IJACT 20-3-5

A study on the factors affecting the usage and diffusion of Mobile Easy Payment Services

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Abstract

This study examines the factors affecting the usage and diffusion of mobile easy payment services which is fast growing industry recently. After wide reviewing previous research about mobile payment, Some factors are identified as the factors influencing intention to use mobile easy payment services-confidence, innovativeness, mobile self-efficacy, relative advantage- through several mediating factors- perceived ease, perceived usefulness, perceived risk. Empirical study for a research model showed confidence, mobile self-efficacy and relative advantage are effective to the intention to use mobile easy payment services via perceived usefulness and perceived risk. Based on the results of the study, some practical implication for customer retention and acquisition are suggested.

Keywords: Mobile Easy Payment, Smart Pay, Fintech, Industry 4.0, Perceived Usefulness, Perceived Convenience

1. INTRODUCTION

There is getting growing interest in fintech, a new financial service based on information communication technology(ICT). Fintech is a combination of the words finance and technology, referring to a new convergent financial service. Fintech includes mobile finance, mobile easy payment, money transfer, asset management, and crowdfunding using internet and telecommunication technology.

Among various fintech services that are considered as the core elements of industy 4.0, "Mobile Easy Payment" or "Smart Pay" system is attracting attention as the core service according to the generalization of smartphones. Mobile Easy Payments or Smart Pay are a series of activities for purchasing goods and services and paying or transferring funds using mobile devices that guarantee mobility in online and offline environments. Typical examples include Paypal, Applepay, and Alipay. With the spread of smartphones and the introduction of various authentication methods, the industy of mobile easy payment is growing rapidly in Korea. To date, about 39 mobile easy payment services have been released in Korea. Recently, top tier companies such as Samsung Pay, Naver Pay, Kakao Pay, and Payco are leading the market.

Most of the research on mobile easy payment has been limited to studies on market trends, institutional and technical aspects. In addition, research on personal, social and risk factors that may affect users' acceptance of mobile payment service is still insufficient. Therefore, this study applies 'The Extension of Technology Acceptance Model (TAM2)', which has been applied to explain the use intention or acceptance behavior of services based on new ICT or media technology. The purpose of this study was to examine the intention of

using mobile payment services.

Based on various previous studies, this study identifies various perceived risk factors (social, personal, functional and financial risk) that may affect the intention to use mobile payment service. This study attempted to find out the factors influencing the intention to use mobile payment service. Also, this study examines what factors affect the adoption and use of new technologies by consumers, and suggests implications for the diffusion of smart pay and the direction of marketing strategy.

Among the factors related to consumer adoption, perceived ease, perceived usefulness and demographic factors, which are factors of the Technology Acceptance Model (TAM) are identified as the most important factors of adoption in many studies. In addition, some research[3] pointed out that empirical studies covering various payment methods and situations are necessary for future research while recent studies about the end-user consumer-centered mobile payment adoption have become more abundant in reality data related to the use of mobile payments.

According to previous study[13], perceived usefulness is the most explanatory variable in terms of mobile payment loyalty and financial application acceptance intention as well as mobile payment intention. Individual intrinsic personalities, such as preference or confidence in new things, have been reported to be important influencers in the acceptance of new technologies or services. Prior studies related to the adoption of the Internet and mobile services also show that personal characteristics such as innovation, innovation resistance, self-efficacy, and prior knowledge influence the adoption of technology[8].

In previous studies related to mobile easy payment, innovation and self-efficacy have a direct impact on usage intention, and indirectly by adjusting the relationship between usage intention[7] or perceived risk and usage intention through the perceived usefulness[13]. As such, previous studies have demonstrated the mediating and moderating effects of innovation and self-efficacy.

Consumers face a variety of risks when purchasing goods or using services. The risk mentioned here refers to the risk of subjective perception rather than the actual and objective risk. Anxiety over economic losses or uncertainties that may arise in these decision-making processes may delay or even abandon the choice of goods or services. Perceived risks can be even greater when new product or new services are present or lacking prior experience. Particularly in the case of e-commerce, perceived risk may be stronger because of the nature of doing business without seeing the real thing. A number of previous studies also report that perceived risk is a major deterrent to new product or technology acceptance[7], and that the greater the perceived risk, the lower the intention to use[10]. Also a relevant prior research[11] showed that perceived risk is one of the most important barriers to the adoption of financial-related mobile services.

2. RESEARCH

2.1. Research Design and Settings

Based on the results of previous studies, some hypotheses were set and implemented empirical research to verify them.

First, we analyze the previous studies on consumer acceptance intention and use of mobile easy payment or smart pay to derive the factors that influence consumer acceptance and the spread of smart pay. The work was to refine the research model of the study. Next, empirical analysis was conducted to verify the research model and related hypotheses on the factors affecting consumer's acceptance intention and spread of mobile easy payment services.

The empirical analysis was conducted on the consumer survey based on the structured questionnaire designed based on the previous studies. The collected data were analyzed by quantitative analysis using statistical program to verify the research hypothesis.

2.2. Research Materials

For this study, the research items on the TAM model related to the acceptance of new technologies were modified, supplemented, and constructed with reference to the items used in the prior researches.

Factors influencing the acceptance of mobile easy payment technology are personal innovation, mobile

self-efficacy, relative advantage and confidence. 1) The personal innovation item was defined as an open attitude toward the new technology of the individual, in the prior study[7] [10]. It was measured by an open question. 2) The mobile self-efficacy category is based on the prior research[7][10]. 3) Relative advantage items are defined as operational items and measured as four items as mobile simple payment technology can bring economic benefits over other payment systems. 4) Confidence was defined as three items based on the prior research [7][10]. 5) Perceived risks were defined as three categories based on the prior research[7][10] as well.

The perceived ease and usefulness of the mobile simple payment technology were measured in three categories based on the prior research [7] [10]. The item of intention to use was measured into three items based on the prior research. All measurement items were measured on a 7-point Likert scale.

3. RESULTS AND DISCUSSION

1) Results of empirical study

To verify hypothesis, we have tried factor analysis for all the variables which put into the empirical model in the study. Factor analysis on independent and dependent variables affecting the acceptance of mobile simple payment was performed, and other analyzes were conducted to confirm the validity and reliability of the construct in the study. First, an exploratory factor analysis (EFA) was performed on the constructs, followed by a confirmatory factor analysis (CFA). As a result of exploratory factor analysis, factor loadings were all over 0.685, and confirmatory factor analysis showed $\chi^2 = 492.673$ (p = 0.00, df = 247), CFI = 0.949, TLI = 0.938, IFI = 0.949, NFI = .903, RMSEA = 0.055 (p <0.001), meeting the fitness criteria[1]. The Cronbach-α coefficients for verifying the reliability of the variables used in this study all met 0.7 or more. In addition, the range of average variance extracted values for the construct concept exceeds the threshold of 0.5 [4].

Table 1. Factor Analysis for variables

Construct	Variables	Factor Loading	AVE	CR	Cronbach's α
innovativeness	Quick to new product Try to buy new product Quick to new technology	.893 .918 .821	.771	.910	.871
Mobile self-efficacy	Well known mobile device and know how to use Competency to use mobile services	.869 .779	.681	.810	.774
relative advantage	More usefel More convenient More efficient Faster	.815 .844 .839 .818	.761	.927	.896
confidence	Trust mobile payment service provider No technological problem Trust technological competency of mobile payment service provider	.775 .840 .794	.645	.845	.814
Perceived risk	Risk of privacy Risk of hacking Risk of private information	.805 .732 .833	.626	.833	.710
Perceived ease	Easy to learn how to use Easy to use Easy to access	.805 .685 .824	.599	.816	.788
Perceived usefulness	convenient simple	.775 .704	.557	.790	.881

		.759			

	Intention to use continuously	.871			
Intention to use	Intention for word of mouth	.881	.751	.900	.905
	Intention to recommend	.846			

For discriminant validity, the correlation coefficient of each component is compared with the square root of AVE to confirm that the correlation coefficient is smaller than the square root of AVE.

The discriminant validity was confirmed by comparing the correlation coefficient of each component with the square root of AVE through [Table 2].

To verify the hypothesis of this study, covariate structural model analysis was performed using AMOS 22.0 program. According to the analysis results, the fit of the research model is $\chi2 = 605.438$, df = 260 (p = .000), CFI = .928, IFI = .928, TLI = .917, GFI = .870, AGFI = .837, RMSEA = .063 appeared to confirm that the appropriate level of fitness. The results of the research hypothesis test through the coefficient values and the significance of each path coefficient of this model are shown as below [Table 3].

Table 2. Coefficient and Discriminant Validity

Construct	Mean	S.D	innovativeness	Mobile self-efficacy	relative advantage	confidence	Perceived risk	Perceived ease	Perceived usefulness	Intention to use
innovativeness	4.41	1.46	**.878**							
Mobile self-efficacy	2.72	1.17	.286**	**.825**						
relative advantage	2.27	1.02	.144**	.451**	**.872**					
confidence	3.35	1.10	.257**	.356**	.461**	**.803**				
Perceived risk	2.39	1.05	-.085	.009	.048	-.227**	**.791**			
Perceived ease	2.11	1.03	.123*	.238**	.378**	.327**	.104	**.773**		
Perceived usefulness	1.66	0.80	.126*	.279**	.533**	.320**	.143**	.660**	**.746**	
Intention to use	2.18	1.00	.104	.397**	.654**	.488**	-.045	.451**	.598**	**.866**

**correlation is significant at the 0.01 level

Table 3. Results

Hypothesis	Path Coefficient	Result
innovativeness → perceived ease	.013	Denied
Mobile self-efficacy → perceived ease	.161*	Accept
Perceived risk → perceived usefulness	.060	Denied

Perceived risk → intention to use	-.192***	Accept
relative advantage → perceived usefulness	.259***	Accept
relative advantage → perceived ease	.313***	Accept
confidence → Perceived risk	-.268***	Accept
perceived ease → perceived usefulness	.520***	Accept
perceived usefulness → intention to use	.833***	Accept

This study investigated what factors affect the usage intention of mobile easy payment services. To this end, the factors of technology acceptance are systematically classified in terms of perceived risks of consumers such as social, personal, functional, and financial risk factors.

The research model to be examined in this study basically examined, mobile self-efficacy and confidence of mobile payment services as main factors, the perceived usefulness, perceived ease of use, focusing on technology acceptance model. In addition to the factors that increase the intention to use, we also examined how the perceived risk of mobile payment technology affects the intention to use.

2) Implications

Theoretical and practical implications of this study are suggested as follows. First, theoretical models related to the use of mobile simple payment technology can be explained in various dimensions such as social, personal, functional, and risk factors, in addition to the perceived usefulness and ease of use by using the technology acceptance model. Second, the technology acceptance model can be applied to the decision of acceptance of easy payment application. Third, as the fintech industry is expanding, including mobile easy payment, mobile easy payment technology can be influenced by different factors such as perceived risk and personal factors like innovativeness , self-efficacy and confidence and functional factor like relative advantage, perceived ease and perceived usefulness. It was confirmed empirically whether those factors greatly affected or not to the acceptance of new technology like mobile easy payment service. This can provide specific practical implications for the acceptance and spread of the fintech industry. Perceived risk and perceived usefulness affect the intention to use, so it will be very important to appeal specific features on perceived usefulness of mobile easy payment service and to reduce its perceived risk for potential customers. It will provide specific directions on what marketing strategies should be implemented to increase consumer acceptance and use of mobile easy payment services. Though this study provides some useful and empirical implications for academic and practical fields, it has some limitations and suggests some further study for future research. It suggests further research on some personal factors for acceptance and diffusion of mobile easy payment services.

ACKNOWLEDGEMENT

REFERENCE

[1] J. C. Anderson and D. W. Gerbing, "Structural Equation Modeling in Practice: A Review and R ecommended Two-Step Approach", *Psychological Bulletin*, Vol. 103, No. 3, pp.411-423, 1988.

[2] F. Belanger and R. E. Crossler, "Privacy in the Digital Age: A Review of Information Privacy Research in Information Systems," *MIS Quarterly*, Vol. 35, No. 4, pp. 1017-1041, 2011.

[3] T. Dahlberg, J. Guo, and J. Ondrus, "A critical review of mobile payment research," *Electronic Commerce Research and Application*s, Vol. 14, pp. 265–284, 2015.

[4] C. Fornell and D. F. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, Vol. 18, No. 1, pp. 39-50, Feb. 1981.

[5] R. Goldsmith and C. Hofacker, "Measuring consumer innovativeness," *Journal of the Academy of Marketing Science*, vol. 19, no. 3, pp. 209-221, 1991.

[6] J. Hwang and H.S. Yoo, "Intention to use of mobile easy payment users", *Journal of Information Technology and Architecture*, Vol. 13. No. 2, pp. 291-306, June 2016.

[7] S.M. Jung, "Comparative Study of factors in intention to use mobile payment: age and service types", *Journal of the Korea Academia-Industrial cooperation Society*, Vol. 18, No. 9, pp. 101-112, 2017.

[8] R. Kalakota and M. Robinson, M-Business: The Race to Mobility, New York, NY: McGrew-Hill, 2002.

[9] C. Kim, M. Mirusmonov and I. Lee, "An Empirical Examination of Factors Influencing the Intention to use Mobile Payment," *Computers in Human Behavior*, Vol. 26, pp. 310-322, 2010.

[10] J.S. Lee and D.K. Sung, "A Study of influencing factors for mobile easy payment, moderating role of self-interpretation", *Journal of Digital Convergence,* Vol. 16. No. 4, pp. 137-147, 2018.

[11] N. Mallat, "Exploring consumer adoption of mobile payments: a qualitative study," *Journal of Strategic Information Systems*, Vol. 16, No. 4, pp. 413–432, 2007.

[12] R. Thaler, "Mental accounting and consumer choice," *Marketing Science*, Vol. 4, No. 3, pp. 199-214, 1985.

[13] J. T. Van Slyke, R. Shim, R. Johnson, and J. Jiang, "Concern for Information Privacy and Online Consumer Purchasing," *Journal of the Association for Information Systems*, Vol. 7, No. 6, pp. 415-444, June, 2006.