

Predicting and Explaining the Adoption of Mobile Banking

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Abstract: Mobile banking is a typical application of mobile communications technology in the bank industry. While it has many advantages, the adoption rate of mobile banking is significantly lower than that of other mobile value-added services. This study focuses on how customers perceive and adopt mobile banking in China. Based on the technology acceptance model and the DeLone and McLean model, this paper proposes a theoretical model to explain and predict consumer intention to use mobile banking. We test the model through an empirical study using structural equation modeling techniques. The results show perceived usefulness and perceived ease of use are important factors affecting consumer adoption intention toward mobile banking, and information quality, system quality and service quality have indirect effects on adoption intention through perceived usefulness and perceived ease of use. This paper offers insights on mobile banking success based on the findings of our work.

Keywords: Perceived usefulness; Perceived ease of use; Information quality; Adoption; Mobile banking

1 Introduction

With the full liberalization of China's financial markets, the banking industry is facing a new round of challenges. In the new competitive situation, many banks have begun to consider the development of intermediary business, and use information technology to optimize business structure and improve their competitiveness. Some banks have started to regard mobile banking as a new business innovation model. Mobile banking is the product of a combination of banking business and mobile communications technology and relates to the use of cell phone to handle the banking business via mobile communication network. As a combination of electronic money and mobile communication, mobile banking not only makes people deal with a variety of financial services at any time, any place but also enriches the connotation of banking services. It enables the banks to provide customers with services more efficiently and conveniently. With the popularity of cell phone and the development of mobile communication technology, mobile banking as the personal financial steward will give a huge prospects for the bank's business. By the end of July 2009, the number of cell phone users has increased to 703 million. Mobile banking operates in support of such a large group of users, therefore, it has remarkable potential. However, the number of mobile banking users is still far small. iResearch, a famous internet consulting firm, reported that only 14.3 percent of cell phone users used mobile banking and the rate of mobile banking adoption was significantly lower than that of other mobile value-added services^[1]. Obviously, mobile brokerage service has experienced very limited adoption.

In light of this, a comprehensive model describing the factors that drive consumers to adopt mobile banking would be useful for banks to better understand consumer behavior in the emerging mobile environment. In order to provide a solid theoretical basic for selecting driving factor, this study integrate the DeLone and McLean model (D&M) and the technology acceptance model (TAM). They have been used individually in the online contexts to predict consumer perceptions of adopting an online system. Therefore, the combination of D&M and TAM should provide a comprehensive understand to explain mobile banking adoption. Many studies have considered affecting factors of consumer adoption toward different online systems, but rarely has research examined the driving factors of consumer adoption of mobile banking. The purpose of this study is to test the key factors that impacts consumer to adopt mobile banking system based on D&M and TAM.

2 Research model and hypotheses

2.1 TAM

Based on the theory of reasoned action^[2], technology acceptance model (TAM) is a robust theoretical model that explains the relationship between perceived ease of use, perceived usefulness, intention, and actual usage for technology adoption. The main constructs of TAM is listed in Figure 1. Two important concepts in TAM are perceived usefulness and perceived ease of use, both of which are instrumental in explaining the variance in a user's intention toward technology adoption^[3]. Perceived usefulness is the degree to which a person believes that using a technology or service will enhance her

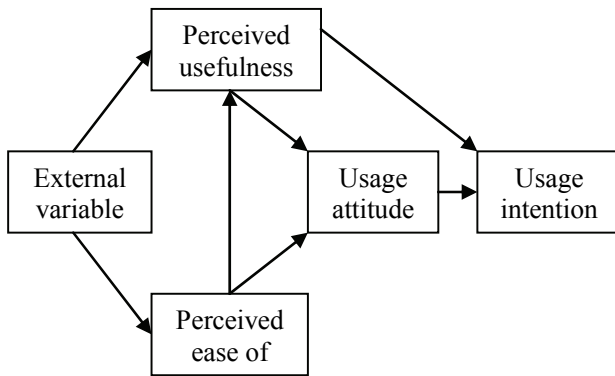


Figure1. Technology acceptance model (TAM)

performance. Perceived ease of use refers to a user's perceived exerted efforts while using a technology or service.

In the contexts of electronic commerce and information systems, many studies examine the acceptance of online services and information systems. For example, Lee^[4] develops a research model which integrates perceived risk, perceived benefit and trust, together with TAM and theory of planned behavior (TPB) perspectives to predict and explain investors' intention to use online trading and the empirical results show that perceived ease of use and perceived useful both have positively impact on attitude about online trading. Hsu et al.^[5] finds that both perceived usefulness and perceived ease of use positively influence learner intentions to use statistical software. Therefore, based on previous research, we have:

[H1]: Perceived usefulness has a positive influence on the intention to adopt mobile banking.

[H2]: Perceived ease of use has a positive influence on the intention to adopt mobile banking.

[H3]: Perceived ease of use has a positive influence on perceived usefulness of mobile banking

2.2 D&M

The D&M model is a widely cited theoretical framework that explains information systems (IS) success. DeLone and McLean suggest IS success is a multi-dimensional concept mainly consisting of six interrelated variables which are system quality, information quality, use, user satisfaction, individual impact, and organizational impact^[6]. The original D&M model is showed in Figure 2. Later, DeLone and McLean consider service quality as an antecedent of IS success.

Information quality refers to a consumer's perception about the extent mobile banking is able to provide reliable, adequate, relevant and timely financial market information. Reliability relates to the credibility and accuracy of the information. Adequacy is concerned With the completeness and abundance of the information. Relevance refers to the applicability of the information to

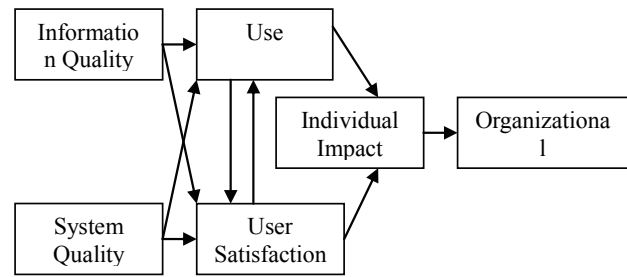


Figure 2. D&M model

investors' needs. Timeliness means that information contents are in real-time, which is critical to investors. High quality information is very important for consumers in making trading by mobile banking. If consumers perceive that mobile banking provides high quality information, they may form a favorable perception toward it. In online transactions, a website's information quality has a direct impact on perspective customers' perceptions of the vendor and its products^[7]. Detailed product and service information can foster consumers' trust in the website and vendor, which will in turn increase the purchase intention. Hence, it is not surprising that research suggests that a website's information quality is a multidimensional construct and is an antecedent to the purchase intention. In the field of IS, Kim et al.^[8] suggest that information quality of hotel front office systems has positively impact on perceived usefulness and perceived ease of use. Hence, we have:

[H4]: Information quality has a positive influence on perceived usefulness of mobile banking.

[H5]: Information quality has a positive influence on perceived ease of use of mobile banking.

System quality relies on the intended operational characteristics in the context of information system. It is relevant to with whether there are errors in the system, its ease of use, response time, flexibility, and stability. System quality consists of usefulness, usability, responsiveness, reliability, and flexibility in electronic commerce environment. System quality relates to the mobile network speed and system stability in the context of mobile banking. The mobile network speed and system stability are important for consumers to use mobile banking, which can ensure the smooth progress of banking services. Consumers will perceive mobile banking to be useful if the mobile banking services are provided accurately and with high speed. Prior research finds system quality significantly influences perceived usefulness and perceived ease of use^[8, 9]. Thus, we have the following hypotheses:

[H6]: System quality has a positive influence on perceived usefulness of mobile banking.

[H7]: System quality has a positive influence on perceived ease of use of mobile banking.

Service quality plays a dominant role in the success of an information system and delivering high quality service is regarded as an essential strategy for information system^[10]. Service quality is a multi-dimension construct and mainly has five perceptual dimensions which are tangible, responsiveness, assurance, empathy and reliability. Kim et al.^[8] find service quality has significant effects on perceived usefulness and perceived ease of use. When consumers interact with mobile banking, they make judgments about the service based on response promptness, promise-keeping, problem-solving ability, attention to particular customer needs, and so forth. If service quality is perceived, they will feel that mobile banking is efficient and effortless. Therefore, we have the following hypotheses:

[H8]: Service quality has a positive influence on perceived usefulness of mobile banking.

[H9]: Service quality has a positive influence on perceived ease of use of mobile banking.

We summarize our research model and hypotheses in Figure 3.

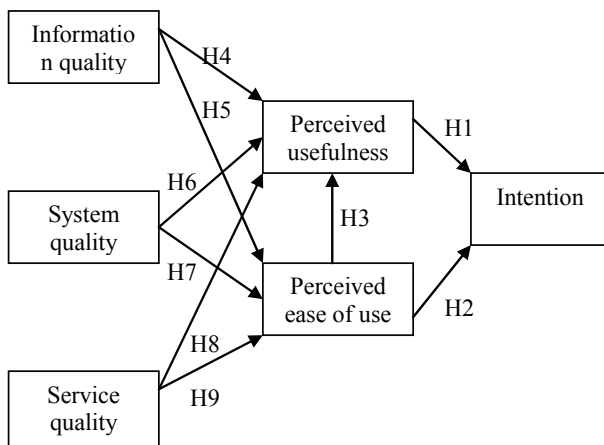


Figure 3. Our research model and hypotheses

3 Research design and method

3.1 Data collection

We used empirical method to examine our theoretical method. The sample was collected from one famous bank in China. Our respondents were from the customers of Industrial and Commercial Bank of China. The survey was administered to people who were mobile banking users. We randomly chose mobile banking users from database, and called them to ask whether they were willing to complete the questionnaire on mobile banking. If the respondent agreed to participate in our survey, we sent the survey questionnaire through e-mail. We sent out

240 questionnaires and received 192 returned ones. The invalid and incomplete questionnaires were eliminated. At the end, we obtained 172 valid responses for our research.

3.2 Hypothesis testing

We used PLS-Graph 3.0 to analysis our collected data. The path coefficients were showed in Figure 4. T-statistics confirmed that all hypothesized paths except two were significant. The path between information quality and perceived ease of use and that between service quality and perceived usefulness were not significant. The paths between system quality and perceived usefulness, and perceived ease of use were significant at the 0.05 level and all other paths were significant at the 0.01 level. The percentage of variance in usage intention of mobile banking is 63.8%.

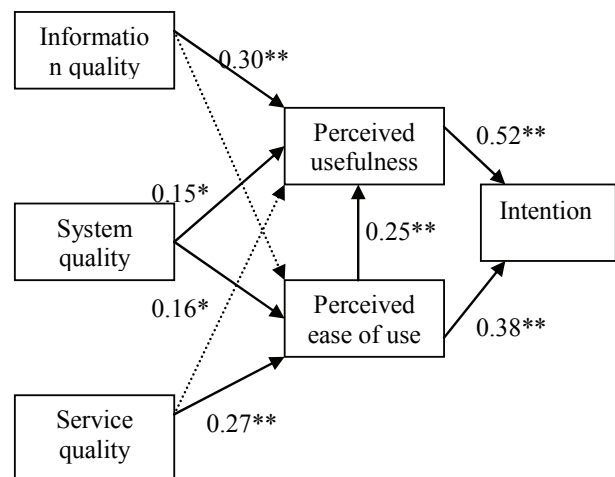


Figure 4. Hypothesis testing results (* $p < 0.05$; ** $p < 0.01$)

4 Conclusions

This study develop a theoretical model to explain and predict consumer intention to use mobile banking systems by using the constructs of perceived usefulness, perceived ease of use, information quality, system quality and service quality based on TAM and D&M models. The empirical results show that perceived usefulness and perceived ease of use have important impacts on consumer intention to adopt mobile banking and information quality, system quality and service quality have positive effects on intention through perceived usefulness and perceived ease of use. The correlation between perceived ease of use and information quality was not significant which indicates information quality is unrelated to the belief that the information is easy to use. Information quality has the greatest impact on perceived useful and service quality has the greatest impact on perceived ease of use. Banks should provide mobile banking user with high information quality and service quality to encourage

adoption. Our model has good explanatory power in predicting consumer intention to use mobile banking.

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References

- [1] iResearch. China Mobile Netizen Internet Phone Acts Research Report. [WWW document]. URL <http://www.iresearch.com.cn> (accessed 17 December 2009), 2008.
- [2] Fishbein, M., Ajzen, I. Belief, attitude, intention, and behavior: An introduction to theory and research. Addison-Wesley, 1975.
- [3] Davis, F. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 1989, 13(3): 319-340.
- [4] Lee, M.-C. Predicting and explaining the adoption of online trading: An empirical study in Taiwan. *Decision Support Systems*, 2009, 47(2): 133-142.
- [5] Hsu, M.K., Wangb, S.W., and Chiu, K.K. Computer attitude, statistics anxiety and self-efficacy on statistical software adoption behavior: An empirical study of online MBA learners. *Computers in Human Behavior*, 2009, 25(2): 412-420.
- [6] DeLone, W., McLean, E. Information systems success: The quest for the dependent variable. *Information Systems Research*, 1992, 3(1): 60-95.
- [7] Kim, D.J., Ferrin, D.L., and Rao, H.R. A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems*, 2008, 44(2): 544-564.
- [8] Kim, T.G., Lee, J.H., and Law, R. An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model. *Tourism Management*, 2008, 29(3): 500-513.
- [9] Gu, J.C., Lee, S.C., and Suh, Y.H. Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, 2009, 36(9): 11605-11616.
- [10] Delone, W., McLean, E. The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 2003, 19(4): 9-30.