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# New Tends in Mobile Commerce: An Empirical Survey in China

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**Abstract**:

The explosive development of m-commerce is probably the main phenomenon in recent retailing and consumer behavior. Traditional brand giants are struggling to maintain their competitive advantages through mobile technologies; emerging firms are striving to enter this new business by relying on innovative ideas; and consumers are enjoying the convenience and pleasure brought by numerous mobile applications. In recent years, sophisticated Smartphone, more experienced users, and related firms' strategies coming to maturity, have made m-commerce more integrated and complex. This paper is an early attempt to explain those new features and tendencies of current m-commerce, and analyzes how consumer behavior evolves through them. This study also provides a short investigation of consumers' attitudes, because in practice the users' acceptance varies quite dramatically between different applications. As survey basis, an empirical research review is performed, which highlights some interesting facts concerning m-commerce adoption.

**Keywords**: consumer behavior, marketing paradigm, m-commerce, new tendencies, technology adoption.

## Introduction

In the 1990s, while mobile-commerce was at its beginning, many people considered m-commerce as an extension of e-commerce, rather than a substitute: they considered m-commerce only as *mobile* e-commerce. Today, the primary opinion in both academic and managerial areas is that m-commerce is actually a fresh form of commerce, which needs be treated differently. Especially with handheld mobile terminals becoming more affordable and sophisticated, and more users gaining familiarity and experience with mobile devices, m-commerce is playing an important role in social and economic life. Some new features of m-commerce are emerging, which have changed consumer behavior, business models, and hence marketing paradigms. Examining current state-of-the-art in m-commerce is therefore of interest and worthy.

This study firstly introduces which new trends and changes are emerging in today's m-commerce, from four aspects, discusses how these new features impact consumers, and what firms and merchants should do to respond to customers' needs and wants. Next, through reviewing consumer attitude research in m-commerce context, this study explores whether there are different theories of adoption research between m-commerce, traditional e-commerce, and IT, and if so, why. Also, the study analyzes the validity of these theories and most predictors used before. Finally, an investigation using 116 MBA and undergraduates students was conducted to capture the driving factors and obstacles while accepting complex mobile applications.

## 1. Current development in m-commerce

Mobile commerce, or m-commerce, generally refers to the use of mobile devices to conduct electronic business transactions (Khalifa and Shen, 2008). The definition comprises two elements: *mobility* and *exchanges*. Mobility means: (1) ubiquity access which indicates mobile service can be provided and consumed at anytime, from anywhere; and (2) portable devices which indicate that in m-commerce consumers perform transactions by various handheld terminals instead of stationary desktop PCs. The element of *mobility* can distinguish m-commerce from e-commerce making the concept of m-commerce easier to understand.

The second element of m-commerce, *exchanges*, leads to fierce debates on whether m-commerce must lead to monetary benefits. In other words, if some interactions bring zero financial profits, do they still belong to m-commerce? Both views have supporters, however, in the present *mobile economy* or *wireless economy*, more and more people prone to agree that m-commerce should encompass a broader scope than money involvement only. As Sultan and Rohm (2005) pointed out, mobile-marketing brings to three outcomes: brand awareness, brand impression, and brand purchase. Given this perspective, whether directly buying or only increasing the possibility of future buying, both types of actions should be regarded as m-commerce. Thus, those firms are visionary which make firmly efforts to achieve the varying aims: either stimulating immediate purchase or deepening brand impression for future purchase.

In this study, broader concept of m-commerce is adopted. That is, m-commerce is

defined as different kinds of *mobile interactions* between consumers and brands, including direct purchase behavior or information exchanges for a certain purpose. Given this definition, the following four tendencies can be found related to:

- Function diversification
- Multi-party interaction
- Personalization
- Consumers' roles spread

### 1.1 Function diversification

At the early stages of m-commerce, most mobile applications were developed for some specific functions either for utilization, for example, personal financial services, or for entertainment like games and music. After the new generation of mobile telecommunication networks (3G) was built in 2002, the role of mobile applications became more synthetic and integrated. Two good examples are location-based service, known as LBS (Barnes, 2003), and context-aware service, or CAS (Schilit and Theimer, 1994). LBS is used to provide personalized information service according to users' geographic situations; while CAS is based on exclusive contextual information from users. According to Schmidt et al. (1999) and Chen and Kotz (2000), since LBS catches only users' low-level context (i.e., nearby situations) and while CAS provides users with any possible information on a personal basis (including physical environment, social context, historical consumption records, etc.), LBS is seen as the preliminary version of CAS. These two kinds of applications can perform different

functions simultaneously, sometimes crossing from efficiency, social networking to entertainment, as Figure 1 shown.

**Insert Figure 1**

In 2011, a venture capital expert John Doerr of Kleiner Perkins Caufield & Byers presented a brand-new concept: SoLoMo (social, local, mobile), which has perfectly described the ongoing feature of function diversification of m-commerce and has become a buzzword in mobile and other related sectors. Many enterprises, like Facebook, Google, and Amazon have taken SoLoMo as their own strategic direction.

### 1.2 Multi-party interaction

As mentioned above, due to single-functionality in the past, mobile applications had few participants: generally only including users, carriers, and content providers. Currently, with mobile usefulness becoming so widespread, more and more participants are involved. In addition to the traditional three parties, a large number of retailers and merchants are also joining up: for instance, a new and increasingly well-known mobile company, Foursquare, has signed up 500,000 business partners. All of these players transact frequently and steadily through contracts, eventually evolve into a kind of ecosystem. In the process of multi-party interactions, firms have to re-position themselves and manage co-creation value (Amit and Zott, 2001; Maamar, 2003).

### 1.3 Marketing policy: Personalization

Considering that marketers will be able to create sale strategies based on location and context, Sultan and Rohm (2005) called today the coming era of marketing the "brand in a hand" marketing. Relying on current multifarious technologies, when design marketing mix, marketers not only consider consumers' demographic characteristics and lifestyles, but also take into account consumers' spatial and temporary information, weather, nearby surroundings, and even moods. Imagine such a scene: a traveler is walking down the Avenue des Champs-Elysées in Paris, at two different times: 11 am and 2 pm. At 11 am, his cell phone receives a multimedia messaging service (MMS) showing a nearby restaurant's information. At 2 pm, he receives an MMS showing some electronic coupons of dress shops or cinemas on the same street he is on. In both situations, an additional reminder at the end of the MMS says it would rain in the next four hours. It is not surprising that even if these messages were not able to bring about immediate consumption money (though in fact, it could contribute to a sale), lovely logos and warming words could deepen the consumer's brand impression.

Recently, a manager of Taobao, the biggest electronic firm in China, described Chinese markets: *women are coming*. In the past, due to complex using procedures of cell phones, the majority of mobile buying was male (62% sales in last year), while this year, however, females comprise a higher growing rate than males (22% vs. 16%). More important, data indicates once women accept mobile buying, they would buy more frequently and steadily. The second fact of Chinese markets is *youth is coming*.

Consumers aged from 24 to 30 contribute account for 42% of Chinese mobile sales, and those aged from 19 to 23 is 34%. These two segments contribute to a total of 76% sales, to ring true with the thought that, whoever satisfies the youth will win in the future.

The Chinese case implies it is profitable to integrate mobile marketing into a firm's whole market strategy. It also illustrates that utilizing mobile approaches does not mean that a company must give up or ignore traditional marketing methods.

### 1.4 Transformation of the consumers' role

In past m-commerce, alike with e-commerce, the consumer's role as the service acceptor was clear and obvious. In present, new m-commerce, the role becomes mixed and blurred. Surprisingly, existing research pays less attention to this issue. Imagine that one is wandering outside three hotels and cannot decide which one is the best fit for a two-night stay. At that time, he opens a mobile application and finds that one of his twitter followers happens to be staying in hotel Z; the consumer can make an easy choice in a second. Mobile technology has shortened the distances from person-to-person, and between brand and consumer, as well. In this case, the real-time location information of the consumer (the follower) becomes a part of the decision-making basis of another individual. The follower even acts as a live advertisement. In current m-commerce, consumers play multiple roles, often as acceptors of mobile information, sometimes as information providers, and in certain situations, even as mobile service providers.

In summary, current m-commerce presents many emerging features, which differently with the past m-commerce. The past m-commerce more inherited the characteristics of e-commerce and then added mobility as its main advantage, while the present m-commerce further develops this advantage towards more full functions and social influence. Due to its higher complexity, the present m-commerce may be named complex m-commerce, which is impacting consumer behavior more exclusively and deeper.

## 2. Consumer behavior change

From a spatial and temporary view, Balasubramanian, Peterson and Jarvenpaa (2002) describe the impact of mobile technology on consumer behavior. They consider that, compared with no mobile technology, consumers will no longer be constrained by the spatial and temporary. In this study, we discuss the impact from another view: the time-dependent process of consumer behavior. Although following analyses are not adequately profound, we consider they are helpful owing to the neglect in prior research.

### 2.1 Gaining decision-making information

In today's society, due to the increasing pace of life and work pressure, people's attention is fragmentized (Chakravorti, 2010). Harrison (2011), a consultant, says: "Thanks to digital technology, there will be more ways to reach consumers, but only creative and compelling messages will capture their fragmented attention". To consumers, watching an entire scenario (e.g., a video or plain ad) to obtain

decision-making information is less and less important (or prominent) compare to what used to be. Consumers are prone to choose those quicker, shorter, and easier-focused on information channels. In addition, due to less certain fixed time and place to search information, consumers hope to search at anytime in anywhere as long as they need. This transfer reminds firms to remake their advertising policies, and in fact, a recent report from BIA/Kelsey (2011) also predicts total U.S. mobile advertisement spending will grow from $790 million in 2010 to $4 billion in 2015.

**2.2 Patronage**

M-commerce creates more opportunities for small business, as well. In the past, when a consumer was driving on a strange street to find a restaurant, he/she might not walk into an unknown chain or store because of uncertainty of taste, price, and sanitation. Now, however, with the help of some mobile applications, his/her Smartphone can tell him/her all the attributes of nearby restaurants, including taste, price, star-level, customer comments, and even predicted waiting time. Therefore, some retail niche might benefit from m-commerce and that will occur probably in an easier way in company-owned stores than in franchised stores (Kaufmann, Cliquet and Achabal, 2010). It is noticeable that the individual patronage behavior change caused by mobile technology has altered the traditional brand theory and retail location models. To a certain degree, mobile applications decrease the positive effect of brand on store choice. And, the attractiveness of one shop no longer heavily depends on distance and population in the original area, as suggested by Huff model (1964).

### 2.3 Customer comments

In present mobile society, customers have more motivations to make comments on products and services. Except traditional purpose for providing some personal experiences and psychological feelings after consuming a specific product or service, nowadays people recommend often only for memory. Many mobile applications provide a *check-in* function: "leave your footprint here, only a simple click." Whatever the aim is, strutting in the first bowling play or commemorating a gathering of friends from afar, consumers' comment can serve as a special kind of *recessive advertisement*. Foursquare attracts three million check-ins everyday, and McDonald's and several fast food chains have begun to get their customers this way, as well.

## 3. Consumer attitude to m-commerce

After nearly two decades of developments, m-commerce has become virtually a necessity of many people's everyday lives, as the latest report from CNN said, users check their Smartphones 34 times a day on average. However, the fact that 79.3% paid applications have been used less than 100 times, illuminates that further efforts to understand consumer attitudes regarding mobile services is a pressing issue. Up to now, there have been many empirical outcomes of m-commerce adoption from various disciplines; nevertheless, as far as we known, a review is still lacking. Therefore, a summary was performed in this study to paint a full view of the area.

### 3.1 A review of adoption research in m-commerce

Up to April 2011, we searched four related and often-used online databases: EBSCO, ScienceDirect, Springer Link, and Wiley-Blackwell, based on following keywords: "mobile commerce," "m-commerce," "adoption," "acceptance," "use," and "usage". Several selection criteria were used to further refine the outcome of the initial search, described as follows:

- Considering the aim of present research, only individual level studies were retained. All organizational adoption literature was given up.
- Those literature used non-empirical methods were omitted; the methods including, conceptual articles, reviews, exploratory studies, qualitative studies, and case studies[1]. Comparing research between two existing models and meta-data research also were excluded. In other words, all reserved articles strictly fulfill three conditions: (1) using *survey* method, (2) testing *new-built* cause-and-effect relationships, and (3) their dependent variables are consumers' attitude, intention, or actual use behavior.
- Only full-text articles and peer-reviewed journal articles were included, while all conference papers and less informational articles were excluded.

Finally, 43 pieces of empirical literature are selected. Appendix A shows the detailed descriptions of these studies. Analyzing these previous empirical studies, several important facts can be found:

(1) Adoption research of m-commerce has been a hot topic in recent years.

[1] Because cased study usually was used to research organization adoption in the m-commerce area.

Reviewed articles were published between 2003 and 2011, among which, peak times emerged in 2007, 2009, and 2010: respectively eight articles each year. Sample areas appeared rather imbalanced; generally, most attention was paid to Asian countries and regions (e.g., Korea, Taiwan, Hongkong, Singapore), followed by North America, less involved was Europe, with only a few countries represented (e.g., Spain, Finland, Germany).

(2) Overall, the dominant research paradigm is an economic-rationalistic model, which is consistent with the findings of Fichman and Carroll (2004) and Jeyaraj, as well as Rottman, and Lacity (2006). The paradigm means that, the more individuals possess the right independent variables, the greater the chance that m-commerce will be adopted.

(3) Theories employed in the m-commerce environment are rather different from the general IT area. Jeyaraj et al. (2006) summarized 10 theories used for IT adoption. Removing three organizational theories that include innovation diffusion theory (IDT, Rogers, 1995), the diffusion/implementation model (Kwon and Zmud, 1987), and the tri-core model (Swanson, 1994), there are eight theories[2] used in individual level adoption. In my review, there are more than 14 theories or integrated models found, among which two theories failed to appear in the IT adoption: they are value model and task-technology fit (Goodhue and Thompson, 1995). Similarly, three models were used in the IT area, but not in m-commerce research. Table 1 shows the summarized comparison of theories used in two areas.

[2] Innovation diffusion theory, as proposed by Regers is actually two theories: one produced in 1983 is used in individual adoption; the other, produced in 1995, is for organizational adoption studies.

(Several models which emerged only once and are not classic models are excluded from Table 1.)

**Insert Table 1**

(4) Technology acceptance model (Davis, 1989), called TAM, was the most popular model used in the mobile commerce environment, which is consistent within IT adoption. The second popular model was the value model which is a fresh theoretical framework never emerged before, according to Jeyaraj et al. (2006). The frequency of all main theories employed is summarized in Table 2. (We categorize those once use and non-classic models into *others*.)

**Insert Table 2**

(5) The most frequently used (more than five times) predictors of individual m-commerce adoption are perceived usefulness (examined 27 times, significant 26 times ), perceived ease of use (examined 27 times, significant 22 times), fun (examined 15 times, significant 15 times), personal innovativeness (examined 7 times, significant 7 times), prior knowledge or experience (examined 4 times, significant 4 times), trust (examined 6 times, significant 5 times), compatibility (examined 6 times, significant 5 times), perceived value (examined 5 times, significant 5 times), perceived cost (examined 5 times, significant 4 times), self-efficiency (examined 6 times, significant 5 times), and subject norm (examined 7 times, significant 6 times).

In summary, as far as adoption theory is concerned, TAM is the most extensively

used and verified model for technology acceptance, which shows the good validity in m-commerce as well as in IT adoption. Meanwhile, value models are the second most popular theory due to the particular characteristics of m-commerce, especially increasing risks makes consumers often make some trade-offs to decide whether adopt a certain mobile service. In addition, owing to the complex nature of mobile service, integrated models emerge frequently.

Considering of the less development of m-commerce before, objects of previous research are quite primal, including general m-commerce, some specific mobile services, and a certain mobile device, as shown in Appendix A. Among mobile services, most focused on single-function services, for instance, mobile banking (e.g., Kim et al., 2009), mobile advertising (e.g., Zhang and Mao, 2008), mobile ticketing (e.g., Mallat et al., 2009), and so forth. Only two studies pertained to multi-functional mobile applications: Kwon et al. (2007) explored consumer attitude to CAS and Xu and Gupta (2009) explored privacy problems in the context of LBS. This academic situation rather lags behind current practice, in which complex applications, like CAS and LBS, are playing a more and more prominent role.

### 3.2 A Survey of Consumer Attitude on CAS

A short investigation was performed to capture consumers' general beliefs on CAS. Following the guide of two experts in m-commerce and marketing respectively, we selected two representative applications of CAS and described them in scenarios (see Appendix B). Given the exploratory nature of the present research, we adapted some

predictors from those most used ones in prior research (mentioned above), and then added several extra CAS-focused factors according to Kwon, et al. (2007) and Xu and Gupta (2009), to form the final questionnaire. Specifically, six questions were used to capture the reasons for using CAS, and six for the problems faced by users in using CAS. All of questions were measured with a 5-point Likert-type scale.

The investigation was conducted in a university in Beijing, China, for convenience. The back-translation process was used to ensure the scenarios and questions were properly translated into English and Chinese. Among the population of 604, considering the aim of survey, only those who had Smartphones were recruited. Eventually, 116 questionnaires were retained. Table 3 shows the demographic description.

**Insert Table 3**

Especially, respondents' purchase history of mobile applications was investigated to capture consumers' enthusiasms on paid applications, and the outcomes are shown as Figure 2. The data indicate that the amount of buying in past year was surprisingly small, only with a 2.53 mean value; i.e. the consumption amount was between RMB 20-50 (about EUR 2.19-5.48) per respondent.

**Insert Figure 2**

When queried about the reasons why they have a positive attitude about CAS, the most important factors are *usefulness* (48.28%) and *like new things* (37.93%). These results are consistent with prior experience: perceived usefulness is always the

prominent explanation for technology and innovation (see Jeyaraj et al., 2006, and the review in previous section of this study); while personal innovativeness has been regarded as a stable character trait to impact consumers' decisions (Featherman, Valacich and Wells, 2006; Lastovicka and Joachimsthaler, 1988).

Interestingly, the two least important factors were quite contrary to common sense. *Following other's suggestion* showed the weakest relationship with positive attitude (27.59%), which implies that the young generation has run away from traditional collective and oriental culture. In contemporary China, young people tend to make decisions by their own minds and favorites, rather than obeying the instructions of the elders or other important people. The second least important factor, *good price* (23.28%), indicates Chinese mobile consumers no longer put price as the first consideration when making a buying decision. Considering the tremendous market opportunity (94 million 3G subscribers and 928 million mobile users as of August 2011 in China), the decreasing price sensitivity indicates a promising future for all mobile practitioners. Table 4 presents the above results.

**Insert Table 4**

When asked about problems encountered while thinking about using CAS, more than half respondents indicated their concerns regarding on invasion of privacy. The outcome is understandable after taking the nature of complex m-commerce into account. CAS and LBS are *second exchange* in essential (Culnan and Bies, 2003; Xu, et al., 2011), which means users have to sacrifice some personal information for

personalized service. Thus, how, when, and by whom their individual information will be extracted, stored, and used becomes a big concern. The second most powerful obstacle that needs to be removed was the feeling of distrust. As previously discussed, in order to conduct a mobile service successfully, many participants join up, including numerous small and unknown retailers. In this case, the trust relationship would be vital and indispensable to encourage consumers to have a try (see Table 5).

**Insert Table 5**

## 4. Conclusion and future research

From the above discussion, we can observe that some noteworthy tendencies have and are emerging in today's m-commerce. Function diversity, participants' complexity, meticulous marketing strategies, and the numerous roles of the consumer have led to a significant change in business models, marketing paradigms, and consumer behavior. This study describes these tendencies of current complex m-commerce, analyzes the mobile users' behavioral changes from time-honored perspectives, and expects to offer some possible recommendations for both academic and managerial usage.

This study also provides a review of existing peer-level journal articles on the adoption of m-commerce, and comparison of the theories mostly used in m-commerce, traditional IT, and e-commerce areas. TAM is constantly prominent and effective in most situations, while the frequency of value models has risen rapidly in mobile adoption research, owing to more uncertainty faced by consumers today.

Through a brief survey, this study primarily captures Chinese mobile users'

attitudes on a kind of typically complex m-commerce, known as CAS. Producers and developers should put their efforts on the usefulness of mobile applications, and meanwhile, inspire those innovative consumers become the early users. Firms also should make unremitting efforts to decrease the negative impacts of privacy concerns and consumers' distrust.

The study's flaws are a result of its exploratory purpose: both conceptual and methodological works only described rather than dug out the essence of m-commerce or consumers attitude on it. In the future, it will be important to better understand the features and influences of complex m-commerce, moreover, test consumers' beliefs theoretically and empirically and explore their special concerns caused by complex applications and transactions. At the same time, it is also an imminent task to develop more sophisticated instruments to match the characteristics of current applications.

**Reference**

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Amit, R., & Zott, C. (2001). Value creation in E-business. *Strategic Management Journal*, 22(6/7), 493-520.

Balasubraman, S., Peterson, R. A, & Jarvenpaa, S. L. (2002). Exploring the Implications of M-Commerce for Markets and Marketing. *Journal of the Academy of Marketing Science, 30*(4), 348-361.

Bandura, A. (1986). Social Foundations of Thought a0nd Action: A social cognitive theory, Englewood Cliffs, NJ: Prentice-Hall.

Barnes, J. S. (2003). Known by the network: The emergence of location-based mobile commerce. In E.-P. Lim & K. Siau (Eds.), Advances in mobile commerce technologies (pp. 171–189). Hershey: Idea Group.

Bigne, E., & Sanz, S. (2005). The Impact of Internet User Shopping Patterns and Demographics on Consumer Mobile Buying Behavior. *Wireless Week*, 6(3), 193-209.

Bouwman, H., Carlsson, C., Molinacastillo, F., & Walden, P. (2007). Barriers and drivers in the adoption of current and future mobile services in Finland. *Telematics and Informatics*, 24(2), 145-160.

Bruner Ⅱ, G., & Kumar, A. (2005). Explaining consumer acceptance of handheld Internet devices. *Journal of Business Research*, 58(5), 553-558.

Chakravorti, B. (2010). Finding Competitive Advantage in Adversity. *Harvard Business Review*. 88(11), 102-108.

Chang, S. E., Chen, S., & Liu, Y. (2009). A user study of accessing web applications via voice cellular phone: a model comparison approach. *Behaviour & Information Technology*, 28(5), 471-484.

Chen, G., & Kotz, D. (2000). A Survey of Context-Aware Mobile Computing Research, Dartmouth Computer Science Technical Report TR2000-381, 1-16.

Culnan, Mary J., & Bies, R. J. (2003). Consumer Privacy: Balancing Economic and Justice Considerations. *Journal of Social Issues, 59*(2), 323-342.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly,* 13(3), 319-340.

Fang, X., Chan, S., Brzezinski, J., & Xu, S. (2006). Moderating Effects of Task Type on Wireless Technology Acceptance. *Journal of Management Information Systems*, 22(3), 123-157.

Fichman, R. G., & Carroll, W. E. (2004). Going Beyond the Dominant Paradigm for Information Technology Innovation Research: Emerging Concepts. *Journal of the Association for Information Systems, 5*(8), 314-355.

Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly, 19*(2), 213-236.

Harrison, S. (2011). Trending Topics for Crisis Communications, *Public Relations Tactics*, 18 (1), 12-13.

Huff, D. L. (1964). Defining and Estimating a Trading Area. *Journal of Marketing*, *28*(3), 34-38.

Hung, S., Ku, C., & Chang, C. (2003). Critical factors of WAP services adoption: an empirical study. *Electronic Commerce Research and Applications*, 2(1), 42-60.

Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology, 21*(1), 1-23.

Kaufmann P. J., Cliquet G., & Achabal D. D. (2010) Implementing Multi-Channel Strategies: Issues and Opportunities for Franchise System Websites, 24th ISoF Conference, Sydney.

Khalifa, M., & Shen, K. N. (2008). Drivers for Transactional B2C M-commerce Adoption: Extended Theory of Planned Behavior. *Journal of Computer Information Systems*, 48(3), 111-117.

Kim, C., Mirusmonov, M., & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behavior*, 26(3), 310-322.

Kim, D. J., & Hwang, Y. (2010). A study of mobile internet user's service quality perceptions from a user's utilitarian and hedonic value tendency perspectives. *Information Systems Frontiers*. Online First, 8 September 2010.

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.

Kim, H., Chan, H., & Gupta, S. (2007). Value-based Adoption of Mobile Internet: An empirical investigation. *Decision Support Systems*, 43(1), 111-126.

Kim, S., & Garrison, G. (2009). Investigating mobile wireless technology adoption: An extension of the technology acceptance model. *Information Systems Frontiers*, 11(3), 323-333.

Ko, E., Kim, E. Y., & Lee, E. K. (2009). Modeling Consumer Adoption of Mobile Shopping for Fashin Products in Korea. *Psychology & Marketing*, 26(7), 669-687.

Koivumäki, T., Ristola, A., & Kesti, M. (2006). The perceptions towards mobile services: an empirical analysis of the role of use facilitators. *Personal and Ubiquitous Computing*, 12(1), 67-75.

Kuo, Y., & Yen, S. (2009). Towards an understanding of the behavioral intention to use 3G mobile value-added services. *Computers in Human Behavior*, 25(1), 103-110.

Kwon, O., Choi, K., & Kim, M. (2007). User acceptance of context-aware services: self-efficacy, user innovativeness and perceived sensitivity on contextual pressure. *Behaviour & Information Technology*, 26(6), 483-498.

Kwon, T.H. and Zmud, R.W. (1987). Unifying the Fragmented Models of Information Systems Implementation, in R.J. Boland and R.A. Hirschheim (eds.) Critical Issues in Information Systems Research, New York: John Wiley & Sons, pp. 227–251.

Lastovicka, J. L., & Joachimsthaler, E. A. (1988). Improving the Detection of Personlaity-Behavior Relationships in Consumer Research, *Journal of Consumer Research*, 14(March), 583-588.

Lee, C., Cheng, H.K., & Cheng, H. (2007). An empirical study of mobile commerce in insurance industry: Task–technology fit and individual differences. *Decision Support Systems*, 43(1), 95-110.

Li, S., Glass, R., & Records, H. (2008). The Influence of Gender on New Technology Adoption and Use-Mobile Commerce. *Journal of Internet Commerce*, 7(2), 270-289.

Liang, T., & Yeh, Y. (2011). Effect of use contexts on the continuous use of mobile services: the case of mobile games. *Personal and Ubiquitous Computing*, 15(2), 187-196.

Lin, H.-F. (2010). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International Journal of Information Management*, 31(3), 252-260.

Lu, Y., Deng, Z., & Wang, B. (2010). Exploring factors affecting Chinese consumers' usage of short message service for personal communication. *Information Systems Journal*, 20(2), 183-208.

Luarn, P, & Lin, H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21(6), 873-891.

Maamar, Z. (2003). Commerce, e-commerce and m-commerce: What comes next? *Communications of the ACM*, 46(12), 251–257.

Mahatanankoon, P. (2007). The Effects of Personality Traits and Optimum Stimulation Level on Text-Messaging Activities and M-commerce Intention. *International Journal of Electronic Commerce*, 12(1), 7-30.

Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, A. (2008). An empirical investigation of mobile ticketing service adoption in public transportation. *Personal and Ubiquitous Computing*, 12(1), 57-65.

Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, A. (2009). The impact of use context on mobile services acceptance: The case of mobile ticketing. *Information & Management*, 46(3), 190-195.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information System Research*, 2(3), 192-222.

Muk, A. (2007). Cultural influences on adoption of SMS advertising: A study of American and Taiwanese consumers. *Journal of Targeting, Measurement and Analysis for Marketing*, 16(1), 39-47.

Mun, H. J., Yun, H., Kim, E. a, Hong, J. Y., & Lee, C. C. (2010). Research on factors influencing intention to use DMB using extended IS success model. *Information Technology and Management*, 11(3), 143-155

Nysveen, H. (2005). Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons. *Journal of the Academy of Marketing Science*, 33(3), 330-346.

Pagani, M. (2004). Determinants of adoption of third generation mobile multimedia services. *Journal of Interactive Marketing*, 18(3), 46-59.

Pedersen, P. (2005). Adoption of Mobile Internet Services: An Exploratory Study of Mobile Commerce Early Adopters. *Journal of Organizational Computing and Electronic Commerce*, 15(3), 203-222.

Rogers, E. M. (1983). *The diffusion of innovation*. New York: Free Press.

Rogers, E. M. (1995). *Diffusion of Innovations*, 4th ed. New York: Free Press.

Schilit, B. N.,& Theimer, M. M. (1994). Disseminating Active Map Information to Mobile Hosts. *IEEE Network* 8(5): 22-32.

Schmidt, A., Aidoo, K.A., Takaluoma, A., Tuomela, U., Van Laerhoven, K., and Van de Velde, W. (1999). Advanced interaction in context. In *Proceedings of the First International Symposium on Handheld and Ubiquitous Computing, HUC'99*, pages 89-101, Karlsruhe, Germany.

Shin, D.H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, 25(6), 1343-1354.

Song, J., Koo, C., & Kim, Y. (2007). Investigating Antecedents of Behavioral Intentions in Mobile Commerce. *Journal of Internet Commerce*, 6(1), 13-34.

Sultan, F., & Rohm, A. (2005). The coming era of "Brand in the Hand" marketing. *MIT Sloan Management Review*, 47(1), 83–90.

Swanson, E.B. (1994). Information Systems Innovation among Organizations, *Management Science*, 40(9), 1069–1092.

Tsang, M. M., Ho, S.-chun, & Liang, T.-peng. (2004). Consumer Attitudes Toward Mobile Advertising: An Empirical Study. *International Journal of Electronic Commerce*, 8(3), 65-78.

Turel, O, Serenko, a, & Bontis, N. (2007). User acceptance of wireless short messaging services: Deconstructing perceived value. *Information & Management*, 44(1), 63-73.

Turel, Ofir, Serenko, A., & Bontis, Nick. (2010). User acceptance of hedonic digital artifacts: A theory of consumption values perspective. *Information & Management*, 47(1), 53-59.

Van der Heijden, H. (2004). User Acceptance of Hedonic Information Systems. *MIS Quarterly*, 28(4), 695-704.

Venkatesh, V., & Davis, F.D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Science*, 46(2), 186-204.

Venkatesh, V., Morris, M. G., Hall, M., &Davis, G. B., Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3), 425-478.

Wang, Y.-S., Lin, H.-H., & Luarn, Pin. (2006). Predicting consumer intention to use mobile service. *Information Systems Journal*, 16(2), 157-179.

Wu, J., & Wang, S. (2005). What drives mobile commerce?An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42(5), 719-729.

Xu, H., & Gupta, S. (2009). The effects of privacy concerns and personal innovativeness on potential and experienced customers' adoption of location-based services. *Electron Markets*, 19(2-3), 137-149.

Xu, H., Luo, X. (Robert), Carroll, J. M., & Rosson, M. B. (2011). The personalization privacy paradox: An exploratory study of decision making process for location-aware marketing. *Decision Support Systems*, *51*(1), 42-52.

Yang, K. C. C. (2005). Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics and Informatics*, *22*(3), 257-277.

Yen, D. C., Wu, C., Cheng, F., & Huang, Y. (2010). Determinants of users' intention to adopt wireless technology: An empirical study by integrating TTF with TAM. *Computers in Human Behavior*, *26*(5), 906-915.

Zhang, J., & Mao, E. (2008). Understanding the Acceptance of Mobile SMS Advertising among Young. *Psychology & Marketing*, *25*(8), 787-805.

**Table 1 The comparison of theories used in two areas**

| *Theory* | *Main author(s)* | *Used in IT individual adoption studies* | *Used in m-commerce adoption studied* |
|---|---|---|---|
| Innovation diffusion theory (IDT) | Rogers (1983) | X | X |
| Perceived characteristics of innovations (PCI) | Moore and Benbasat (1991) | X | |
| Social cognitive theory (SCT) | Bandura (1986) | X | |
| Technology acceptance model (TAM) | Davis (1989) | X | X |
| Technology acceptance model 2 (TAM 2) | Venkatesh and Davis. (2000) | X | |
| Theory of planned behavior (TPB) | Ajzen (1991) | X | X |
| Theory of reasoned action (TRA) | Fishbein and Ajzen (1975) | X | X |
| Unified theory of acceptance and use of technology (UTAUT) | Venkatesh *et al.* (2003) | X | X |
| Technology-task fit (TTF) | Goodhue and Thompson (1995) | | X |
| Value model | | | X |

**Table 2 The frequency of theories employed in m-commerce research**

| *Theory* | *Count (Percent)* | *Author(year)* |
|---|---|---|
| TAM | 15(34.88) | Bruner and Kumar, 2005; Fang *et al*, 2005; Kim and Garrison, 2009; Kim, Mirusmonov, and Lee, 2010; Ko, Kim, and Lee, 2009; Kuo and Yen, 2009; Kwon, Choi, and Kim, 2007; Li, Glass, and Records, 2008; Lu, Deng, and Wang, 2010; Luarn and Lin, 2005; Pagani, 2004; Song, Koo, and Kim, 2007; Van der Heijden, 2004; Yang, 2005; Zhang and Mao, 2008. |
| Value model | 6(13.95) | Bouwman *et al*., 2007; Kim, and Hwang, 2010; Kim, Chan, and Gupta, 2007; Kleijnen, Deruyter, and Wetzels, 2007; Turel, Serenko, and Bontis, 2007; Turel, Serenko, and Bontis , 2010. |
| Others | 5(11.63) | Bigne and Sanz, 2005; Kim, Shin, and Lee, 2009; Mahatanankoon, 2007; Mun *et al*., 2010; Tsang, Ho, and Liang, 2004. |
| TAM & IDT | 3(6.98) | Mallat *et al*., 2008, Mallat *et al*. 2009; Wu and Wang, 2005. |
| UTAUT | 3(6.98) | Koivumaki, Ristola, and Kesti, 2008; Shin, 2009; Xu, and Gupta, 2009. |
| TAM & TPB | 3(6.98) | Chang, Chen, and Liu, 2009; Nysveen, 2005; Wang, Lin, and Luarn, 2006. |
| TPB | 2(4.65) | Khalifa, and Shen, 2008; Pedersen, 2005. |
| IDT | 1(2.33) | Lin, 2010. |
| TAM & TRA | 1(2.33) | Liang, and Yeh, 2011. |
| TAM & TTF | 1(2.33) | Yen *et al*., 2010. |
| TPB & IDT | 1(2.33) | Hung, Ku, and Chang, 2003. |
| TRA | 1(2.33) | Muk, 2007. |
| TTF | 1(2.33) | Lee, Cheng, and Cheng, 2007. |
| *Total* | *43(100)* | |

**Table 3 Demographic characteristics of the respondents**

| | | Account | Percent |
|---|---|---|---|
| Age | 20-25 | 1 | .9 |
| | 26-30 | 5 | 4.3 |
| | 31-35 | 45 | 38.8 |
| | 36-40 | 31 | 26.7 |
| | 41-45 | 23 | 19.8 |
| | >45 | 11 | 9.5 |
| Gender | Male | 101 | 87.1 |
| | Female | 15 | 12.9 |
| Profile | Undergraduate | 50 | 43.1 |
| | MBA | 66 | 56.9 |
| Annual Income | < RMB 30,000 | 10 | 0.86 |
| | RMB 30,001-80,000 | 10 | 0.86 |
| | RMB 80,001-150,000 | 21 | 18.1 |
| | >RMB 150,001 | 75 | 64.7 |
| Total Responses | | 116 | 100 |

**Table 4 Reason for positive attitude**

| | Least Important (1) | Less (2) | Average (3) | Kind of (4) | Very Important (5) |
|---|---|---|---|---|---|
| Usefulness | 2.59 | 6.03 | 15.52 | 27.59 | 48.28 |
| Easy of Usefulness | 17.24 | 27.59 | 9.48 | 31.03 | 14.66 |
| Fun | 3.45 | 10.34 | 40.52 | 29.31 | 16.38 |
| Good Price | 23.28 | 33.62 | 15.52 | 12.07 | 15.52 |
| Like New Things | 4.31 | 8.62 | 18.97 | 30.17 | 37.93 |
| Others' Suggestion | 27.59 | 18.10 | 29.31 | 16.38 | 8.62 |

**Table 5 Potential problems worried from CAS use**

| | Least Important (1) | Less (2) | Average (3) | Kind of (4) | Very Important (5) |
|---|---|---|---|---|---|
| No Enough Knowledge | 54.31 | 18.10 | 15.52 | 2.59 | 9.48 |
| No Prior Experience | 51.72 | 16.38 | 10.34 | 13.79 | 7.76 |
| Privacy Invasion | 0.86 | 2.59 | 5.17 | 40.52 | 50.86 |
| Low Compatibility | 37.07 | 21.55 | 11.21 | 18.10 | 12.07 |
| Distrust of Carrier | 13.79 | 9.48 | 33.62 | 26.72 | 16.38 |
| Distrust of others participants | 16.38 | 12.07 | 18.10 | 25.86 | 27.59 |

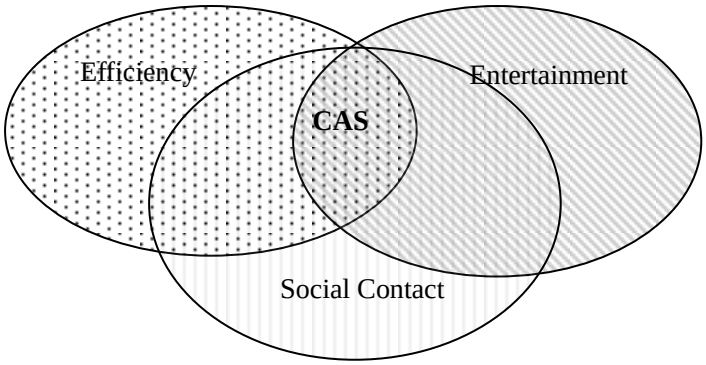


**Fig. 1 CAS: A kind of integrated multi-function service**

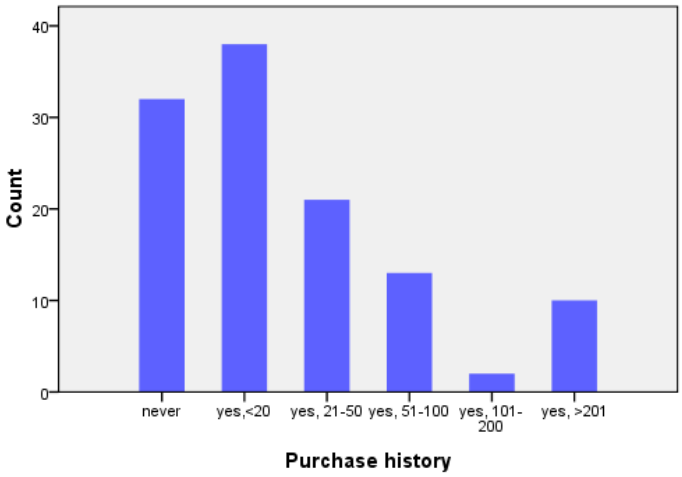


**Fig. 2 Mobile application purchase history**

## Appendix A. The details of all empirical summarized in study 1

| *Author* | *Year* | *Journal* | *Research aim* | *Sample* |
|---|---|---|---|---|
| Bigne and Sanz | 2005 | WW | Research on mobile buying behavior | 2104, Span |
| Bouwman *et al*. | 2007 | TI | Adoption of current and future mobile services in Finland | 484, Finland |
| Bruner, and Kumar | 2005 | JBR | Handheld internet devices acceptance | 212, US |
| Chang, *et al* | 2009 | BIT | Intention to a web applications: VWS | 229. Taiwan |
| Fang *et al.* | 2005 | JMIS | Wireless technology acceptance | US |
| Hung, *et al.* | 2003 | ECRA | WAP services adoption | 267, Taiwan |
| Khalifa, and Shen | 2008 | JCIS | M-commerce adoption | 202, HK |
| Kim, and Garrison | 2009 | ISF | Mobile wireless technology adoption | 242, Korea |
| Kim, and Hwang | 2010 | ISF | Mobile internet quality perceptions | 719, Korea |
| Kim, *et al* | 2007 | DSS | Mobile internet adoption | 161, Singapore |
| Kim, *et al* | 2010 | CHB | Mobile payment use | 269, Korea |
| Kim, *et al.* | 2009 | ISJ | Initial trust and Intention of mobile banking | 192, Korea |
| Kleijene, *et al.* | 2007 | JR | The role of value on the adoption of m-commerce | 373, Netherlands |
| Ko, *et al.* | 2009 | PM | Mobile shopping adoption | 511, Korea |
| Koivumaki, *et al.* | 2008 | PUC | Mobile service adoption | 243, Finland |
| Kuo, and Yen | 2009 | CHB | Intention to use 3G mobile | 269, Taiwan |
| Kwon, Choi, and Kim | 2007 | BIT | Intention to CAS | 206, Korea |
| Lee, *et al.* | 2007 | DSS | PDA usage intension | 238, Taiwan |
| Li, *et al.* | 2008 | JIC | The influence of gender on mobile commerce use | 372,US |
| Liang, and Yeh | 2011 | PUC | Mobile service continuous use | 390, Taiwan |
| Lin | 2010 | IJIM | Mobile banking adoption | 368, Taiwan |
| Lu, *et al.* | 2010 | ISJ | Short message service usage | 262, China |
| Luarn, and Lin | 2005 | CHB | Mobile banking usage | 180, Taiwan |
| Mahatanankoon, | 2007 | IJEC | Text-messaging activities and m-commerce intention | 246, US |
| Mallat et al. | 2008 | PUC | Mobile ticketing service adoption | 362, Finland |
| Mallat et al. | 2009 | IM | Mobile ticketing service adoption | 360, Finland |
| Muk | 2007 | JTMAM | Culture influence on adoption of SMS advertising | 376, US & Taiwan |
| Mun *et al.* | 2010 | ITM | Intention to use digital music broadcasting | 350 |
| Nysveen | 2005 | JAMC | Intentions to use mobile services | 2038 |
| Pagani | 2004 | JIM | Adoption of 3 G service | 1000, Italy |
| Pedersen | 2005 | JOCEC | Mobile internet services adoption | 232 |
| Shin | 2009 | CHB | Mobile wallet acceptance | 296 |
| Song, *et al.* | 2007 | JIC | Mobile commerce acceptance | 180, Korea |
| Tsang, *et al.* | 2004 | IJEC | Attitudes to mobile advertising | 309, Taiwan |
| Turel, *et al.* | 2007 | IM | Wireless short messaging services use | 222, US |
| Turel, *et al.* | 2010 | IM | Hedonic digital service acceptance | 422, US |
| Van der Heijden | 2004 | MISQ | User acceptance of hedonic information systems | 1144 |
| Wang, *et al.* | 2006 | ISJ | Mobile service usage | 258, Taiwan |
| Wu, and Wang | 2005 | IM | Mobile commerce acceptance | 310 |
| Xu, and Gupta | 2009 | EM | Location-based services adoption | 176, Singapore |
| Yang | 2005 | TI | Mobile commerce adoption | 866, Singapore |
| Yen *et al.* | 2010 | CHB | Wireless technology adoption | 231 |
| Zhang and Mao | 2008 | PM | SMS advertising acceptance | 262， China |

## Appendix B. Questionnaires

*Introduction*

This is an academic study on consumer attitude on context-aware service (CAS). First, we will give the definitions of CAS. Second, two scenarios are supplied to help you better understand the process how CAS works. Then, a questionnaire follows and includes attitude to CAS and personal information. This study performs in an anonymous way and it is only for the purpose of academic research. Please feel free to finish the entire instrument. Thank you for corporation!

June, 2011

lauchenxiaoyan@163.com

*CAS* is a type of integrated m-commerce service which *utilizes* user's context information, *combines* user profiles and historic consumption records and *provides* personalized information service to consumer so as to help consumers make better and faster decisions.

*Scenario A*

Mr. Li is a stockbroker who owns a smart phone. Recently, he spent 2.5 dollars in buying a CAS application called *I am here*. The application is able to locate users and then supplies personalized service. One day, Mr. Li took a financing course. Entering the hall, he opened the CAS service. Quickly, the following information was displayed on his smart phone: **A). Nearby friends.** Based on his previous setting, which sets a half mile as near scope, 21 linkmen out of his phone contacts list were near at the moment. **B). Friends grouping**. These 21 friends belong to three previous groupings: friends, clients, and classmates. **C). Business records.** Mr. Li once labeled each of his linkmen into three groups: already dealt with, not yet, no intention. At present, among 21 nearby friends, 3 friends have dealt with in the past, 16 still do not deal with, and the last 2 belong to no intention to deal with in recent future. According to this information, Mr. Li contacted several present friends and had lunch with them after the course.

**Notice**: Mr. Li needs to authorize and disclose some *personal information* to perform this CAS; for example, his geographic and temporal context, contact list, and label. This information *might be* provided by his phone carriers to third-party merchants and/or interested individuals (e.g., mobile phone contacts or Facebook friends).

*Scenario B*

Miss Wang has a smartphone. Recently, she spent 3 dollars to buy a CAS application: *Enjoy yourself everywhere*. This application helps users to make a plan, and supplies go-store routine and previous customers' comments. One day, Miss Wang input her plan for next week, which included going out for lunch three times, and input her budget of $100. She set her company address as the start point. Quickly, her phone showed the following information: **A. Options.** There are four alternatives, all fit her predetermined conditions. **B. Distance and comments.** The application shows the total distance for each alternative and customers' comments on each recommended restaurant. **C. Coupons**. The application supplies some electronic coupons for several

recommended restaurants. **D. Patronage records.** The application highlights three restaurants that Miss Wang has patronized or has patronized the same franchising chains in the last two months. According to this information, Miss Wang eventually chose an alternative.

**Notice**: Miss Wang needs to authorize and disclose some *personal information* to perform this CAS, for example, her geographic context, historical consumption records, and comments. This information *might be* provided by her phone carriers to third-party merchants and/or interested individuals (e.g. mobile phone contacts or Facebook friends).

Q1. I think using a CAS application is a good idea, when____

| | Least important | Little | Not sure | Kind of | Most important |
|---|---|---|---|---|---|
| It is useful | | | | | |
| It is easy for use | | | | | |
| It is Fun | | | | | |
| It is at a good price | | | | | |
| I like new things | | | | | |
| Others suggest | | | | | |

Q2. If you are a CAS user, which problem is your concern?:

| | Least important | Little | Not sure | Kind of | Most important |
|---|---|---|---|---|---|
| I have no enough knowledge to use it | | | | | |
| I have no prior experience | | | | | |
| Privacy invasion | | | | | |
| Low compatibility | | | | | |
| I distrust Carriers | | | | | |
| I distrust of others participants | | | | | |

1. Gender: □ Male □ Female

2. Age: □ below 20 □ 21-25 □ 26-30 □ 31-35 □ 36-40 □ 41-45
□ 46 or above

3. Education background: □ Bachelor □ MBA/EMBA

4.Annual income (after tax):
□ below RMB 30,000 □30,001-80,000 □ 80,001-150,000 □ above RMB 150,001

5. Did you buy any paid mobile application in past one year:

□ never □ yes, below RMB 20 □ yes, RMB 21-50 □ yes, RMB 51-100

□ yes, 101-200 □ yes, above RMB 201