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Hong Yan

School of Management, Wuhan University of Science and Technology, China

KaiLing Pan

School of Management, Wuhan University of Science and Technology, China

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Examine User Adoption of Mobile Payment Using the TAM: A Trust Transfer Perspective

Hong Yan, KaiLing Pan

School of Management, Wuhan University of Science and Technology, China

Abstract: Success in online services cannot promise the success in corresponding mobile services. To understand the mobile service adoption behavior under the context of online service transition, this study, taking mobile payment as an example, from a trust transfer perspective, examines users' acceptance of mobile payment using the TAM (Technology acceptance model). A field survey with 220 mobile payment student users is conducted to test the research model and hypotheses. The key findings include: trust of online payment and structural assurance play the crucial role in the initial trust of mobile payments; perceived ease of use and perceived usefulness positively influence trust in mobile payment. Limitations, theoretical and practical implications are also discussed.

Keywords: online payment, mobile payment, Trust transfer, Technology acceptance model, user adoption

1. INTRODUCTION

The mobile Internet has been developing rapidly around the world. According to a report issued by China Internet Network Information Center(CNNIC), the number of mobile Internet users in China exceeded 500 million, accounting for 81% of its Internet population by 2013^[1]. This report indicates the great mobile payment user base. Compared with the online payment, mobile payment frees users from the temporal and spatial constraints, and enables them to acquire information and services at anytime from anywhere. Due to the increase of the phone's screen and web design optimization, mobile phone network shopping user experience is gradually improving, increasing acceptance and recognition of users. In this case, the development of mobile payment in China is more attractive. For mobile users, mobile payment for real-time electronic trading provides a convenient way for users.

However, despite the benefits associated with mobile payments, many mobile phone users are reluctant to adopt them. The main obstacles that prevent users from using mobile payments are the uncertainties and risks involved^[2-4]. Some users presume that wireless telecommunications networks are unstable and worry that transactions may be interrupted, paused, delayed, or executed with data errors. Some are concerned that sensitive financial information may be lost when mobile phones are lost, and others are afraid of monetary and information losses due to malicious attacks of cell phone viruses, hackers, and other unpredictable factors. These uncertainties and risks prevent users from adopting it. Therefore, user trust is a primary reason for the success of mobile payments.

Trust is the main reason that motivates users to conduct online transactions^{[2],[4]}. Because trust mitigates risks and promotes long-term relationships, it is crucial in relational exchanges where risk and uncertainty exist^[5]. By contrast, it is more difficult to build trust in the mobile environment because mobile commerce involves greater uncertainties and risks^{[6],[7]}. As mobile networks and devices improve and the number of mobile users increases, extending electronic commerce to mobile commerce is a business trend. One way to solve the trust building problem is to transfer trust from the electronic commerce to the mobile commerce environment.

Even though trust is so important in mobile commerce, previous research mainly studies trust in the mobile environment^{[8],[9],[10]}. Except for few literature studies on trust transfer from online to mobile context^{[11],[12],[13],[14]}. Given the insufficiency in the literature, the purpose of this research is to examine trust transfer as a means of

establishing initial trust in mobile payment. Based on the TAM and the institution-based factor of trust, we postulate that trust gained through experience with online payments positively affects key perceptions of mobile payments. We test the proposed model using survey data collected from college student users in China and use structural equation modeling techniques to analyze causality. The empirical results show that the user trust in online payments can create positive perceptions of them. This study improves our understanding of how to build users' initial trust in mobile commerce.

The present study is organized as follows. The research theoretical background and hypotheses are presented in Section 2. Next, in Section 3 the research method is discussed. The results are reported in Section 4. Finally, the conclusions and the implications of the findings are presented in Section 5.

2. THEORY BACKGROUND AND RESEARCH HYPOTHESES

2.1 Trust and Trust Transfers

Mayer et al. integrate the shared characteristics of trust across different disciplines and define it as “Trust reflects a willingness to be in vulnerability based on the positive expectation towards another party's future behavior. Trust includes three beliefs: ability, Integrity and benevolence.”^[15] In commercial transactions, especially in the online or mobile context, trust plays an important role due to the high degree of uncertainties and risks involved. Thus, trust is critical in understanding user behavior in electronic commerce and mobile commerce. Trust is also important for the adoption of new technologies^[16].

Trust transfer is a cognitive process that may arise from one familiar context to another new context or from one trusted entity to another unknown entity^[17]. Marketing and electronic commerce research examines both intra-channel and inter-channel trust transfer. Intra-channel trust transfer refers to consumer trust in one entity (e.g., products or organizations) being moved to another related entity in the same channel^[17]. Stewart also found that trust is transferred from trusted to unfamiliar business-to-consumer websites based on hyperlinks to each other^[17]. In addition, an unknown online brand can improve consumer trust and purchase intention by associating itself with a known online brand^[18]. Inter-channel trust transfer refers to the transfer of trust from one context to another, mainly from the offline to online or from online to mobile context. Multiple studies suggest that consumer trust in an offline firm positively affects perceptions of the firm's online business^{[12],[13],[14]}. Similarly, Verhagen and Dolen suggest that perceptions of an offline store directly influence perceptions of the same company's online store^[19]. These studies are about trust transfer from the offline to the online channels. But there is little research on trust transfer from the online to the mobile context.

Because of the large number of mobile phone users and the development of fourth-generation mobile telecommunications technology (4G) in China, research on mobile-commerce applications is crucial to our understanding of mobile commerce development. We examine whether users' trust of online payment influences their perceptions of the initial trust of mobile payments.

2.2 Trust and TAM

A previous study suggests that user trust in offline banking services positively influences beliefs in online banking services such as flow, structural assurance, perceived website satisfaction, and perceived extend of future use^[13]. In our research, perceived ease of use and perceived usefulness are two beliefs in the mobile context. Similarly, we expect trust in online payments to influence beliefs in mobile payments. Trust in online payments reduces users' need to understand, monitor, and control the situation, which facilitates the transaction and makes it effortless. Therefore, when users trust online payments, they will feel that the services are easy to use. Thus they may also view mobile payments as easy to use since these services usually provide a similar

version of online services. When online payments trust online services, they will feel the services are useful. This may lead to the belief that mobile payments are also useful ^[9]. Based on the above discussion, we have:

Hypothesis 1 Trust in online payments is positively related to perceived ease of use of mobile payments.

Hypothesis 2 Trust in online payments is positively related to perceived usefulness of use of mobile payments.

Cognitive beliefs are important antecedents for users to develop initial trust in an online vendor ^[20]. Perceived ease of use and perceived usefulness are the main characteristics of a website and positive feelings of user cognition. If the website shows characteristics such as logical layout and comprehensive functionality that help users find desired items, users will perceive that the vendor cares about them and form feelings of initial trust toward the online vendor ^[21]. Perceived ease of use of mobile payments can help promote users' favorable perceptions and make them more willing to trade using these services. Hence, we have:

Hypothesis 3 Perceived ease of use of mobile payments is positively related to perceived usefulness of mobile payments.

Hypothesis 4 Perceived ease of use of mobile payments is positively related to initial trust of mobile payments.

Hypothesis 5 Perceived usefulness is positively related to initial trust of mobile payments.

Based on categorization theory, mobile payments are novel services although their functions are similar to those of online services. User's evaluations (e.g., trust) of mobile payments will be mainly based on a related category member (i.e., online payments). In other words, if users trust online services, this trust will be transferred to its mobile payments. In addition, prior studies suggest that offline channel trust significantly influences online channel trust ^{[12],[13],[14]}. Thus, we have:

Hypothesis 6 Trust in online payments is positively related to initial trust in mobile payments.

Structural assurance relates to a person's belief that safeguards like legal recourses, guarantees, regulations, policies, promises, or other formal agreements are established to promote success. Macnigh and Chervany(2002) argue that structural assurance refers to trusting beliefs and willingness to depend upon, as a person is more likely to trust others that are in a safe and secure environment^[22]. In other words, one person may form favorable perceptions of individuals or groups associated with a good environment. Structural assurance fosters trust and diminishes perceived risk between relevant parties in a relationship ^[5]. Prior research suggests that trust in offline banking affects online banking structural assurance ^[13]. Mobile payments services require a high level of security because personal account and transaction password information should be safely protected against network failures and mobile phone viruses to avoid monetary loss. If a user trusts online payments, this trust could transfer to her belief about mobile payments, and she may perceive that the system has sufficient safeguards in the mobile context as well. In addition, prior studies suggest that structural assurance affects the initial trust in the online environment ^[16]. Therefore, we have:

Hypothesis 7 Trust in online payments is positively related to structural assurance in mobile payments.

Hypothesis 8 Structural assurance in mobile payments is positively related to initial trust in the services.

Based on TAM, users' attitude affects user's usage intention, trust as a belief will affect usage intention, which in turn affects actual usage behavior ^[23]. Thus, we have:

Hypothesis 9 Initial trust in the mobile payments is positively related to the usage intention of users.

Fig.1 presents the research model.

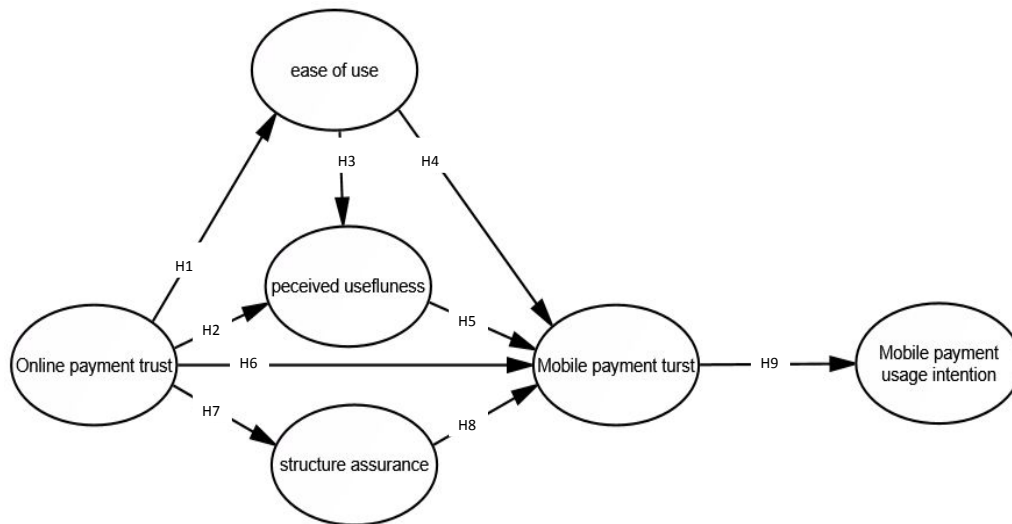


Fig.1 The research model

3. METHOD

The research model includes six factors. Each factor was measured with multiple items. All items were adapted from extant literature to improve content validity [24]. Both researchers had knowledge on e-business and expertise on English-Chinese translation. There were no significant discrepancies between the original English items and the back-translated items. When the instrument was developed, it was tested among ten users that had online payments experience. Then, according to their comments, we revised some items to improve the clarity and understandability. All items were measured with a seven-Likert scale ranging from strongly disagree (1) to strongly agree (7).

Data were collected at a university located in a central China city. We feel that selecting students as our subjects is appropriate as they represent the largest group of mobile internet users now. They are also potential mobile banking users, which fit our research context. In order to obtain a representative sample, we distributed the questionnaires among students with amateur degree, bachelor degree and graduate degree, respectively. We also considered their majors to cover a wide sample. Researchers first inquired whether the students had online payments usage experience. Then we invited those with previous experience to participate in our survey. After that, users were asked to fill the questionnaire based on their experience. We scrutinized all responses and dropped those with too many missing values, which may affect estimation results in data analysis. As a result, we obtained 220 valid responses. Among them, 58.3% were male and 41.7% were female. A majority of them (95%) had conducted electronic trading for more than one year. Over 90% of them used mobile internet.

4. DATA ANALYSIS AND RESULTS

Following the two-step approach recommended by Anderson and Gerbing [25], we first examined the measurement model to test reliability and validity. Then we examined the structural model to test research hypotheses and model fitness.

First, we conducted a confirmatory factor analysis (CFA) to examine the measurement model and test the reliability and validity. Validity includes convergent validity and discriminant validity. Convergent validity measures whether items can effectively reflect their corresponding factor, whereas discriminant validity measures whether two factors are statistically different. Table 1 lists the standardized item loadings, the average variance extracted (AVE), the composite reliability (CR) and Cronbach Alpha values. As listed in the table, all item loadings are larger than 0.7 and t values show that all loadings are significant at 0.001. All AVE exceed 0.5 and all CRs exceed 0.7. Thus the scale has a good convergent validity. In addition, all Alpha values are larger

than 0.7, showing a good reliability.

Table1 Standardized item loading, AVE, CR and Alpha Values.

factor	Item	Standardized item loading	AVE	CR	Alpha value
Ease of use	EOU1	0.792	0.664	0.866	0.835
	EOU 2	0.839			
	EOU 3	0.813			
Perceived Usefulness	PU1	0.742	0.593	0.850	0.827
	PU2	0.793			
	PU3	0.774			
Structural assurance	SA1	0.83	0.625	0.856	0.829
	SA2	0.812			
	SA3	0.727			
Online payments trust	ONT1	0.790	0.664	0.814	0.798
	ONT 2	0.827			
	ONT 3	0.807			
Mobile payments trust	MOT1	0.818	0.654	0.833	0.813
	MOT2	0.843			
	MOT3	0.820			
Usage Intention	UI1	0.816	0.697	0.902	0.886
	UI2	0.840			
	UI3	0.823			
	UI4	0.860			

To test discriminant validity, we compared the square root of AVE and factor correlation coefficients. As listed in Table 2, for each factor, the square root of AVE is significantly larger than its correlation coefficients with other factors, thus establishing discriminant validity.

Second, we employed AMOS21 to verify our measurement and theoretical model. The structural model with results is presented in Figure 2. The explained variance of perceived ease of use, perceived usefulness, structure assurance, mobile payments trust and mobile payment usage intention is 26%, 31%, 43%, 61% and 54%, respectively.

Table 3 lists the recommended and actual values of some fit indices. As listed in the table, except NFI, other fit indices have better actual values than the recommended values. This shows a good fitness.

Table2 The square root of AVE (shown as bold at diagonal) and factor correlation coefficients

	EOU	PU	SA	ONT	MOT	UI
EOU	0.815					
PU	0.502	0.770				
SA	0.460	0.439	0.791			
ONT	0.560	0.471	0.554	0.815		
MOT	0.521	0.491	0.568	0.615	0.809	
UI	0.601	0.616	0.635	0.694	0.630	0.835

Table 3 The recommended and actual values of fit indices for CFA

Fit indices	Chi2/df	GFI	AGFI	CFI	NFI	RMSEA
Recommended value	<3	>0.90	>0.80	>0.90	>0.90	<0.08
Actual value	2.275	0.912	0.825	0.906	0.886	0.073

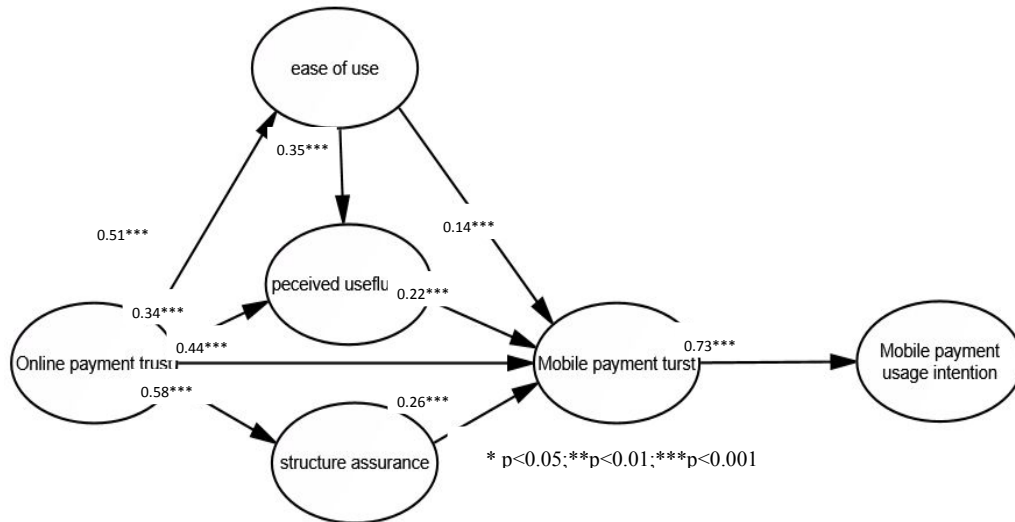


Fig.2 The research model with result

5. DISCUSSION

The aim of this study is to examine users’ acceptance of mobile payment using the TAM from a trust perspective. So we examine how users’ trust of online payment affects her beliefs about the mobile payment. The results implies that initial trust in mobile context can be developed using a variables related to the online trust. The major results of this research are as follows.

Firstly, the result implies that trust of online payment play the crucial role in the initial trust of mobile payments. A prior study finds that offline trust is positively related to online trust [14]. This result is consistence with the finding of Lin Jiabao (2011). When users are not familiar with mobile payments, they rely on their experience with online payment.

Secondly, we find that trust in online payments has a significant effect on structural assurance in mobile payments. This result is similar to the finding in Lee et al. (2007) that trust in offline banking affects the structural assurance of online banking [13]. When users trust online payment system, they will also think favorably of the mobile trading system’s safeguards, such as regulations, laws, and encryption. This favorable perception will foster users’ initial trust in mobile context.

Thirdly, trust in online payment has significant impacts on perceived ease of use and perceived usefulness of mobile payment. Perceived ease of use has significant impacts on perceived usefulness. When users trust in the online payment is relatively high, she will feel that the services are easy to use and useful. And both of them have significant impacts on the initial trust of mobile payment.

Fourthly, we find that structural assurance is also a key factor affecting initial trust in mobile payment. Structural assurance, which reflects environmental and structural perceptions about mobile payments, emphasizes the importance of using safety measures to protect users from financial or information losses, and gaining their faith in mobile context. When users perceive mobile payment as having low structural assurance, they are likely to be distrustful. Therefore, mobile services and mobile network operators should invest in infrastructure, processes, and policies to protect users’ interests.

Fifthly, perceived ease of use and perceived usefulness of mobile payment is positively related to initial

trust. Our results confirm findings from prior research that perceived usefulness is an important predictor of the initial trust [27]. Perceived ease of use has a significant effect on the initial trust in mobile context.

Finally, the initial trust of mobile payment is positively related to users' usage intention of mobile payment. This result is consistency with predecessors' studying results.

6. IMPLICATIONS AND LIMITATIONS

This study has both theoretical and practical contributions. From a theoretical standpoint, while TAM has been extensively applied in prior research on user adoption in the virtual marketplace, prior research mostly focuses on factors that might be effective in predicting behavioral intention in a single channel. Few scholars have used TAM to examine trust formation across channels [10],[13]. This paper examines user trust transfer from the online to the mobile context based on TAM. The results trust in online payment is significantly related to the initial trust in mobile payments. Today more and more companies are turning to mobile commerce to expand their businesses. This study indicates that companies can leverage user trust in their online services to provide similar user-trusting product lines in the mobile channel. The extent to which online trust affects mobile perceptions suggests that trust in online services may be a key factor of mobile services success.

From a practical perspective, the results that online trust positively affects perceived usefulness and initial trust in the mobile setting indicate that online trust can be used as an enabler that allows electronic trading to expand from the online to the mobile channels. This may lead to higher adoption rates than simply promoting mobile services in isolation. So internet operation should improve the quality of online services and network security to meet users' needs.

This research has the following limitations. First, we collected data from students in China, where mobile commerce is developing rapidly but still in its infancy. Thus our results need to be generalized to other countries that had developed mobile commerce. Second, besides the three factors including structural assurance, ease of use and usefulness, there may be other factors affecting users' initial trust in mobile payments.

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REFERENCES

- [1] CNNIC (2013). 32th statistical survey report on the Internet development in China. China Internet Network Information Center.
- [2] Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision support systems*, 44(2), 544-564.
- [3] Grabner-Kräuter, S., & Kaluscha, E. A. (2003). Empirical research in on-line trust: a review and critical assessment. *International Journal of Human-Computer Studies*, 58(6), 783-812.
- [4] Bhattacharjee, A. (2002). Individual trust in online firms: Scale development and initial test. *Journal of management information systems*, 19(1), 211-242.
- [5] Pavlou, P. A., & Gefen, D. (2004). Building effective online marketplaces with institution-based trust. *Information Systems Research*, 15(1), 37-59.
- [6] Siau, K., Sheng, H., Nah, F., & Davis, S. (2004). A qualitative investigation on consumer trust in mobile commerce. *International Journal of Electronic Business*, 2(3), 283-300.
- [7] Ghosh, A. K., & Swaminatha, T. M. (2001). Software security and privacy risks in mobile e-commerce. *Communications of the ACM*, 44(2), 51-57.

- [8] Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM*, 46(4), 91-94.
- [9] Lee, T. (2005). The impact of perceptions of interactivity on customer trust and transaction intentions in mobile commerce. *Journal of Electronic Commerce Research*, 6(3), 165-180.
- [10] Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, 19(3), 283-311.
- [11] Lin, J., Lu, Y., Wang, B., & Wei, K. K. (2011). The role of inter-channel trust transfer in establishing mobile commerce trust. *Electronic Commerce Research and Applications*, 10(6), 615-625.
- [12] Hahn, K. H., & Kim, J. (2009). The effect of offline brand trust and perceived internet confidence on online shopping intention in the integrated multi-channel context. *International Journal of Retail & Distribution Management*, 37(2), 126-141.
- [13] Lee, K. C., Kang, I., & McKnight, D. H. (2007). Transfer from offline trust to key online perceptions: an empirical study. *Engineering Management, IEEE Transactions on*, 54(4), 729-741.
- [14] Kuan, H. H., & Bock, G. W. (2007). Trust transference in brick and click retailers: An investigation of the before-online-visit phase. *Information & Management*, 44(2), 175-187.
- [15] Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of management review*, 20(3), 709-734.
- [16] Kim, K. K., & Prabhakar, B. (2004). Initial trust and the adoption of B2C e-commerce: The case of internet banking. *ACM sigmis database*, 35(2), 50-64.
- [17] Stewart, K. J. (2003). Trust transfer on the world wide web. *Organization Science*, 14(1), 5-17.
- [18] Delgado-Ballester, E., & Hernández-Espallardo, M. (2008). Effect of brand associations on consumer reactions to unknown on-line brands. *International Journal of Electronic Commerce*, 12(3), 81-113.
- [19] Verhagen, T., & Van Dolen, W. (2009). Online purchase intentions: A multi-channel store image perspective. *Information & Management*, 46(2), 77-82.
- [20] McKnight, D. H., Cummings, L. L., & Chervany, N. L. (1998). Initial trust formation in new organizational relationships. *Academy of Management review*, 23(3), 473-490.
- [21] Koufaris, M., & Hampton-Sosa, W. (2004). The development of initial trust in an online company by new customers. *Information & Management*, 41(3), 377-397.
- [22] McKnight, D. H., & Chervany, N. L. (2002). What trust means in e-commerce customer relationships: an interdisciplinary conceptual typology. *International journal of electronic commerce*, 6, 35-60.
- [23] Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*.
- [24] Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information Systems*, 13(24), 380-427.
- [25] Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411-423.
- [26] Yaobin, L., & Tao, Z. (2007). A research of consumers' initial trust in online stores in China. *Journal of research and practice in information technology*, 39(3), 167-180.