents tend to develop higher levels of trust in mobile banking than older respondents

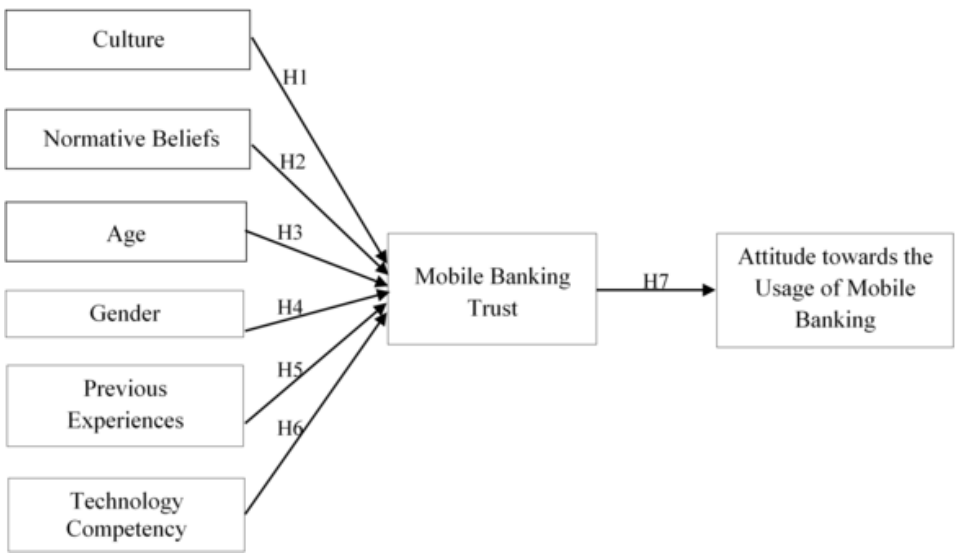
(Malaquias & Hwang, 2016), because they can perceive lower levels of risk in mobile banking (Luo et al., 2010). Therefore, it is interesting to include these two constructs in the model to test whether they have the same or different impact on the mobile banking trust between these two nationalities. The next construct is normative beliefs. Since mobile banking technology is a new technology for banking services, opinions of family members and peers should be a major key for consumers to use this service. In addition, mobile banking transactions require the engagement of counterparty which tends to involve customers' significant others. So, we believe that this construct should be included in the model to test whether it influences the two nationalities in the same manner.

This research also extends the study of factors investigated in prior studies to include the factor "Previous Experiences". It was hypothesized that consumers' experiences on using mobile banking should influence their attitudes toward mobile banking adoption. Third, unlike prior studies that did not track whether subjects have used mobile banking before or not, subjects in this study contain only those who have experience using mobile banking before. Attracting potential customers and retaining existing customers is crucial to the long-term business success of mobile banking firms (Gu et al., 2009). The responses gathered from this target group of subjects should not only help banking services understand the needs of their customers in regard to the adoption of mobile banking but also help them improve the retention rate of their existing customers. Regarding the construct technology competency, typically consumers with a high technology self-efficacy are expected to have positive attitudes on new technology, and it is likely that this construct can impact consumer's attitude on mobile banking adoption. Trust has been reported to affect users' perception of mobile banking satisfaction (Lee & Chung, 2009). We then hypothesize that trust in mobile banking positively influences the attitude toward the use of mobile banking, and thus also include these two constructs in the research model. Each construct included in this model was measured with multiple items. All items were adapted from extant literature to improve content validity (Straub et al., 1997). The model is shown in Figure 1.

Culture and Mobile Banking Trust

Culture has been shown to have an impact on trust. Results from several prior studies suggested that culture had varying impact on the meaning of trust and perceived risk (Jarvenpaa and Tractinsky,

Figure 1. Research Model



1999; Weber and Hsee, 1998). Also, a study reported that culture affects user perceptions of privacy towards instant messaging technology (Cao and Everard, 2008) as well as individuals' risk perception and information systems risk management. Thus, we suggest that culture also may impact the level of trust towards using a mobile banking app and propose the following hypothesis:

H1: There is a significant difference in the level of mobile banking trust between subjects in the U.S. and Thailand.

Age

The influence of age on mobile E-Commerce has been investigated in many studies. For instance, Sarker and Wells (2003) suggested that the age of the potential adopter may predict whether or not an individual is likely to adopt mobile technology. The results of another study also revealed that young users had a different adoption behavior than other age groups (Pederson, 2005) and a study specifically on mobile banking found that age influenced perspectives towards adoption (Chaouali and Souiden, 2019). Sheehan (2002) found that people over the age of 45 years tended to be either not concerned about privacy or highly concerned about privacy, while younger people tended to be more pragmatic, meaning that their concerns about privacy depended on the situation presented. We therefore posit:

H2a: Age has a significant impact in U.S. subjects' trust in mobile banking.
H2b: Age has a significant impact in Thai subjects' trust in mobile banking.

Gender

The influence of gender on new technology adoption has received considerable attention in the literature (Suhong et al., 2008). Prior studies have shown that, compared to men, women are less likely to adopt and to use new technology, have less confidence in their ability to use new technology and are less likely to choose a career in information technology (Wood and Li, 2005).

Several prior studies were conducted to examine the relationship between gender and trust. The results were not all identical as one study found gender to have little to no effect on trust (Chaudhuri et al. 2013) while another study found that gender affected privacy concerns (O'Neil 2001). Other studies also reported that women are more concerned than men about losing their personal privacy in Internet contexts (Garbarino and Strahilevitz, 2004, Sheehan, 1999). Another study also found that girls considered online privacy to be more important than boys. (Youn and Hall, 2008). Grubbs and George (2010) found that women were significantly more concerned than men about the privacy of information, but that no gender difference exists regarding the belief that social networking sites do a good job of protecting privacy. For this paper, we seek to explore if gender impacts the level of trust in mobile banking:

H3a: Gender has a significant impact in U.S. subjects' trust in mobile banking security.
H3b: Gender has a significant impact in Thai subjects' trust in mobile banking security.

Previous Experiences in Using Mobile Banking

Research indicates that prior experiences play a significant role in whether consumers will or will not continue future online transactions (Changchit et al. 2014; Shim et al. 2001). Another study also reported that consumers with more Internet experience have fewer privacy concerns (Bellman et al. 2004). Therefore, previous technology usage experiences may have a role in trust perceptions that customers currently have. We thus seek to investigate the following hypothesis:

H4a: Previous experience (PEX) positively affect U.S. subjects' trust in mobile banking.
H4b: Previous experience (PEX) positively affect Thai subjects' trust in mobile banking.

Normative Beliefs

Normative beliefs represent the social pressures to perform certain behaviors (Ajzen, 1991). It can also be defined as an individual's perception about a particular behavior, which is influenced by the judgment of significant others such as parents, a spouse, friends, teachers, coworkers, and a boss. Normative beliefs can also be defined as the degree of agreement among the opinions of key reference groups such as friends, peers or colleagues, superiors, and subordinates in an organizational environment Hernandez and Mazzon (2007).

According to a recent public opinion boom and widespread use of new technology such as smartphones or tablet devices, people are influenced to adopt technologies used by their relatives and friends. Normative beliefs have become an important factor shaping the direction on how to do business. Sprott et al. (2003) stated that normative beliefs can lead to a socially desirable behavior in a specific situation, and thus should be included as a fundamental component of any predictive variables. So, the decision to trust or not trust appears to be influenced by others' thoughts. Based on this, we propose the following hypothesis:

H5a: Normative beliefs (NB) positively affects U.S. subjects' trust in mobile banking.
H5b: Normative beliefs (NB) positively affects Thai subjects' trust in mobile banking.

Technology Competency

Technology competency is defined as the extent to which an individual is knowledgeable about and effectively utilizes Information Technology to manage information (Tippins and Sohi, 2003). High technology competent consumers are likely to perceive that mobile banking is easy to use (Yang, 2010). Typically, consumers with a high level of self-efficacy are more motivated to use technology-based services. Moreover, they have a more positive attitude and intent to use technology-based services than consumers with a low level of technology competency (Yang, 2010). We thus seek to explore if consumers with a high technology competency are more likely to have a higher level of trust:

H6a: Technology competency (TC) positively affects U.S. subjects' trust in mobile banking.
H6b: Technology competency (TC) positively affects U.S. subjects' trust in mobile banking.

Mobile Banking Use and Trust

There have been numerous attempts to define and provide meaning to conceptions of trust (Shergill and Li, 2005). Moorman et al. (1993, p82) has defined trust as "a willingness to rely on an exchange partner in whom one has confidence". Traditionally trust has not been shown to significantly affect use in non-online technology usage studies (Davis, 1989; Klaus et al., 2010). However, some studies examining use of online systems have found that trust is a significant factor. For example, Mukherjee and Nath (2003) conducted research about online relationship marketing, and further developed the dimensional constructs of trust, providing valuable insights for Internet banking research. Several prior studies also found that low trust in the privacy and security of the system are the most important issues that inhibit customers from using mobile banking (Islam, 2014). In addition, one study examining mobile banking found that trust affects intention to use mobile banking (Sharma and Sharma, 2019). As online banking requires sending financial transaction information over the internet, we propose that trust will be a significant factor that affects attitude towards use:

H7a: Trust positively affects U.S. subjects' attitude towards mobile banking use.

H7b: Trust positively affects Thai subjects' attitude towards mobile banking use.

RESEARCH METHODOLOGY

Instrument Development and Pretest

The questionnaire was designed by adapting questions from prior studies. Some questions related to TAM (Technology Acceptance Model) were adapted from TAM studies (Venkatesh and Davis, 2000; Venkatesh et al., 2003). The other questions used to measure the constructs not related to TAM were adapted from other studies (Changchit et al. 2017; Intana et al. 2013; Pikkarainen et al., 2004; Vijayasarathy, 2004; Wong and Hsu, 2008).

The questionnaire consisted of thirty (30) questions. Twenty-six (26) questions (shown in Appendix A) had a five-point Likert scale and were designed to measure subjects' perceptions on mobile banking. The remaining four questions were asked to gather demographic data of the subjects.

To validate the clarity of these questions, three professors and three researcher assistants were asked to read through the survey questions. Revisions to the survey were made based on the feedback received. For linguistic validation, this questionnaire was first translated from English to Thai by two researchers. A third researcher then translated the Thai questionnaire back to English. There were minor discrepancies for several questions compared to the original English questionnaire which were discussed and resolved in order to make the Thai and English questionnaires equivalent.

Data Collection

Surveys were distributed to students enrolled at a South-western United States university for the U.S. subjects and a Northern university in Thailand for Thai subjects during the fall and spring semester of 2015-2016 academic year. The researcher contacted the instructors to gain their consents to distribute the surveys in their classes. In the class, the researcher spent about ten minutes explaining the importance of the study and asked students to read each item carefully as their responses are very important to this study. Then, all students were provided with sufficient class time to respond to the survey. Students were informed that participation in the study was voluntary and that their responses would be kept anonymous.

For subjects in the U.S., four hundred and forty-seven (447) subjects participated in this study. However, only three hundred and fifty-five (355) responses are valid. Of the three hundred and fifty-five (355) subjects, three hundred and eight (308) or 69% of them are mobile banking customers. The remaining forty-seven (47) or 31% of the subjects have never used mobile banking before and thus have been removed from the data analysis.

For the Thai subjects, four hundred (400) subjects participated in this study. Of the four hundred (400) subjects, two hundred fifty-three (252) or 63% of them are mobile banking customers. The remaining one hundred forty-seven (148) or 37% of the subjects have never used mobile banking before and therefore have been disregarded from further analysis. Subjects' demographics for both countries are shown in Table 2 below.

DATA ANALYSIS AND DISCUSSION

Analysis of Measurement Model

The data analysis for this study was conducted using SPSS 25.0 and AMOS 25.0 statistical software. A reliability test was conducted to examine the internal consistency of the research instrument. The test confirmed the reliability with Cronbach's alpha coefficient of 0.947 for the U.S. subjects and 0.946 for Thai subjects. In addition, since multicollinearity can have

Table 2. Subject's Demographics

Items	U.S., n = 308		Thai, n =252	
	Number	**Percentage**	**Number**	**Percentage**
Gender				
Male	139	45.13%	90	35.71%
Female	169	54.87%	162	64.29%
Total	308	100%	252	100%
Age group				
Below 24	236	76.62%	201	79.76%
Over 24	72	23.38%	51	20.24%
Total	308	100%	252	100%
Current level of education				
Undergraduate	242	78.57%	176	69.84%
Graduate	60	19.48%	74	29.37%
No answer	6	1.95%	2	0.79%
Total	308	100%	252	100%
Have made purchase through Internet				
None	14	4.55%	38	15.08%
1-5	212	68.83%	194	76.98%
6-10	46	14.94%	10	3.97%
11 and up	30	9.74%	10	3.97%
No answer	6	1.95%	0	0%
Total	308	100%	252	100%

harmful effects (Cenfetelli and Bassellier, 2009), multicollinearity was assessed for all of the indicators in the research model. The results revealed that the multicollinearity is not an issue with this data set.

The measurement model for the seven constructs was assessed by a confirmatory factor analysis with varimax rotation in order to test whether the questionnaire items produced the expected number of factors and whether each item loaded on their appropriate factor. Results from the factor analysis indicate that the items loaded into six factors. As shown in Table 3 below, the result from the factor analysis reveals that the ten (10) questionnaire items designed to measure perceived privacy and perceived security loaded onto the same factor. We, therefore, combined the two factors and labeled it as Trust. As previous research has identified perceived privacy and perceived security to be dimensions of trust (Yousafza et al., 2009), this classification into one construct seems reasonable. All other factors loaded as expected.

The measurement model was further assessed for construct reliability. The composite reliability for all the constructs was above .70, conforming to an acceptable threshold (0.7 or above) suggested by Nunnally and Bernstein (1994). Table 3 below presents the mean, standard deviation, factor loading, and composite reliability of all items assessed in this study.

Table 3. Summary of measurement scales

Constructs	U.S.				Thai			
	M	SD	Factor Loading*	Reliability	M	SD	Factor Loading*	Reliability
Trust				0.937				0.943
T1	3.435	1.121	0.818		3.187	1.022	0.827	
T2	3.610	1.091	0.821		3.187	1.049	0.859	
T3	3.724	1.049	0.839		3.425	1.005	0.799	
T4	3.698	1.165	0.651		3.421	1.044	0.700	
T5	3.211	1.301	0.728		3.083	1.043	0.750	
T6	3.633	1.020	0.719		3.187	0.902	0.775	
T7	3.506	1.063	0.755		3.187	0.924	0.791	
T8	3.328	1.181	0.763		3.202	0.921	0.745	
T9	3.617	1.182	0.637		3.294	0.884	0.656	
T10	3.718	1.050	0.751		3.282	0.890	0.800	
Previous Experiences				0.913				0.907
PEX1	4.166	0.959	0.769		3.869	0.885	0.739	
PEX2	4.195	0.969	0.788		3.921	0.889	0.783	
PEX3	4.195	0.938	0.806		3.937	0.877	0.839	
PEX4	4.075	1.048	0.811		4.163	0.809	0.797	
PEX5	3.860	1.099	0.783		3.706	0.907	0.666	
Normative Beliefs				0.822				0.770
NB 1	3.419	1.093	0.646		3.357	0.874	0.698	
NB 2	3.338	1.151	0.688		3.218	0.976	0.558	
NB 3	2.795	1.358	0.822		2.937	1.088	0.789	
NB 4	3.273	1.265	0.748		3.722	1.003	0.577	
NB 5	3.370	1.242	0.769		3.627	1.016	0.665	
Technology Competency				0.870				0.867
TC 1	4.510	0.957	0.619		4.198	1.082	0.676	
TC 2	4.571	0.810	0.745		4.405	0.839	0.788	
TC 3	4.442	0.902	0.863		4.175	0.857	0.882	
TC 4	4.315	0.976	0.851		4.274	0.833	0.833	
TC 5	4.234	1.042	0.851		4.107	0.875	0.829	

* Rotation Method: Varimax with Kaiser Normalization.

MODEL TESTING RESULTS AND DISCUSSION

Table 4 below shows the results for H1, indicating that U.S. subjects have a significantly higher level of trust in mobile banking than Thai subjects. The mean and median of trust (T) of U.S. subjects are 3.548 and 3.500, while those of Thai subjects are 3.245 and 3.200, respectively. The mean and median across the two countries are significantly different at the 1% level, indicating that various aspects of the culture likely impacted the level of trust that users had in mobile banking.

In order to assess the relationship of factors in the proposed research model, a multiple regression analysis was conducted to test hypotheses H2 to H6. The independent variables include

Table 4. Subjects' trust in mobile banking

Perceived Trust	U.S.	Thai
Mean	3.548	3.245
Median	3.500	3.200
Standard Deviation	0.898	0.790
Observations	308	252
Mean diff. (U.S. - Thai)	0.3038***	
t Stat	4.19	
P(T<=t) two-tail	< 0.0001	
Wilcoxon Z Stat	3.930***	

*** Significant at 1% level

normative beliefs (NB), age, gender, previous experience (PEX), and technology competency (TC). The dependent variable in this test is the trust (T) in mobile banking. The regression equation was written as follow:

$$T_i = \alpha_0 + \alpha_1 NB_i + \alpha_2 Age_i + \alpha_3 Gender_i + \alpha_4 PEX_i + \alpha_5 TC_i + \varepsilon_i \quad (1)$$

$$ATT_i = \beta_0 + \beta_1 T + \mu_i \quad (2)$$

The results as shown in Table 5 indicate, the R^2 and adjusted R^2 of 42.0% and 41.1%, respectively, for U.S. subjects and 40.7% and 39.5% for Thai subjects, showing that the factors investigated are

Table 5. Relationship between independent factors and trust in mobile banking

	U.S. Subjects; n = 308				Thai Subjects; n = 252			
Independent Variables	**Ha**	**β**	***t***	**VIF**	**Hb**	**β**	***t***	**VIF**
Model 1: Dependent variable: Trust								
Age	H2a	0.291***	6.63	1.0925	H2b	0.338***	5.29	1.3950
Gender	H3a	0.075	0.79	1.0310	H3b	-0.049	-0.51	1.0267
PEX	H4a	-0.004	-0.05	1.0232	H4b	-0.003	-0.04	1.0756
NB	H5a	0.479***	9.15	1.3281	H5b	0.485***	7.71	1.4645
TC	H6a	0.079	1.36	1.2532	H6b	-0.116**	-1.98	1.2233
		R-Square Adj R-Square F-stat		0.420 0.411 43.76***		R-Square Adj R-Square F-stat		0.407 0.395 33.82***
Model 2: Dependent variable: Attitude towards Mobile Banking Use								
Trust	H7a	0.572***	9.38	1.0000	H7b	0.561***	8.75	1.0000
		R-Square Adj R-Square F-stat		0.224 0.221 88.08***		R-Square Adj R-Square F-stat		0.234 0.231 76.53***

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

suitable to explain the trust of mobile banking. The F-stat was reported to be at 43.76 for U.S. subjects and 33.82 for Thai subjects, both of which are significant at the 1% level. The variance inflation factors (VIF) for all factors range between 1.0232 and 1.3281 for U.S. subjects and between 1.0267 and 1.4645 for Thai subjects. All VIFs are less than 10, indicating that there is no multi-collinearity problem.

In regard to the results for age (H2a and H2b), the analysis does not indicate that Age significantly impacts the level of trust in mobile banking for both Thai and U.S. respondents. This is interesting in that it shows a societal shift in the level of trust people have as younger adults traditionally have had a higher level of trust in online data security (Fleming et al., 2016). Multiple news releases on large data breaches perhaps have affected the level of trust that younger adults have in mobile banking, making the level of trust that older adults have comparable to younger adults. In addition, it is possible that higher percentages of older adults have used much more of mobile banking and smartphones in the last decade, they do not consider it as a new experience and their perceived risk of mobile banking has decreased over time.

For gender (H3a and H3b), the results indicate that gender does not significantly impact the level of trust in mobile banking for both Thai and U.S. respondents. This could be due to a societal shift overall as studies from 10 to 20 years ago regularly have found that gender is a significant factor (Garbarino and Strahilevitz, 2004; O'Neil, 2001; Sheehan 1999; Yaun and Hall, 2008), but a couple of more recent studies either found a weak relationship between age and trust (Malaquias and Hwang, 2016) or did not find a significant relationship (Jiabao et al., 2014). As the percentage of people using mobile banking has greatly increased, perhaps gender is no longer an influencing factor in the level of trust that a person has in mobile banking.

Previous experiences (H4a and H4b) in mobile banking is shown to be a significant factor that influences the level of trust in mobile banking for both Thai and U.S. respondents. The chance is low that people who previously used mobile banking have had their data compromised. Therefore, it is likely that respondents who have used mobile banking in the past have the experience of mobile banking reliability without a data breach. This perhaps makes them more confident in trusting mobile banking while people who have not used mobile banking in the past may be more hesitant because of the news reports of data breaches in large corporations.

For normative beliefs (H5a and H5b), the results show that normative beliefs are a significant factor that influences the level of trust in mobile banking for both Thai and U.S. respondents. Trust in mobile banking is clearly influenced by the opinions of others. If others think that mobile banking should be used, a person will likely have a larger amount of trust towards using mobile banking. This is perhaps because most people do not spend the time to research the chance of a data breach or its impact, and thus the recommendations of others on mobile banking may make people increase their confidence in the security of their data and financial transactions.

For Technology Competency (H6a and H6b), the results indicate that Thai respondents who have a higher perceived technology competency also have a greater level of trust in mobile banking. However, there is not a significant result in this relationship for U.S. respondents. This is likely due to different cultures between U.S. and Thai respondents. The findings confirm suggestions from other studies that culture should be considered in explaining the IT adoption (Chang et al., 2015; Kim et al., 2013; Hung et al., 2012; Niederman et al., 2012; Susanto et al., 2013). Previous studies have found that attitude towards use or actual usage is greater when there is a higher level of technology competency (Tippins and Sohi, 2003; Yang, 2010; Lin 2011). However, there is no indication that Technology Competency increases a personal's perception of trust towards the technology.

In regard to the effect of Trust on Attitude towards Use (H7a and H7b), the results indicate significant results for both U.S. and Thai respondents. This is interesting to note as the Technology Acceptance Model (TAM) research found that Perceived Usefulness and Perceived Ease of Use are the primary indicators that show consistent results towards predicting Attitude towards Use. However, as much of the TAM research focused on the voluntary acceptance of information systems within an organization, it does not necessarily fully apply to the use of personal mobile banking systems. As

employees, organizational users may trust a system because it was recommended by managers or the IT department. However, in the case of personal mobile banking, users may have a different perspective towards trusting the system as their own finances and personal information are at stake. Thus, trust is an important consideration that impacts the attitude towards using the mobile banking system.

CONCLUSION AND IMPLICATIONS

The research results suggest that there is a significant difference between Thai consumers and U.S. consumers regarding their mobile banking trust. In addition, the results suggest various factors that influence both Thai and U.S. customers' perspective of trust towards using mobile banking. The research results also indicate that trust is an influencing factor in customers' attitude towards use for both Thai and U.S. customers.

This study expands on previous research as it examines mobile banking in different cultures, examining differences in customers' perspectives towards mobile banking and trust. The different cultures in Thailand and the U.S. impact mobile banking customers' views towards using their smartphones for mobile banking. The U.S. respondents had a higher level of mobile banking trust. The results also showed that normative beliefs for both Thailand and U.S. respondents impacted their level of mobile banking trust. It is interesting to note that culture and normative beliefs influence mobile banking users and these results expand on the stream of literature as prior studies have not conclusively determined if these factors influence mobile banking trust.

In addition, the research findings of this study contribute to system adoption theory with the integration of cultural impact. The findings reveal that the factors that influence trust may not be the same for different cultures. For instance, the finding in our study revealed Technology Competency as a significant factor for Thai customers, but not for U.S. customers. This indicates that not all factors are going to influence users in the same way and provides support for the influence that the culture has on individuals who are considering mobile banking. As this study cross-examined users in the U.S. and Thailand, the results also contribute to the literature of the cultural impact on system adoption and provides practical implications for cross-cultural strategies in mobile banking and global markets. In addition, unlike prior studies that include all subjects regardless of their mobile banking experience, subjects in this study contain only those who are currently using or have had experiences using mobile banking. The responses gathered from this target group of subjects should not only help banking services understand the needs of their customers in regard to the adoption of mobile banking but also help them improve the retention rate of their existing customers.

Based on the results, there are several practical implications for banks. As customers' perspectives have been found to differ among cultures, global banks need to adapt their strategies to the culture they are targeting as one strategy likely will not meet the differing needs of customers' perspectives across various cultures. As countries differ in many ways, banks need to understand the factors that influence trust and usage. It is interesting to note that this trust was found to be a mediating variable influenced by several factors and influencing customers' attitude towards use. Some factors, such as Previous Experiences and Normative Beliefs influence trust in both the U.S. and Thailand, but it is important to understand culture in order to effectively market and deliver an application to customers in a particular country. Furthermore, since trust influences customers' attitudes towards use, banks should consider how they can increase customers' perspectives of mobile banking trust, so that usage rates and customer retention rates are higher.

Similar to many other empirical studies, there is an inherent limitation due to the sample, which was students in Thai and U.S. universities. The practice of using students as surrogates of real-world subjects is rather widespread in empirical studies (Luo et al., 2010; Remus, 1998; Zhou, 2012). Previous studies have suggested that students are good surrogates to mobile banking consumers (Luo et al., 2010; Zhou, 2012) and usage of younger bank customers is similar to older bank customers (ABA Banking Journal, 2017). Typically, the key factor that determines the suitability of students as

surrogate is the nature of services investigated. In this study, since one construct in the research model is previous experience, all subjects who have not used mobile banking before were excluded from the data analysis. Therefore, these student subjects should represent the population of interest in this study. In addition, prior studies also supported that adopters of mobile banking have some intermediate education and are generally younger, as younger customers tend to perceive lower risks in mobile banking than mature customers and are less resistant to changing their habits to perform financial transactions (Luo et al., 2010; Laukkanen et al., 2007; Suoranta et al., 2015). We, therefore, believe that student subjects are suitable for this study. Previous studies have suggested that students are good surrogates to mobile banking consumers (Luo et al., 2010; Zhou, 2012) and usage of younger bank customers is similar to older bank customers (ABA Banking Journal, 2017). However, there might be an external validity issue as students do not represent the entire population of mobile banking users. Future research using non-student subjects is encouraged for greater external validity. In addition, studies could examine the effectiveness of organizational strategies in building and influencing customers' trust and influencing banking customers' attitude towards use. One more area of future research could be to examine specific cultural aspects that affected why trust significantly varied between the U.S. and Thailand respondents.

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APPENDIX A. RESEARCH QUESTIONNAIRE

Table 6. Research Questionnaire

Trust (T)	
	I believe that the mobile banking system will protect the privacy of my personal banking data
	I believe that the mobile banking systems will not disclose my personal banking data
	I believe that banks will keep mobile banking transaction confidentially
	I am not afraid to do transactions via mobile banking
	I am not afraid to lose my confidential data via mobile banking transactions
	Using mobile banking enables me to conduct transaction securely
	Using Internet banking makes me believe that the existing regulations are sufficient to ensure that users are protected
	Overall, I am not worried about the security of the mobile banking
	I believe that my banks protect me from unauthorized charges
	I believe that my transactions are secured
Previous Experience (PEX)	
	I am usually satisfied with the mobile banking services
	My mobile banking transactions are always accurate
	I usually have a good experience with mobile banking services
	My transactions are always processed in a timely manner
	I never feel disappointed with mobile banking
Normative Beliefs (NB)	
	People in my organization think that I should use mobile banking
	My family thinks that I should use mobile banking
	My friends influence my decision to use mobile banking
	The image of the bank has influence on my using mobile banking
	Using mobile banking makes me feel current in the trend
Technology Competency (TC)	
	I use computer everyday
	I am not afraid of using technology
	My ability to learn new technology is high
	I am always interested in new technology
	I enjoy working with technology
Attitude towards the Use of Mobile Banking (ATT)	
	Overall, I prefer to do mobile banking transaction than other forms of banking

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