Summer 5-26-2017

Study of User's Adoption Behavior for Innovative Mobile Commerce —Take the Internet Chauffeured Car as an Example

Yongbo Jiang
Business School, Qingdao University of Technology, Qingdao, 266520, Shandong, pupple@163.com

Study of User's Adoption Behavior for Innovative Mobile Commerce —Take the Internet Chauffeured Car as an Example

*Yongbo Jiang**
Business School, Qingdao University of Technology, Qingdao, 266520, Shandong

Abstract: Internet chauffeured car (abbreviated as ICC) is a typical representative of the innovative mobile commerce and has gained rapidly development in a short period. But research about its users' adoption behavior is not reach. The changing market environment also makes it important for ICC platforms timely grasp their users' adoption behavior characteristics. Our study is based on the user's view. By introducing UTAUT and structural equation model (SEM), factors affecting the user's adoption behavior and their influencing path are empirically analyzed. Results show that expected performance, trust tendency and initial trust all have positive effect on the user's adoption behavior significantly. Convenient condition positively influences adoption behavior by initial trust as a mediator. But perceived risk's expected negative influence on adoption behavior is not significant. The results can provide some reference for platforms to promote their service and make related management policies

Keywords: Internet Chauffeured Car, UTAUT, Initial Trust, Adoption Behavior

1. INTRODUCTION

Users' application custom via mobile network has been already cultivated with the improvement of the environment of mobile network, the popularization of the intelligent mobile accessing terminals, and the enrichment of the online payment offline scenarios. Mobile commerce (abbreviated as m-commerce, too) develops rapidly [1, 2]. Many new forms and commercial modes have been derived from the integrating of mobile internet applications and typical industries, such as online payment, internet chauffeured car (abbreviated as ICC), etc, which enrich people's work and life. Our society has been in the era of internet+.

In China, ICC has appeared in 2012. It eases the problem of asymmetric information during the process of taking a taxi to a certain extent, and solves the dilemma of people's hard to take a taxi and high empty loading rate of the taxies. ICC diversifies people's traveling model. Meanwhile, it realizes the effective allocation of society resources. It is the embodiment of shared economy under the background of Internet+. The new policy of ICC implemented on November 1, 2016 marks its legal application. But dispute from all sides is ongoing. The new policy introduces a new round disputing peak. Meeting people's basic need and promoting the society's progress is the basic starting point of market development. The ICC platform's goal and strategy should adjust accordingly when the market steps in a different stage [3]. So it is urgent to explore the consumer's characteristics, analyze their essential appeal and factors influencing them to adopt the ICC service.

Existing research about ICC mostly focuses on its validity, operating economy and impact on the typical taxi. It's also a hot spot discussing its standardized development from the angel of law, regulations and policies [4]. But very little research is about the user's behavior. Only references [5] to [7] study factors influencing ICC users' adoption behavior and their satisfaction in the market launching stage. However, users and market environment all have changed much. Platforms' subsidies are not as much as before, too. There is still strong demand in the ICC market with the disappearance of subsidies yet. Information getting from random investigating 53 ICC drivers shows that their volume hasn't decreased with gradually disappearing subsidies. People already take ICC as a conventional phenomenon. The rapid development of the ICC market depends on people's adoption. So,

* Corresponding author. Email: pupple@163.com.

users' adoption behavior about ICC service in its rapidly developing stage is studied in this paper. Referring to research methods of users' trust and adopting behavior in mobile commerce, we introduce UTAUT and SEM to analyze factors affecting ICC users' adopting behavior. This research can provide some reference for ICC platforms to regulate managing and promoting methods better.

2. REFERENCE REVIEW

2.1 Initial Trust

ICC is an innovative m-commerce. Users are not familiar with it and there is no experience to follow. Therefore their perception of uncertainty and risk are more strongly than ever before. Once they try it and feel well, initial trust will be established which will perhaps lead to repeated use and recommendation to others. So establishing users' initial trust is essential. Yang Guangming et al. investigate factors affecting consumers' initial trust in m-commerce. They found that perceived usefulness, structural security and personal trust tendency significantly influence initial trust, and perceived usefulness and initial trust play important roles in adopting behavior also [8]. Siau et al. studies the same topic. Their research results show that technology feasibility, business reputation, familiarity and third party certification are all important to initial trust [9]. Characteristics of environment, company, consumer and product are essential to initial trust in m-commerce, too [10]. But current research on initial trust of ICC is not rich.

2.2 users' adoption behavior

Exsiting research about users' adoption behavior in m-commerce is mainly based on the view of the party who needs service, that is, from the consumer's or the user's view. Relative theories are mainly TRA, TPA, TAM, UTAUT, etc[12]. Meta analysis about 32 relevant articles finds that perceived usefulness, peiceived fun and personal innovative have positive impact on adoption behavior in m-commerce. But the influence of peiveived ease of use and subjective norms is not significant[13]. For college students, perceived ease of fun, usefulness and intimacy play important roles in the decision of their adopting behavior[14]. And the first two elements in the above circumstance are aslo important in the adoption of online fast payment and e-bank[15-16]. As to privacy concern, it impacts the adoption behavior by intermediaries: perceived risk (positive impact) and trust (negative impact)[17]. In the research of the consumer's initial trust in wearable business, researchers finds that expected performance, convinient conditions, privacy concern and trust tendency all impact initial trust remarkably. At the same time, expected performance and initial trust influence the adoptiong behavior[18]. Study about ICC market in the cultivating stage shows that relative advantage, personal trust tendency and company reputation are all have influence on ICC's adoption by the intermediery of initial trust[5-7].

3. MODEL AND RESEARCH HYPOTHESIS

3.1 Research Hypothesis

Adoption behavior is such a situation that users are willing to provide necessary information to the system to enjoy its products or service. They also take delight in recommending it to others. Expected performance (EP) refers to users' expected benefit to use the system, which is similar to the perceived usefulness in TAM. More detailed, it is the degree to release users' life or work by use ICC service. Existing research shows that EP is related to initial trust[8,18]. It also influences adoption behavior directly[5-8,13-16,18]. ICC platforms improve people's experience and life quality by providing them comfort and convenient service, which can guide people to produce initial trust on the system and improve the rate of their using ICC service.

Basic hypothesis $\boldsymbol{H_1}$: EP positively affects initial trust.

Basic hypothesis $\boldsymbol{H_2}$: EP positively affects adoption behavior.

Convenient conditions (CC) refer to the effort that users need to use the system. CC is essential to both

initial trust and adoption behavior [18]. ICC service realizes the order's match, payment and evaluation by cell phone APP. Whether users having basis skills to use the APP, to what degree the difficult is to use the APP and to what degree the APP is compatible to the system of their mobile phone all will bring influence to initial trust and adoption behavior. The more easily it is to use the system, the more easily it is to enhance the users' first impression. And these will further urge them to adopt the system's service.

Basic hypothesis $\boldsymbol{H_3}$: CC positively affects initial trust.

Basic hypothesis $\boldsymbol{H_4}$: CC positively affects adoption behavior.

Trust tendency (TT) is the user's personal trait. It is related to his personality, culture background, experience, etc. During the process of accepting new things, TT is crucial to establish initial trust [8, 18] and can also impact adoption behavior directly [13, 18]. People with high trust tendency are easy to think of new things from positive aspect. It is ordinary for them to set up initial trust and try further.

Basic hypothesis $\boldsymbol{H_5}$: TT positively affects adoption behavior.

Basic hypothesis $\boldsymbol{H_6}$: TT positively affects adoption behavior.

Users feel their privacy is threatened when information technology can monitor, collect and communicate their personal information; their privacy concern (PC) arises when they can't control their own information; their privacy concern increases when such control is more and more difficult. During the process of using ICC, APP need to correlate the user's cell phone number, locate his address and store his travel history automatically; financial information is also necessary during payment. All this is users' private information. Users are troubled if this information is used unauthorized. Many users are hesitating to establish the initial trust on the system because they are worried about their private information being threatened.

Basic hypothesis $\boldsymbol{H_7}$: PC negatively affects initial behavior.

Most studies have shown that initial trust (IT) has positive effect on adoption behavior [5-8, 13, 18]. When people feel the system is stable, reliable and credible to fulfill its commitment, that is, when people set up initial trust on the system, they'll actively adopt the system service.

Basic hypothesis $\boldsymbol{H_8}$: IT positively affects adoption behavior.

3.2 Conceptual model

ICC is a typical application in the field of mobile commerce integrating traditional industries to implement innovation. ICC is portable, personalized, sceneries, etc. It enriches people's travel pattern and relieves their rigid travel demand. ICC market has already cultivated consumers' using habits on the basis of former promotion. After the game and eventually merge between big platforms, ICC market has been through the stage of exploration and launching and now is stepping into the period of rapid development [1]. When using the ICC service, users inevitably expose their private information such as location, track path, financial information. So, based on the above hypothesises and references, UTAUT is extended to construct a conceptual model to describe the ICC user's adopting behavior (see figure 1). In this model, expected performance, convenient conditions, trust tendency and privacy concern affect initial trust, and the first three ones and initial trust together influence the adoption behavior.

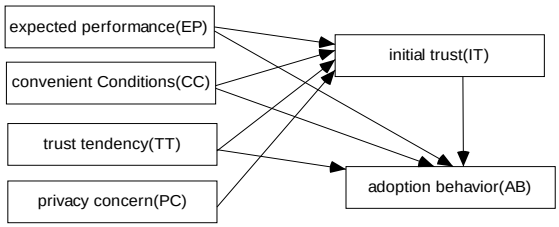


Figure. 1 the conceptual model of users' adoption behavior

4. RESEARCH METHOD

4.1 Scale Design

On the basis of current references, a questionnaire is designed after integrating experts' opinion and ICC users' preliminary interviewing results. Likert 5 scale is used to measure items. Every item has five choices: strongly disagree (1point), disagree (2 points), not clear (3 points), agree (4 points) and strongly agree (5 points). Items and their sources are shown in table 1.

Table 1. Measurement items

Variable	Index	Content of Index	source
Expected Performance, EP	EP_1	The same cost can bring me higher travel quality using ICC service.	[19,20]
	EP_2	The same cost can bring me higher efficiency using ICC service.	
	EP_3	ICC is useful in my work and life.	
Convenient Conditions, CC	CC_1	There are professional persons or organizations to solve my questions during using ICC.	[20,21]
	CC_2	The ICC system is compatible with my phone system.	
	CC_3	I have the needed knowledge to use ICC.	
Privacy Concern, PC	PC_1	It is very important for me to know how my personal information is used..	[22]
	PC_2	I feel my privacy is violated when I can't control my information completely.	
	PC_3	I am afraid that the ICC system collects too much personal information.	
Trust Tendency, TT	TT_1	I believe that human nature is kind。	[21,23]
	TT_2	The level to which that I trust others is very high.	
	TT_3	It is easy for me to believe some persons and things.	
Initial Trust, IT	IT_1	ICC system is reliable.	[21]
	IT_2	ICC system is credible.	
	IT_3	I believe that ICC system can fulfill its commitment to customers.	
Adoption Behavior, AB	AB1	I'd like to recommend ICC system to my friends	[24]
	AB2	I'd like to provide my personal information to ICC system.	

4.2 Collecting sample data

We use internet investigation to collect raw data for analysis. The respondents are those who have tried ICC service already. 352 questionnaires are collected. After eliminating 31 invalid ones, 321ones are left and the effective rate reaches 91.2 percent. Characteristics of the effective sample are listed in table 2.

Table. 2 Characteristics of the effective sample

	age				**educational background**	
	18-24	25<35	35-50	>50	below high school	others
male	43	60	85	3	3	188
female	50	32	41	7	13	117
total	93	92	126	10	16	305

4.3 Data analysis

Firstly, SPSS 16.0 is used to perform reliability analysis of the questionnaire. The Cronbach's alpha value for the whole questionnaire is 0.896, and all factors' Cronbach's alpha values and CRs are above 0.7. So the reliability of the questionnaire is good. Secondly, Bartlett sphere inspection is conducted. The KMO of the sample data is 0.906 and is significant under the confident level of 0.001, which means that the scale is suitable for factor analysis. 6 factors are extracted through principal component analysis with the explaining variance rate of 80.82 percent. All items' weights to their corresponding factors are more than 0.7, while all items' weights to crossing factors are less than 0.5. All AVE is above 0.5 except that one is approximate to 0.5. Weights

between factors are all less than the square roots of their AVEs. These imply that the scale has good convergent and differential validity (see table 3).

Table. 3 Cronbach's alpha, CR, AVE and its corresponding square root; correlation between factors.

	Cronbach's Alpha	CR	AVE	EP	CC	PC	TT	IT	AB
EP	0.859	0.78	0.55	**0.75**					
CC	0.754	0.72	0.46	0.52	**0.68**				
PC	0.789	0.75	0.5	0.24	0.26	**0.92**			
TT	0.854	0.86	0.85	0.07	0.02	0.1	**0.71**		
IT	0.927	0.91	0.91	0.33	0.48	0.02	-0.12	**0.95**	
AB	0.79	0.76	0.5	0.63	0.09	0.06	-0.07	0.31	**0.71**
Note: The bold numbers on the diagonal are square roots of AVEs.									

At last, AMOS 17.0 is adopted to test measurement variables and the hypothesis model. The model fit indexes are listed in table 4. All indexes are fall into the ideal range except RMSEA (it falls in the acceptable range). So the model has good fitness. The weights between observed variables are obtained after path analysis (see figure 3).

Table. 4 the overall model fit indexes of SEM

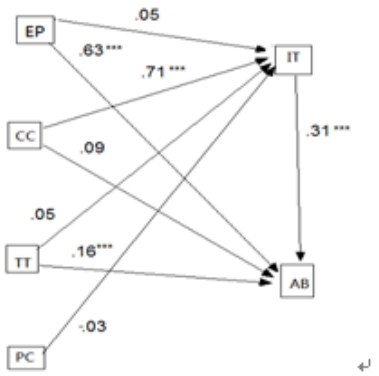
fit indexes	ideal standardized value	acceptable standardized value	result in this research
x^2/df	<=2.00	<=3.00	2.118
RMSEA	<=0.05	<=0.08	0.064**
AGFI	>=0.8	>=0.7	0.873
NFI	>=0.9	>=0.8	0.892
FI	>=0.9	>=0.8	0.939
IFI	>=0.9	>=0.9	0.94
PGFI	>=0.5		0.644
PNFI	>=0.5		0.706
PCFI	>=0.5		0.743

5. CONCLUSIONS AND DISCUSSIONS

5.1 Results analysis

In this paper, we set up the ICC user's adoption behavior model on the basis of UTAUT and implement empirical analysis by SEM. Only hypothesis H_2、H_3、H_6、H_8 are supported and they are significant under the confident level of 0.001.

Among factors that are expected to affect the initial trust of ICC service, only convenient conditions are confirmed and its weight is 0.71. This means it is easier to build initial trust for users when the system is easy, convenient and has good guarantee to users. Nowadays, the diversity for cell phone applications enriches our life



Note: ***, **, * represent p<0.001, p<0.01, p<0.05 respectively.

Figure. 3 Results of the model analysis

and brings much convenience to us. Meanwhile, users are more and more pickier when they are experienced and having more choices. System compatibility is the basis condition. Simple operation saves users' time cost and better service guarantee lowers their risk. So, the better the system convenient condition is, the higher the user's initial trust is. The convenience's impact on the adoption behavior is intermediated by initial trust here.

Secondly, the positive affect of expected performance on the user's adoption behavior is significant with the weight of 0.63. The user's goal of adopting ICC is to solve his/her rigid travel problem. So the core of ICC is to meet the user's preliminary demand. When users perceive that ICC can bring them lower price, higher efficiency and quality, their adoption intent will be strengthened.

Thirdly, trust tendency positively influence adoption behavior which weight is 0.16. Trust tendency measures the way how one treats new things. One that has innovative spirit and higher trust tendency is easier to take in new things. As an innovative mode of m-commerce, ICC doesn't appear for long time. So, only people with innovative consciousness and higher trust tendency will have strongly intent to adopt it.

At last, initial trust positively influences adoption intent and its weight is 0.31. When a new technology conveys such signal to users that it is secure, reliable as well as earnest to fulfill its promise, users will come into being initial trust. Such trust will further introduce users to try the system service. So, the stronger the initial trust is, the stronger the user's adoption intent.

Expected performance, trust tendency and privacy concern haven't affect initial trust significant. That means that users just perceive the system is useful or they are innovative can't prompt them to build initial trust easily. They may try to adopt it, but this behavior is not based on the premise of trust. Expected influence of privacy concern on initial trust isn't proved, either. Perhaps mobile commerce applications is commonplace in people's life and privacy information is collected widely already. Meanwhile, with the advancement of technology, the improvement of regulations and laws and plenty of work that the government has done to protect privacy and information security, users' fear about privacy is not so serious as before. Therefore, even many private information is involved when using ICC service, the initial coficence level of users is not decreased.

5.2 Theoretical significance

Firstly, this research model is constructed based on the characteristics of ICC and UTAUT, which extends UTAUT. Meanwhile, SEM is introduced to implement empirical analysis to explore factors influencing ICC users' adoption behavior and their acting mechanism. The results of the research verifies that the revised UTAUT is rational and effective.

Secondly, this article adds to the exsiting literature related to ICC. According to the exsiting references, studies about ICC mainly concentrate on ICC's operating economy and impact on typical taxies, and most of them are discussed from the angle of law, regulations and policies. Instead, this article is form the user's view, research the user's adoption behavior and takes the change of users and market enviorment into consideration. In this sense, this article is useful.

5.3 Practical implications

ICC market has already stepped into the stage of rapid development. Our research results can provide some managemt and marketing advice to ICC platforms.

- It is fundamental to provide the basis service that users needed. The core is to solve users' problem with comprehensively low cost but better performance. This can be verified by the fact that the gradual disappearance of the platform's subsidies doesn't lead to the ICC market shrink.
- Simplify the operation of the system and enhance the user's experience at the same time.
- Develop young people's market initiatively, for example, college students. Young people are innovative and adventurous. They are glad to try everything and willing to pay for it, even there is risk.

5.4 Limitations

ICC is a new phenomenon and there is vast research space about it. In this paper, cross-section data is used to explore factors influencing the user's adoption behavior. However, users' multidimensional perception for ICC will change with the accumulation of their using experience. The adoption behavior doesn't equal to the continuance behavior. In the coming research, we should go on to concern about factors influencing ICC users' continuance behavior with time and their acting mechanism. From the angel of cost-benefit, old customers are more important than new ones. So, it is essential for platforms to keep customers once they come.

ANOWLEDGEMENT

This research was supported by the Social Science Foundation of Qingdao under grant QDSKL130146 and the Social Science Foundation of Shandong Province under grant 16DGLJ04.

REFERENCES

[1] China Internet network Information. (2016). the 38th Statistic Report of Chinese Internet Development. http://www.cnnic.cn.

[2] Analysis International. (2016). the Annual Comprehensive Report of Chinese Internet Travel Market. http://wenku.baidu.com.

[3] Yang Haoxiong, Wei Bin. (2016). On the Competition Game between Online Tailored Taxi and Traditional Taxi under Platform's Subsidy Policy. Social Science of Beijing. (5): 68-76.

[4] Xu Xiaori, Li Sijia. (2015). Standardized Development of innovation and entrepreneurship Model Under the Strategy of "Internet+"—Take the "Uber" Internet Chauffeured Car as an Example. E-Government. (11): 43-50.

[5] Lin Yuchuan. (2014). Study on Users' behavior for Mobile taxi Software. Ms D Thesis. Xiamen: Xiamen University.

[6] Li Chenggong. (2015). An Empirical Study on Users' Satisfaction for Mobile taxi Software. Ms D Thesis. Chengdu. Southwest Jiaotong University.

[7] Meng Jian, Liu Yang. (2016). Influence factors of Users' Intention for Using Mobile Taxi Booking Software. Journal of Modern Information. 36(2): 25-31.

[8] Yang Guangming, Lu Yaobin, Liu Wei. (2009). An Empirical Research on Factors Influencing Consumers' in Initial Trust in Mobile Commerce. Journal of Inelligence. 28(7): 175-179.

[9] Siau K., Shen Z. (2003). Building Customer Trust In Mobile Commerce. Communications of Acm. 46(4): 91-94.

[10] Lin Jiabao, Lu Yaobin. (2011). Study on Consumers' Initial Trust in Mobile Brokerage Service. Management Review. 23(11): 59-68.

[11] Jin B. K. (2012). An Empirical Study on Consumer First Purchase Intention In Online Shopping: Integrating Initial Trust and TAM. Electronic Commerce Research. 12(2): 125-150.

[12] Li Liwei. (2014). a Literature Review on Mobile Commerce Services and User Adoption Behaviors. Journal of Modern Information. 34(6): 171-176.

[13] Deng Chaohua, Zhang Liang, Zhang Jinlong. (2012). Individual Adoption of Mobile Commerce: A Meta Analysis. Library and Information Service. 56(18): 137-143.

[14] Hu Hongli, Zhang Yacui. (2016). A Model of College Student's Mobile Commerce Adoption an its Empirical Research. Journal of Xi'an University of Posts and Telecommunications. 21(1): 110-115.

[15] Xie Aiping, Liu Wenjun. (2014). Ding Lin. Analysis of Factors Affecting the User's adoption Behavior for Fast E-payment. Statistics & Decision. (14): 90-92.

[16] Li Shubiao, Long Qilong, Guo Tao. (2012). the Research on Factors Affecting Internet Banking Using Intention. Statistics & Information Forum. 27(12): 82-87.

[17] Zhou Tao, Lu Yaobin. (2010). the Impact of Privacy Concern on Mobile Commerce Users' Adoption Behavior.

Chinese Journal of Management. 7(7): 1046-1051..

[18] Gu Zhongwei, Xu Fuyuan, Wei Jun. (2015). an Empirical Study of Factors Influencing Consumer's Initial Trust in Wearable Business. Management Review. 27(7): 168-176.

[19] Venkastesh V., Morris M. G., Davis G. B., et al. (2003). User Acceptance of Information Technology: Toward a Unified View. Mis Quarterly. 27(3): 425-478.

[20] Venkastesh V., Thong J., Xu X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. Mis Quarterly, 36(1): 157-178.

[21] Koufaris M., Hampton S. W. (2004). the Development of Initial Trust in an online Company by New Customers. Information & Management. 41(3): 337-397.

[22] Malhotra N. K., Kim S. S., Agarwal J. (2004). Internet Users' Information of Consumer Attitudes Toward Secondary Information Use. Information Systems Research. 15(4): 336-355.

[23] Lee M. K., Turban E. (2001). A Trust Model for Consumer Internet Shopping [J]. International Journal of Electronic Commerce. 6(1): 75-91.

[24] Gefen D., Karahanna E, Straub D. W., et al. (2003). Trust and TAM in Online Shopping: An Integrated Model[J]. Mis Quarterly. 27(1): 51-90.