

A Conceptual Model for Mobile Banking Adoption

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Abstract

Despite the steady growth of Internet banking and mobile banking, only half of adults in the U.S. use online banking, with the other half still visiting physical branches for their banking services (Fox, 2013). For years, studies are being conducted in the IS field using the Technology Acceptance Model (TAM) in order to determine the key factors explaining the adoption of online banking. But, due to the privacy concerns and the psychological barriers often associated with conducting transactions in a virtual world, the TAM has proven to be a limited tool. In this study, we revisited the IS literature on mobile banking adoption along with relevant theories from the areas of marketing and psychology in order to develop a conceptual model that would have a potentially greater explanation power. The proposed model emphasizes the role of subjective norms, technological readiness, trust, and perceived critical mass of users. The model is discussed along with the research propositions it implies. The theoretical and practical implications of the study are also discussed.

Keywords: mobile banking, technology adoption, technology readiness, perceived critical mass

Introduction

Mobile banking refers to the provision of banking services with the help of mobile telecommunication devices. The scope of offered services may include monitoring account balance, transferring funds between accounts, bill payments, and remote check deposit among other services. For years, driven by the need to improve the cost-effectiveness of operations, financial institutions have been using Web technology to provide mobile and Internet banking services and, substantially, reduce the need for personal interactions in the provision of their services (Elliott, Meng, & Hall, 2008). Today most financial institutions in the western hemisphere are offering Internet banking and mobile banking options to their customers. Despite the steady growth of Internet banking and mobile banking, only half of adults in the U.S. use online banking, with the other half still visiting physical branches for their banking services (Fox, 2013). In the IS field, many studies have been conducted using the technology acceptance model (TAM) to determine the key factors explaining the adoption of online banking (Amin, 2007; McKechnie, Yu, 2012). The TAM by Davis (1989) and the TAM2 by Venkatesh and Davis (2000) arguably do not include factors that are meant to capture key elements such as trust and risk associated with the adoption of e-commerce. Given the privacy concerns and the psychological barriers often associated with conducting transactions in a virtual world, the TAM has proven to be a limited tool (Shen, Huang, Chu, & Hsu, 2010). That is why recent studies are using extended versions of the TAM that include factors such as trust and security concerns. (Chiou & Shen, 2012; Kesharwani & Bisht, 2012; Wang, Hsu, Pelton, & Xi, 2014; Shen, Huang, Chu, & Hsu, 2010; Wang, Hsu, Pelton, & Xi, 2014).

The objective of the present study is to review the IS literature on the adoption of mobile banking along with relevant theories from the areas of marketing and psychology in order to

develop a conceptual model that would have a potentially greater explanation power. In the next sections, we will review the relevant literature in order to lay out the theoretical justifications for the concepts to be included in the model. Then, based on the theoretical background, we will discuss the conceptual model along with the research propositions implied. Finally, the paper will discuss the theoretical and potential practical implications of the model.

Theoretical background

In the IS field, the technology acceptance model has become a cornerstone for explaining technology adoption and use.

The technology acceptance model

Grounded on the theory of reasoned action or TRA (Fishbein & Ajzen, 1975), the TAM is an implementation of the belief-attitude-intention-behavior relationship. According to the TAM, the actual use of a technology is determined by beliefs a user holds about its *perceived usefulness* and its *perceived ease of use*. Perceived usefulness refers to the extent to which people believe that a technology will help them perform their job better, while *perceived ease of use* refers to the degree to which a person believes that using a particular IT would be free of effort (Davis, 1989). According to the model, potential users' perceptions determine their attitude (favorableness or unfavorableness) toward using a specific technology. The attitude will, then, determine their behavioral intention, that is, their intention to use the technology. Finally, the intention may lead to their actual use of the technology.

Over the years, studies have been conducted using extended versions of the TAM in an attempt to explain the adoption of online banking (i.e. mobile and Internet banking). The study of Vatanasombut, Igbaria, Stylianou, and Rodgers (2008) has found that perceived security has a significant impact on trust in online banking which, in turn, has a significant impact on the continuance intention to use online banking. Shen et al. (2010) also found that technology anxiety, convenience benefit, security cost, and trust in the financial institution have a significant impact on the intention to adopt mobile banking. The study of Singer, Baradwaj, Flaherty, and Rugemer (2012) found that, through its impact on perceived ease of use and perceived usefulness, experience has a negative effect on online banking use. They concluded that as an individual gains experience with more complex and sophisticated features of a bank web site, the intensity and frequency of use diminish. Considering different aspects of risk, the studies of Wang et al. (2014) and Chiou and Shen (2012) confirmed the common sense idea that perceived risk (including financial risk, performance risk, time risk, and psychological risk) has a negative impact on engaging in online banking.

The review of those recent studies reveals a distinctive characteristic of online banking. That is, there is a high risk and a potential for monetary loss for the customer who engage in online banking. Therefore, *trust* must be a key factor at the center of any model that aims at explaining mobile banking adoption.

Trust

From the social psychology perspective, trust is characterized in terms of the expectation and willingness of the trusting party engaging in a transaction (Roca, García, & de la Vega, 2009). It

is the main catalyst of most business transactions. According to Mayer, Davis, and Schoorman (1995), trust is a multidimensional concept, typically, defined as the perceived *credibility*, *benevolence*, and *integrity* of a business partner. *Credibility* is the extent to which one business partner believes that the other partner has the required expertise to perform the job effectively and reliably (Wang, Wang, Lin, & Tang, 2003). It is impersonal and relies on reputation. Mayer et al. (1995) defines *benevolence* as the extent to which a trustee is believed to intend to do good to the truster, beyond his or her own profit motives. It can be seen as the extent to which the seller or service provider is genuinely interested in the customer's welfare and has intentions and motives beneficial to the customer (Doney & Cannon, 1997). *Integrity*, on the other hand, refers to the truster's perception that the trustee will adhere to a set of principles or rules of exchange acceptable to the truster during and after the exchange (Mayer et al., 1995). Uncertainty is one of the main reasons explaining online customers' lack of trust (Roca et al., 2009). Typically, in the virtual world, there are two types of uncertainty to deal with: system-dependent uncertainty and transaction-specific uncertainty (Grabner-Kraeuter, 2002). The system-dependent uncertainty is related to all potential technological sources of errors and security gaps like faulty software or hardware devices or security vulnerabilities. System-dependent uncertainty can emerge in the data channel (i.e. the network) or on the "final points" (i.e. customers' desktop system or the seller's or provider's server). Therefore, smooth and secure online transactions depend on the reliability of the hardware and the software as well as the reliability of the technology used to secure the transactions. Transaction-specific uncertainty, on the other hand, is typically, caused by the asymmetric distribution of information between the transaction partners (Grabner-Kraeuter, 2002). In general, the customer does not have as much information as the seller or provider about (a) the quality of the product or the service or (b) the seller's or provider's ability and willingness to perform. This asymmetry is deeper in online transactions because, in part, key elements of personal interactions like facial expression, gestures, and body language are missing in the computer-mediated environment (Grabner-Kraeuter, 2002).

In a virtual world, users' technology readiness can help establish trust.

Technology readiness

Technology readiness encompasses self-efficacy which refers to belief about one's ability to successfully carry out the task at hand (Shen et al., 2010). Parasuraman (2000) defined technology readiness as "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (p. 308). It results from mental enablers and inhibitors that determine a person's predisposition to use a new technology. Parasuraman's 2000 study identified two enablers (optimism and innovativeness) and two inhibitors (discomfort and insecurity) that participate in determining a person's technology readiness. Optimism is the degree to which people believe that technology can benefit their lives and give them more control over their life. Innovativeness is a natural desire to experiment with new technologies. Discomfort is the feeling of lacking both control over technology and the confidence in making technology work. Insecurity was defined as the need for assurance that a technology-based product, service or process will operate reliably and accurately. Because the four dimensions are relatively independent of each other, an individual may harbor both enabler and inhibitor feelings towards technology. It can easily be argued that technology readiness can play a key role in people's intention to use mobile banking. The enabler's aspect of technology readiness can also have a positive impact on people's propensity to trust whereas the inhibitor's aspect would have

the opposite impact. Parasuraman (2000) developed a composite technology readiness index that is meant to capture an individual overall readiness to adopt new technologies.

One may be technology-ready, but in order for a bank customer to actually engage in mobile banking, he or she must need it and find it useful. One of the common ways people come to know about innovations and find them useful is through social influence.

Social Influence

In the IS literature, two theoretically distinct types of social influence, *subjective norms* and *critical mass*, have been frequently employed, but typically confounded (Cho, 2011; Venkatesh et al., 2003). The two concepts share several common elements and underlying assumptions. First, both postulate that social influence shapes people's perceptions and behavior. Second, both assume that people face some uncertainty regarding the appropriateness of various actions (e.g. choosing between different technologies to perform a task). That means, usually, before using a technology or a service, people's beliefs about or knowledge of the technology or the service are vague and ill-informed. Therefore, they choose a course of action by relying more on the opinions or the actions of others (Barki & Hartwick, 1994). Third, as the number of users of a technology or a service in their social circle increases, people tend to receive increasing social information or pressure which subsequently increases the chance that they will adopt the same technology or service (Rogers, 1995). But subjective norms and critical mass differs in fundamental ways too.

Critical mass

The TAM suggests that the adoption of a technology or technology-based service depends, fundamentally, on its perceived usefulness and perceived ease of use by the potential adopters (Rogers, 1995). But, from the business perspective, no matter how useful and easy to use a technology or service is perceived to be, it will only be economically viable if there is a critical mass of people adopting it. According to Rogers (1995), critical mass refers to "the point at which enough individuals have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining" (p. 313). Lou, Luo and Strong (2000) have found that critical mass has a significant impact on groupware acceptance. Ayers, Menachemi, Ramamonjiarivelo, Matthews, and Brooks (2009) have also found that there is a significant increased utility for users of electronic medical records systems when adoption increases among other users. Other studies have found that perceived technology popularity has an impact on the adoption of instant messaging (Strader, Ramaswami, & Houle, 2007), videophone systems (Kraut, et al., 1998), and the Internet (Zhu & He, 2002). These studies seem to confirm the common sense idea that the higher the number of users of a particular technology in a specific community (workplace, circle of friends, etc.), the more pressure there may be on other people to adopt the technology in question. But how do potential users assess the critical mass? The actual critical mass threshold is difficult to determine, but a particular technology user may have a perception of whether it has been reached or how soon it will be reached (Cho, 2011). As in previous studies like Sledgianowski and (Sledgianowski & Kulviwat, 2009) and Cho (2011), in this study we will use the concept of perceived critical mass (PCM) to refer to users' perception of whether the critical mass threshold is (or how soon it will be) reached.

Subjective norm

Subjective norm refers to the perceived social pressure to engage or not to engage in a behavior (Ajzen, 1991). It is an individual’s perception that most of his or her referent others think that he or she should or should not perform a specific behavior like using a specific technology to perform a task. The reason why subjective norm is so prevalent is the belief that following others often leads to better and more accurate decisions, especially when we face uncertainty Griskevicius et al. (2006). Mustonen-Ollila and Lyytinen (2003) reported 16 studies on IT adoption that include subjective norm as a factor. Over the years, consistent with the theory of reasoned actions (Fishbein & Ajzen, 1975), numerous studies have found that subjective norms have a significant impact on people’s perception and beliefs about technology (e.g. Homburg et al., 2010; Karahanna and Straub,1999; Schmitz, 1991; Teo, 2010). (Homburg, Wieseke, & Kuehnl, 2010; Karahanna & Straub, 1999; Schmitz & Fulk, 1991; Teo, 2010)

Taking into account the literature reviewed in this section, we propose a research framework along with a series of research propositions.

Research model and propositions

Research model

Drawing on the TRA (Fishbein & Ajzen, 1975), we propose that *perceived usefulness* and *perceived ease of use* will have a direct impact on people’s *intention to use mobile banking* which, in turn, will impact the *actual use* of mobile banking. As the theory of planned behavior (Ajzen, 1991) suggested, our research model, shown in Figure 1, predicts that *subjective norms* will be an antecedent of *perceived usefulness* and *perceived ease of use*. The model also predicts that people’s *technology readiness* will have a direct impact on their *trust* in mobile banking. As in previous studies (e.g. Vatanasombut et al., 2008, Shen et al., 2010), *trust* is presumed to have a direct impact on the *intention to use mobile banking*. Finally, the proposed model suggests that *perceived critical mass* will have a direct impact on the *intention to use mobile banking*, as well as a moderating effect on the relationship between *perceived usefulness* and *perceived ease of use* on the one hand, and the *intention to use mobile banking* on the other hand.

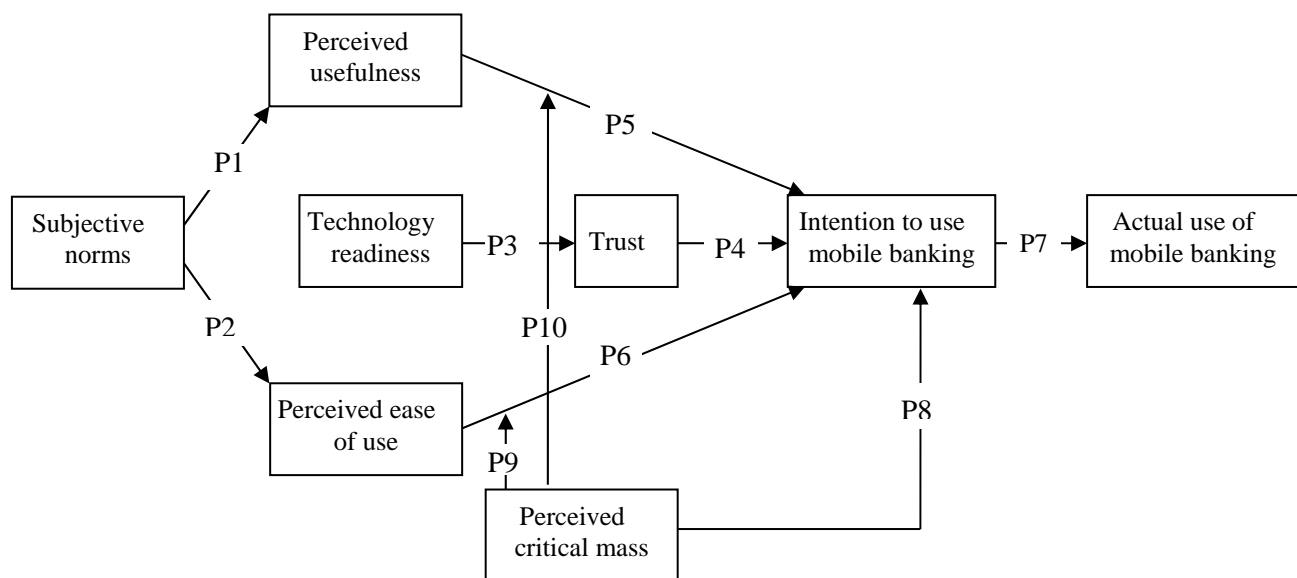


Figure 1: Research model

Research propositions

According to the theory of planned behavior (Ajzen, 1991), subjective norm or perceived social pressure from referent others can impact people's behavior indirectly by shaping their perception over time. That means subjective norm may have an impact on how useful people perceive mobile banking to be. We therefore propose the following:

Proposition 1: *Subjective norm* will have a significant impact on the *perceived usefulness* of mobile banking.

If people's perception about the usefulness of mobile banking can be influenced by subjective norm, their perceived ease of use of mobile banking may also be influenced by subjective norm.

Proposition 2: *Subjective norm* will have a significant impact on the *perceived ease of use* of mobile banking.

A recent Pew Research survey found that 54% of young adults (18 to 29 years old) owning cell phones use mobile banking (Fox, 2013). The percentage drops to 40% for adults between the age of 30 and 49 despite the same level of cell phone ownership among the two groups (Fox, 2013). One possible explanation could be that younger people are more technology savvy. From that perspective, technology readiness may be a factor that helps younger people overcome the psychological barriers, take risk, and trust virtual entities. We, therefore, propose the following:

Proposition 3: *Technology readiness* will have a significant impact on people's *trust* in mobile banking.

Technology readiness has four dimensions, with two of the dimensions (optimism and innovativeness) considered enablers for technology adoption. We propose the following:

Proposition 3a: *Optimism* will have a positive impact on people's *trust* in mobile banking.

Proposition 3b: *Innovativeness* will have a positive impact on people's *trust* in mobile banking.

The two other dimensions (discomfort and insecurity) of technology readiness are considered as inhibitors for technology adoption. We, therefore, propose the following:

Proposition 3c: *Discomfort* will have a negative impact on people's *trust* in mobile banking.

Proposition 3d: *Insecurity* will have a negative impact on people's *trust* in mobile banking.

Trust was proven to be an antecedent of engaging in online banking (Shen et al., 2010, Vatanasombut et al., 2008). It has multiple dimensions (Grabner-Kraeuter, 2002). In this study, we argue that transaction-specific trust (i.e. trust in the financial institution) and systems-specific trust (i.e. trust in the technology involved in providing mobile banking services) will have a significant impact on their intention to use mobile banking. We, therefore, propose the following:

Proposition 4a: Transaction-specific *trust* in mobile banking will have a significant impact on the *intention to use mobile banking*.

Proposition 4b: System-specific *trust* in mobile banking will have a significant impact on the *intention to use mobile banking*.

A strong body of research has confirmed the main idea of the TAM, which is *perceived usefulness* and *perceived ease of use* are antecedents of the intention to use IT in general (Mustonen-Ollila & Lyytinen, 2003). For mobile banking, we expect the relationship between *perceived usefulness* and *perceived ease of use* on the one hand and the *intention to use mobile banking* services to be strong. We, therefore, propose the following:

Proposition 5: *Perceived usefulness* will have a significant effect on people's *intention to use mobile banking*.

Proposition 6: *Perceived ease of use* will have a significant effect on people's *intention to use mobile banking*.

According to the theory of reasoned action, intention which is the cognitive representation of a person's readiness to perform a given behavior is the best predictor of behavior (Fishbein & Ajzen, 1975). We argue that people's intention to use mobile banking will have an impact on the both the frequency and the intensity of their mobile banking services' use. We, therefore, propose the following:

Proposition 7: The *intention to use mobile banking* will have a positive impact on the *actual use of mobile banking* in terms of frequency and intensity of use.

According to the diffusion of innovation (DOI) theory, the adoption and spread of an innovation depend on the critical mass of users defined as the point at which enough individuals have adopted the innovation so that its further rate of adoption becomes self-sustaining (Rogers, 1995). Technology users may have their own perception of whether the critical mass of users has been (or is about to be) reached (Cho, 2011). If a customer of a brick and mortar bank customer has the perception that the critical mass of mobile banking users is (or is about to be) reached, it may make him or her believe that most people are adopting mobile banking, which may have a direct impact on their intention to use the service. We, therefore, propose the following:

Proposition 8: The *perceived critical mass* of users will have a positive direct impact on the *intention to use mobile banking*.

Strader et al. (2007) have postulated that critical mass and usefulness, as two value-oriented factors, should be linked when exploring their impact on communication media use. This suggests that perceived critical mass may also have an indirect impact on mobile banking adoption through a possible interaction effect with perceived usefulness. It means that people who have perceived mobile banking as being useful may see their intention to use mobile banking grow stronger as a result of their perception that the critical mass has been (or will soon be) reached. We, therefore, propose the following:

Proposition 9: The *perceived critical mass* will moderate the impact of *perceived usefulness* on the *intention to use mobile banking*, such that the higher the perceived critical mass, the stronger the impact.

Likewise, it can also be argued that people who have perceived mobile banking as being easy to use may also see their intention to adopt mobile banking grow stronger as a result of their perception that the critical mass has been (or will soon be) reached. We, therefore, propose the following:

Proposition 10: The *perceived critical mass* will moderate the impact of *perceived ease of use* on the *intention to use mobile banking*, such that the higher the perceived critical mass, the stronger the impact.

Implications and limitations

One of the theoretical contributions of this research is a new conceptual model for mobile banking adoption with a potentially greater explanation power compared to the existing frameworks found in the IS literature. The proposed model contributes to the IS literature in two ways. First, it added both positive and negative impacts of technology readiness on the level of trust in mobile banking. Second, it includes a moderating effect of *perceived critical mass*. To our knowledge, this would be the first study in the IS field to include the moderating effect of *perceived critical mass* on the relationship between *perceived usefulness* and *perceived ease of use* on the one hand, and the intention to use mobile banking on the other hand. In terms of practical implications, the testing of the moderating effect of *perceived critical mass* may have some implications for marketing strategy. For example, if it turns out that *perceived critical mass* has a significant moderating effect on the relationship between the *perceived usefulness* and the *perceived ease of use* of mobile banking on the one hand, and the *intention to use to use mobile banking* on the other hand, that means *perceived critical mass* represents a key piece of information that financial institutions offering mobile banking may use in advertising and marketing in general in an attempt to increase mobile banking use. To that end, if regular bank customers are informed through advertising that more and more people are adopting mobile banking, it may have the potential of altering their perception that the critical mass of mobile banking users is (or is about to be) reached, which may have a positive impact on their intention to use the service.

This study has limitations. First, the study is conceptual in nature which means that, although there is a good theoretical foundation for the research propositions, empirical testing is needed. Second, this study didn't include the mediating effect of *attitude* as the TRA (Fishbein & Ajzen, 1975) and the initial TAM (Davis 1989) suggested. This was done for two reasons. One is because a meta-analysis done by Legris et al. (2003) has suggested that attitude does not mediate the influence of perceived usefulness or perceived ease of use on either the usage or the behavioral intention to use technology in general. The second reason is the need to keep the research model focused on the more theoretically relevant factors.

Conclusion

This research built on the limitations of the TAM as a tool that does not capture key factors such as the risk and trust involved in mobile banking adoption. It postulates that technology readiness, which encompasses optimism, innovativeness, discomfort, and insecurity, will have direct positive and negative impacts on people's trust in mobile banking. It also distinguishes between the two types of social influences (subjective norms and critical mass) associated with technology adoption in the IS literature. Like previous studies, this study considers the direct impact of *perceived critical mass* on people's intention to use mobile banking, but unlike previous studies, the study introduced an indirect impact that *perceived critical mass* may also have through its interaction with perceived usefulness and perceived ease of use.

Although explicit prescriptions should await empirical support for the propositions, the research model and the supporting literature suggest some potential theoretical and practical implications. In particular, if it turns out to be conclusive, the testing of the interaction effects of *perceived critical mass* may provide some ground for financial institutions offering mobile banking to revisit their marketing effort in a way that may help widen their mobile banking customers' base.

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