

THE COLLEGE STUDENTS' BEHAVIOR INTENTION OF USING MOBILE PAYMENTS IN TAIWAN: AN EXPLORATORY RESEARCH

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Abstract- With the rapid development of information technology, mobile payments play crucial role to the m-commerce system. This study applies UTAUT 2 and constructs a Structural Equation Model to discuss the college students' intention of using mobile payments. The results shown that the Performance Expectancy, Facilitating Conditions and Habit have positive impact on behavior intention significantly. Hedonic motivation has negative impact on behavior intention.

Keywords- UTAUT2, Mobile Payment, behavior intention, Structural Equation Modeling.

I. INTRODUCTION

International Data Corporation had forecast that there are more than 2 billion people use mobile devices to get online in 2016 and those population will keep growing in 25% rate in next five years. That is, more and more consumers are going to use mobile devices instead of personal computer in the future and e-commerce (electronic commerce) will turn into m-commerce (mobile commerce). With the rapid development of information technology, mobile payments play crucial role to the m-commerce system.

Bank for International Settlements (2012) defined the mobile payments as "Mobile payments are payments initiated and transmitted by access devices that are connected to the mobile communication network using voice technology, text messaging (via either SMS or USSD19 technology) or NFC. This means that not only traditional mobile phones but also other devices such as tablet computers can serve as access devices for mobile payments." According to Gartner, Inc., half of consumers in mature markets will use smartphones or wearables for mobile payments by 2018. There are three types of mobile payments including branded mobile wallets from banks or credit card providers such as t-wallet in Taiwan, smartphone or wearable-based payments such as Apple pay, and branded mobile wallets from retailers such as Starbucks.

In Taiwan, Executive Yuan had agreed to launch the mobile payments such as Apple pay, Samsung Pay and Android Pay and the ecosystem will be opened to the public at the end of 2016. Apple pay, Samsung Pay and Android Pay all use smartphones or smartwatches to make payment with NFC (Near Field Communication) technology. By 2015, there are more than 16 million Taiwanese use mobile devices. Their intentions of using mobile payment services should be an important topic concerning with the success of mobile payment ecosystem. Therefore, the

study applies UTAUT 2 to discuss the behavior intention of using mobile payments by smartphones. Venkatesh, Thong and Xu (2012) proposed UTAUT 2 by modifying Unified Theory of Acceptance & Use of Technology (UTAUT, Venkatesh et al., 2003) to understand consumers' behavior of technology. According to UTAUT, there are four constructs (Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions) influencing behavioral intention to use a technology. Compare to UTAUT, UTAUT 2 includes three additional key constructs (hedonic motivation, price value and habit)and uses gender, age and experience as moderator variables (Fig.1).UTAUT2 has proved to be a better model not only because it includes more determinants that explains consumers' behavior intention but also it provide a better prediction accuracy (Huang et al, 2013). The constructs of UTAUT2 and the definitions of each construct are listed as Table 1.

Table 1: The Constructs and Definitions of UTAUT 2

Construct	Definition
Performance Expectancy (PE)	The degree of benefits obtained from using the technology in performing certain activities.
Effort Expectancy (EE)	The degree of ease while consumer uses a technology in performing activities.
Social Influence (SI)	The degree of consumers' perception associated with the important others believe they should use the technology.
Facilitating Conditions (FC)	Consumers perceive that the resources and supports of the technology are available to perform certain activities.
Hedonic Motivation (HM)	The leisure obtained from using a technology
Price Value (PV)	The differences between benefits and costs while using a certain technology.
Habit (HT)	Habit is the degree of automaticity while perform a certain technology because of learning.

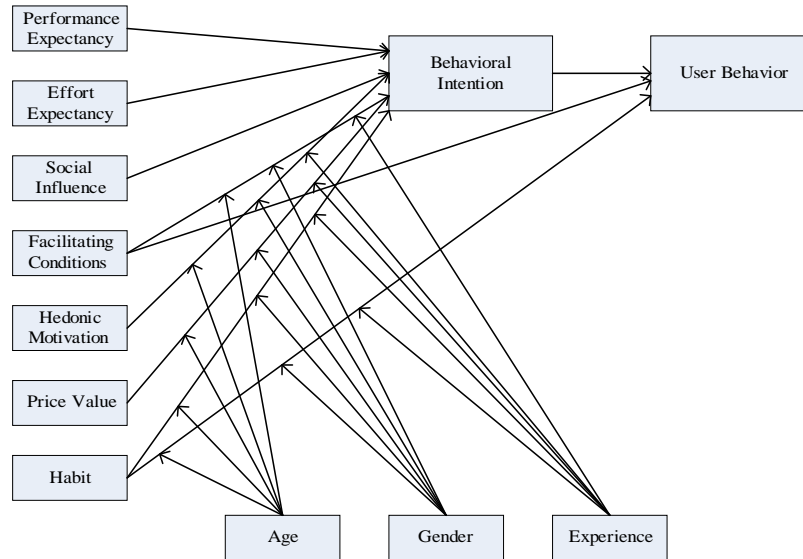


Fig. 1. The Model of UTAUT 2

To discuss the users' behavior intention of using a new technology, prior researchers had developed several models such as Technology Acceptance Model (TAM), diffusion of innovation (DOI) and UTAUT. However, most of the prior studies associated with mobile payments adopted TAM to understand the users' acceptance of a new technology. Nguyen et al. (2016) applied C-TAM-TPB to discuss consumers' intentions to use mobile payment services in Vietnam. Their results shown that the mobile payment service providers should focus on building up consumer trust, and make the system understandable and easy to use. Yang (2005) adopted TAM to explore the factors influencing Singaporeans' attitudes toward using mobile commerce. Schierz et al. (2010) also applied TAM to understand the factors determining users' acceptance of mobile payment services. Chong et al. (2011) used extended TAM and DOI to predict the intention of using mobile commerce in China and Malaysia. The results confirmed that the extended TAM and DOI are necessary while studying m-commerce. Although TAM is a useful model in prediction user acceptance, the perceived usefulness and perceived ease of use do not consider the applicability of technology and the objective usefulness. Therefore, this study applies UTAUT 2 to explore the factors influencing consumers' intention of using mobile payments.

II. RESEARCH MODEL

The model of UTAUT 2 are used to understand the consumers' intention of using mobile payment services. The data were collected by questionnaires designed based on the UTAUT 2 constructs. The survey items included in the questionnaire were developed according to Venkatesh et al. (2012). The questionnaires were delivered to 50 college students at first. After computing the reliability and validity,

the questions were reduced from 25 to 21. The construct of price value was not including in the questionnaires. Because the questionnaires were sent to college students who already use smart phones, there would not be any cost occurred as they use mobile payment services. The research framework used in this study is shown as Figure 2. The hypotheses were postulated as follows.

- H1: "Performance Expectancy" has positive impact on "Behavior Intention" toward using mobile payments.
- H2: "Effort Expectancy" has positive impact on "Behavior Intention" toward using mobile payments.
- H3: "Social Influence" has positive impact on "Behavior Intention" toward using mobile payments.
- H4: "Facilitating Conditions" has positive impact on "Behavior Intention" toward using mobile payments.
- H5: "Hedonic Motivation" has positive impact on "Behavior Intention" toward using mobile payments.
- H6: "Habit" has positive impact on "Behavior Intention" toward using mobile payments.

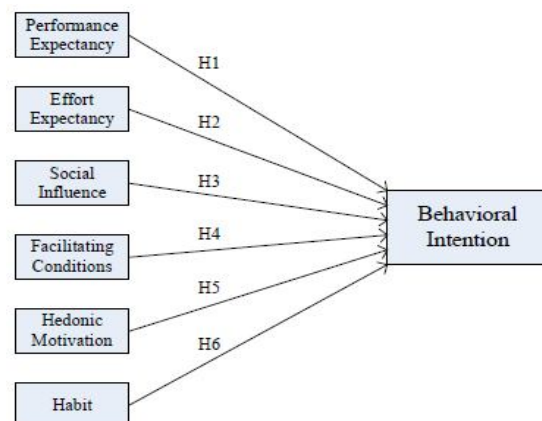


Fig. 2. The research framework

III. METHODOLOGY AND RESULTS

This study adopts a sample survey methodology to test the hypotheses of the proposed model. The survey was conducted at a university in Hsingchu, Taiwan and the questionnaires were given to smartphone users. College students are believed to be the first consumer segment to use mobile commerce (Yang, 2005). A total 212 questionnaires were collected by convenience sampling method and 174 questionnaires are effective after deducting uncompleted ones. Among the respondents, 63.2% were male and 36.8% were female. 64.9% of participants use IOS system smartphones and 35.1% of them use Android system smartphones. 90.2% of respondents have heard about mobile payments, however, 62.6% of respondents use cash to purchase usually.

SPSS 18.0 and AMOS 18.0 were applied to conduct the analysis. The consistency of each construct included in this research model was performed by Cronbach's α (Table 2). Kuo et al. (2013) indicated that Cronbach's α (CA) and Composite reliability (CR) can be used to evaluate the internal consistency. Cronbach's α coefficients reaches 0.8 shows that lantern variables have reached a good internal reliability.

Factor loading, Composite Reliability (CR) and Average Variance Extracted (AVE) are used to evaluate the convergent validity. Factor loading > 0.7 (Xu, 2014), CR > 0.7 (Bagozzi, 1981) and AVE > 0.5 (Fornell and Larcker, 1981) are the thresholds of reaching convergent validity. All the CR and AVE are collected in Table 3.

The goodness-of-fit of this structure model was evaluated by indexes such as Chi-square statistics (CMIN), Root mean square residual (RMR), Goodness of fit index (GFI) and Adjust goodness of fit index (AGFI). According to the suggestions of Chou and Bentler (1995), Byrne (1998), Jöreskog, and D. Sörbom(1993), the structure model can be considered as good fit with CMIN/DF ≤ 2 , RMR ≤ 0.08 , GFI and AGFI ≥ 0.9 . In addition, RMSEA, NFI, CFI and IFI should be all larger than 0.9. The goodness-of-fit statistics and the threshold of all the goodness-of-fit indexes were shown in Table 4.

Table 2: The reliability of research constructs

Constructs	Cronbach's α
Performance Expectancy	0.864
Effort Expectancy	0.876
Social Influence	0.814
Facilitating Conditions	0.874
Hedonic Motivation	0.852
Habit	0.886
Behavioral Intention	0.9

Table 3: Convergent Validity of the research model

Constructs	CR	AVE
Performance Expectancy	0.855	0.662
Effort Expectancy	0.862	0.676
Social Influence	0.839	0.647
Facilitating Conditions	0.874	0.699
Hedonic Motivation	0.851	0.655
Habit	0.904	0.759
Behavioral Intention	0.9	0.751

Table 4: The goodness-of-fit statistics

Goodness-of-fit Index	Actual Value	Recommend Value
CMIN/DF	1.965	≤ 2
GFI	0.881	≥ 0.9
RMR	0.176	≤ 0.08
RMSEA	0.075	≤ 0.08
AGFI	0.816	≥ 0.9
NFI	0.903	≥ 0.9
CFI	0.949	≥ 0.9
IFI	0.95	≥ 0.9

The empirical data only shows partially support relationships between PE, EE, SI, FC, HM, HE and BI (Figure 3, Table 5). The Performance Expectancy (H1), Facilitating Conditions (H4) and Habit (H6) have positive impact on behavior intention significantly. Hedonic motivation (H5) has negative impact on behavior intention.

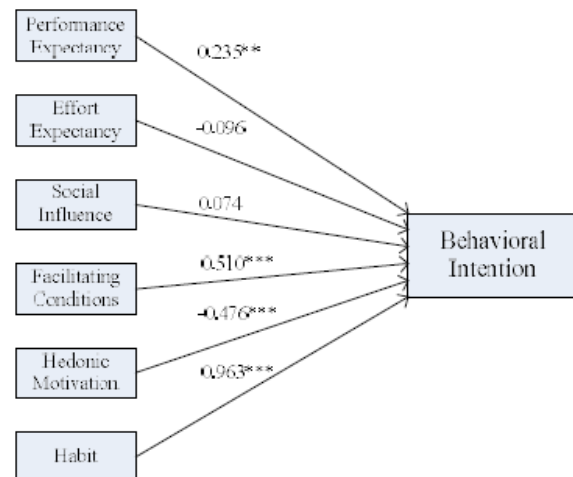


Fig. 3. The path analysis of the structure model

Table 5: The results of Hypotheses Test

Hypotheses	Path	Coefficients	Result
H1	Performance Expectancy → Behavioral Intention	0.235**	Support
H2	Effort Expectancy → Behavioral Intention	-0.096	Not Support
H3	Social Influence → Behavioral Intention	0.074	Not Support
H4	Facilitating Conditions → Behavioral Intention	0.510**	Support
H5	Hedonic Motivation → Behavioral Intention	-0.476**	Support Negatively
H6	Habit → Behavioral Intention	0.963**	Support

CONCLUSIONS

Mobile payments' successful plays a crucial role to the booming mobile commerce. Understanding consumers' intention is an important topic while promoting mobile payments. This study adopted UTAUT2 to predict the factors influencing consumers' intention of using mobile payment services. The results shown that the better performance expectancy, facilitating conditions and habit, the stronger intention of using mobile payment services. The greater benefits obtained from using mobile payments, the stronger the consumers willing to use mobile payment services. Therefore, the mobile payment ecosystem should be designed focus on consumers' need. The facilitating condition has positive impact on consumers' intention and is most important factor. The better the facilitating condition, the safer the consumers felt and might be easier to use the services. To build perfect resources and supports of mobile payment technology availability should be considered as first priority. Habit is also a positive factor influencing consumers' intention. Habit is developed by experiences and learning. Interestingly the hedonic motivation has negative impact on users' intention. Hedonic motivation is a critical negative factor impacting on college students' behavioral intention and was found to be a more important determinant than performance expectancy. The reason about the negative relationship between hedonic motivation and behavior intention might be because of that pleasure obtains from using mobile payment services might cause risky feelings toward financial facilities. Once the consumers feel unsafe, they would not want to use mobile payment services. This is consistent with the results of Nguyen et al. (2016). Therefore, the mobile payment service providers should consider "safety" as a critical determinant toward consumer's intention of using

mobile payments. The college students don't think the ease of use mobile payment and social influence are going to affect the behavior intention of using mobile payment services. Because college students are used to use smartphone for many years, therefore, they might believe there won't be any difficulty while using mobile payment systems. And mobile payments are just one way to make a purchase, therefore, it is not necessary to consider the opinions of others.

In the future, the construct concerned about transaction safety might be considered as a key factor while exploring the behavior of using mobile payment services. And the other group of population should be also included.

REFERENCES

- [1] Bank for International Settlements, 82nd Annual Report, Basel, 24 June 2012.
- [2] V. Venkatesh, J. Y. Thong, and X. Xu, "Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology," *MIS quarterly*, vol.36, no.1, pp.157-178, 2012.
- [3] V. Venkatesh, M. G., Morris, G. B. Davis, and F. D. Davis , "User acceptance of information technology: Toward a unified view," *MIS quarterly*, vol.27, no.3, pp.425-478, 2003.
- [4] C. Y. Huang, Y. S. Kao, M. J. Wu and G. H. Tzeng, "Deriving factors influencing the acceptance of Pad Phones by using the DNP based UTAUT2 framework," *Technology Management in the IT-Driven Services (PICMET)*, pp. 880-887, 2013
- [5] T. N. Nguyen, T. K. Cao, P. L. Dang and H. A. Nguyen, "Predicting Consumer Intention to Use Mobile Payment Services: Empirical Evidence from Vietnam," *International Journal of Marketing Studies*, vol. 8, no. 1, pp.117-124, 2016
- [6] K. C Yang, "Exploring factors affecting the adoption of mobile commerce in Singapore," *Telematics and informatics*, vol.22, no.3, pp.257-277, 2005.
- [7] P. G. Schierz, O. Schilke, and B. W. Wirtz, "Understanding consumer acceptance of mobile Wirtz payment services: An empirical analysis," *Electronic commerce research and applications*, vol.9, no.3, pp.209-216, 2010.
- [8] A. Y. L. Chong, F. T. Chan, and K. B. Ooi, "Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia," *Decision Support Systems*, vol.53, no.1, pp.34-43, 2011.
- [9] Y. L. Kuo, "Technology readiness as moderator for construction company performance," *Industrial Management & Data Systems*, vol.113, no.4, pp.558-572, 2013.
- [10] X. Xu, "Understanding Users' Continued Use of Online Games: An Application of UTAUT2 in Social Network Games," In *MMEDIA 2014, The Sixth International Conferences on Advances in Multimedia*, pp. 58-65, 2014.
- [11] R. P. Bagozzi, "Attitudes, intentions, and behavior: A test of some key hypotheses," *Journal of personality and social psychology*, vol.41, no.4, pp.607-627, 1981.
- [12] C. Fornell, and D. F. Larcker, "Structural equation models with unobservable variables and measurement error: Algebra and statistics," *Journal of marketing research*, Vol.18, no.3, pp.382-388, 1981.
- [13] C. P. Chou, and P. M. Bentler, "Estimates and tests in structural equation modeling," In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications*. Thousand Oaks, CA: Sage, 1995.

- [14] B.M. Byrne, "Structural Equation Modeling with LISREL, PRELIS and SIMPLIS: Basic Concepts, Applications and Programming," Mahwah, New Jersey: Lawrence Erlbaum Associates, 1998.
- [15] K. Jöreskog, and D. Sörbom , "LISREL 8: User's reference guide," Chicago: Scientific Software International, 1993.
- [16] M. X. Huang, Y. H. Wang, and S. C., Chen, "Applying UTAUT2 to Investigate the Factors Influencing MOD Adoption: An Empirical Study," 2015 International Conference on Information Management (ICIM 2015), Tatung University, Taipei, Taiwan, 2015.

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