The Effect of Technology Usage Habits on Consumers’ Intention to Continue Use Mobile Payments

Completed Research Paper

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Abstract

With the arrival of the mobile commerce era, mobile payments have become one of the critical drivers for mobile commerce success. However, the percentage of consumers who use mobile payments frequently is still low. This research views IT acceptance from the IT ecosystem perspective and adopt transfer of learning theories as the theoretical background to investigate how technology usage habits affect consumers’ intention to continue use mobile payments. Results indicate that mobile service usage habit influence consumers’ behavioral intention directly and indirectly through mobile payment usage habit. In addition, consumers’ online shopping habit and cell phone usage habit influence their behavioral intention indirectly through mobile payment usage habit. Theoretical and practical implications of the findings are also presented.

Keywords

Technology usage habits, Post adoption, Mobile payments, IT ecosystem, Transfer of learning.

Introduction

Mobile payments are transactions that use mobile devices to pay for goods, services, and bills or perform bank transactions by using mobile technology (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). Nowadays, we are in the era of mobile commerce, and mobile payments have become one of the critical drivers for mobile commerce success (Yang, Lu, Gupta, Cao, & Zhang, 2012). Continuous usage refers to a usage stage when using mobile payments becomes part of normal routine activity (Bhattacharjee, 2001). It matters in a long term relationship and is closely related to vendor success because continuous usage will bring companies more profits with less marketing cost (Deng et al., 2010; Gupta & Kim, 2007).

However, the percentage of consumers who use mobile payments frequently is still low (Ewing, Leberman, Mendelsohn, & Milner, 2012). Individuals cannot benefit from their implementation of an innovation if they do not use it (Setterstrom, Pearson, & Orwig, 2012) and companies cannot recover their investments in mobile payments if consumers do not adopt and use it continuously. Thus, it is of great importance to explore factors affect consumers’ intention to continue use mobile payments.

Some IS acceptance research have focused on the psychological construct of habit, which refers to the extent to which people tend to use technology automatically because of learning (Limayem, Hirt, & Cheung, 2007; Polites & Karahanna, 2013; Venkatesh, Thong, & Xu, 2012). Past literature mainly focus on
prior usage of a certain IT innovation on their future usage of it. Ajzen (1991) argued that the establishment of a link between prior and future behavior involving a certain innovation does not contribute to theoretical understanding of post adoption research because it just reflects the stability in consumers’ usage behavior across time. Limayem et al. (2007) also criticized that there is “a lack of convincing argument and a sound theoretical base” for the indirect effect of habit on technology use via behavioral intention (p. 718). More research is needed to explore the relationship between habit and behavioral intention.

In order to bridge the gap mentioned above, we view IT acceptance from the IT ecosystem perspective and adopt transfer of learning theories as the theoretical background. IT ecosystem refers to “a subset of information technologies in the IT landscape that are related to one another in a specific context of use (Adomavicius, Bockstedt, & Gupta, 2008, p. 783)”. In the ecosystem, IT innovations are often mutually dependent, interact and erect an ecology (Swanson, 1994). This coincides with transfer of learning theories, which emphasize that consumers’ past usage of different technologies will enhance or undermine their potential usage of similar or new technologies (Haskell, 2001). Mobile payments, mobile service (other than mobile payments), online shopping, and cell phone are correlated technologies in the mobile ecosystems (Basole, 2009). This research investigates how technology usage habits, mobile payment usage habit, mobile service usage habit (other than mobile payments), cell phone usage habit, and online shopping habit, affect consumers’ intention to continue use mobile payments.

**Theoretical Background and Research Model**

*Transfer of Learning Theories*

In this study, transfer of learning is defined as the process that skills, processes, or content that consumers have learned during past usage of different technologies enhances or undermines individuals’ potential usage of similar or new technologies (Haskell, 2001). Haskell (2001) summarized six levels of transfer, which are nonspecific transfer, application transfer, context transfer, near transfer, far transfer, and displacement or creative transfer. The effect of mobile payment usage habit on their future usage of mobile payments pertains to the first three levels while the effect of their online shopping habit, mobile service usage habit, and cell phone usage habit on their behavioral intention pertains to the other levels of transfer.

There are three streams of learning transfer models. The first stream is the classic perspective. This stream emphasizes the impact of environmental factors such as similarity between learning and transfer situations on transfer of learning. The identical element model is one representative model of this stream. This model posited that the more similarity between learning and transfer situations, the greater the transfer of learning (Thorndike, 1924; Thorndike & Woodworth, 1901).

The second stream of transfer of learning research refers to the cognitive perspective, which emphasizes the impact of intrinsic factors of individuals. The cognitive perspective suggests that when a learner is faced with new tasks to perform or new concepts to learn, previously learned knowledge will be accessed and retrieved to solve problems in transfer situations (Haskell, 2001).

Baldwin and Ford (1988) were one of the first researchers to introduce a holistic model to explain transfer of learning mechanisms. There are so many factors affecting transfer of learning that some researchers consider those factors to be a generalized transfer climate (Holton & Baldwin, 2000). Holton (1996) and Holton et al. (2000) developed the learning transfer system inventory scale including four sets of factors: motivational factors, trainee characteristics, environmental factors, and ability factors.

**Research Model**

According to transfer of learning theory, a conceptual model is proposed in order to explore the impact of consumers’ technology usage habits on their behavior intention (Figure 1).
Hypotheses Development

**Effect of Online Shopping Habit**

Consumers who have formed the online shopping habit are more likely to shop online whenever possible. Mobile payments provide consumers with ubiquitous payment services (Lu et al., 2011), allowing consumers to make payments anytime they need. Thus, mobile payments become attractive and important for consumers who have formed the online shopping habit. Importance of mobile payments has a positive relationship with the formation of mobile payment usage habit (Lankton, Wilson, & Mao, 2010). Additionally, people with the online shopping habit will purchase online frequently. Payment is a necessary stage for consumers to complete transactions, and mobile payments become an important payment option (Yang et al., 2012). Consumers who have formed the online shopping habit have more chance to use mobile payments frequently. An individual’s frequency of using mobile payments is a good predictor of mobile payment usage habit (Jolley, Mizerski, & Olaru, 2006). Thus,

**Hypothesis 1.** Consumers’ online shopping habit will have a positive relationship with their mobile payment usage habit.

Consumers shop online because, at least to some extent, it is convenient (Beauchamp & Ponder, 2010). Consumers prefer that they could shop anytime and wherever they want to and use flexible payment methods to complete their purchase (Jiang et al., 2013). Mobile payments meet consumers’ need mentioned above because mobile payments are notable for its mobility, reachability, compatibility, and convenience (Kim et al., 2010). Mobile payments become one of the critical drivers for mobile commerce success (Yang, Lu, Gupta, Cao, & Zhang, 2012) because mobile payments meet consumers’ need of ubiquity when they shop online. Consumers tend to feel satisfied if their needs are met, and psychological need satisfaction have a positive relationship with their behavioral intention directly (Hagger et al., Harris, 2006). Thus,

**Hypothesis 2.** Consumers’ online shopping habit will have a positive relationship with their intention to continue use mobile payments.
Effect of Mobile Service Usage Habit

A mobile service is a service that is accessed by a person with a mobile device. There are four categories: communication services (such as short messaging and email), entertainment services (such as mobile games), transaction services (such as banking, shopping, brokerage, and booking & reservations), and information services (such as maps, news, and mobile advertising) (Islam, Khan, Ramayah, & Hossain, 2011). Mobile payments and other mobile services operate based on mobile technology and are similar to some extent. Past experience of using similar technologies has a positive relationship with accepting a new technology (Giovanis, Binioris, & Polychronopoulos, 2012). People with a stronger mobile service usage habit are more likely to feel familiar with mobile payment services, encouraging the formation of mobile payment usage habit (Chiu, et al., 2010). Moreover, mobile payments are operated on mobile technology, involving a high level of uncertainty and different kinds of risks (Zhou, 2014). Frequently usage of mobile services will encourage consumers to have a higher level of institution-based trust in mobile technology, which is positively related with their intention to use the innovation habitually (Kim & Han, 2009; McKnight, 1998, 2002). Thus,

Hypothesis 3. Consumers’ mobile service usage habit will have a positive relationship with their mobile payment usage habit.

Mobile services are different from mobile payments but still have some similarities with mobile payments. Experience of using similar services will boost consumers’ self-efficacy of using another similar service (Giovanis et al., 2012). Consumers that have a higher level of self-efficacy are more likely to use mobile payments (Ajzen, 1991). In addition, consumers who use mobile services frequently tend to perceive mobile payment ease to use as well. Perceived ease of use will stimulate consumers to use mobile payments (Chandra, Srivastava, & Theng, 2010). Additionally, mobile payments and other mobile services operate based on mobile technology. Experience of using mobile services encourages consumers to trust in mobile technology, which is an important component of institution-based trust. Thus, mobile service usage habit has a positive relationship with their institution-based trust in mobile payments, which will encourage consumers to continue use mobile payments (McKnight et al., 1998, 2002). Thus,

Hypothesis 4. Consumers’ mobile service usage habit will have a positive relationship with their intention to continue use mobile payments.

Effect of Mobile Payment Usage Habit

In the IS literature, habit is defined as the extent to which people tend to use technology automatically because of learning (Limayem et al., 2007). After the formation of mobile payment usage habit, consumers tend to continue use mobile payments as a matter of automated action. This relationship is reasonable because consumers’ habit encourages the formation of inertia to change (Polites & Karahanna, 2012), which has a positive relationship with their intention to continue use a certain innovation. In addition, habitual behaviors are effortless and cognitively easier to perform than other behaviors (Lankton et al., 2010). Consumers are more likely to repeat behaviors that can be performed with less effort (Lindbladh & Lyttkens, 2002). The positive relationship between habit and behavioral intention is also supported by the extended unified theory of acceptance and use of technology (Venkatesh et al., 2012). Thus,

Hypothesis 5. Consumers’ mobile payment usage habit will have a positive relationship with their intention to continue use mobile payments.

Effect of Cell Phone Usage Habit

Cell phone usage habit helps consumers become more familiar with mobile technology, including knowing how to use mobile technology to perform mobile payments while avoiding potential defraud. Thus, consumers’ online usage habit has a negative relationship with their effort to use mobile technology. Psychology literature indicate that behaviors are prone to be repeated if individuals can perform them quickly and relatively effortlessly (Lindbladh & Lyttkens, 2002). Moreover, small screen of cell phones has been viewed as a reason that limits the function and usage of mobile financial services (Zhou, Lu, & Wang, 2010). Consumers’ cell phone usage habit allow consumers to feel comfortable even with a small screen of
cell phones compared with computer. Hence, consumers’ cell phone usage habit will also have a positive relationship with repeated usage of mobile payments. Thus,

**Hypothesis 6. Consumers’ cell phone usage habit will have a positive relationship with their mobile payment usage habit.**

As cell phone usage further expands, the possibility that they could rely on their cell phones as primary payment devices increases (Au & Kauffman, 2008). This can be explained from several aspects. First, consumers who have formed the habit of using cell phones will consider mobile payments useful since it helps them get out of the limitation of using computers to surf on the internet and pay bills and purchase items without using a computer. Perceived usefulness has a positive relationship with consumers’ intention to continue use mobile payments (Chandra et al., 2010). Second, consumers who are familiar with cell phones know how to avoid fraud during performing mobile payment by using mobile technology. Thus, they will have a higher level of self-efficacy and trust toward mobile payments, each of which has a positive relationship with their intention to continue use mobile payments (Zhou, 2013, 2014). Thus,

**Hypothesis 7. Consumers’ cell phone usage habit will have a positive relationship with their intention to continue use mobile payments.**

### Methodology

#### Data Collection

A survey based research was used to collect data from general public in China by using the QQ group, one of the largest online social networking sites in China. Several groups were randomly selected from the QQ group platform, and group members who have used mobile payments were invited to participate in the survey. The data was collected in January, 2014. Two hundred and thirty one questionnaires were collected. Eleven questionnaires were excluded from the dataset because of high rate of same answers, making the final sample size 220. Table 1 summarizes the demographic information of the participants.

#### Measures

Wherever possible, items were drawn from existing scales. Some minor modifications were made to the adopted measures. All items are measured on a seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). The original English instruments was translated into Chinese by following the back translation approach. In order to test the wording and reliability of the items, a pilot test was conducted using some volunteer respondents in China. All items can be found in the Appendix (English version only).

Each of online shopping habit, mobile service usage habit, mobile payments usage habit, and cell phone usage habit was assessed with three items adapted from Setterstrom et al. (2012). Users’ intention to continued use mobile payments was assessed with three items adapted from Venkatesh et al. (2012). Perceived usefulness was measured with three items adapted from Kim, Mirusmonov, and Lee (2010). The technology acceptance model supports the effect of perceived ease of use and perceived usefulness on behavioral intention. Thus, perceived ease of use and perceived usefulness were used as control variables in this study.

#### Data Analysis and Results

The PLS algorithm was conducted to analyze the data by using SmartPLS 2.0 (Ringle, Wende, & Will, 2005). PLS was chosen for its ability to handle non-normality in the data, and because the goal of this research is to explain variance in the outcome variable (Gefen & Straub, 2000).

#### Common Method Bias

All data was collected through a self-report survey. Thus, there is a potential of common method bias (Podsakoff et al. 2003). This research examined common method bias using three tests. First, the Harmon’s single factor test was performed. More than one single factor emerges from the unrotated factor solution, and no single-factor accounts for the majority of variance. Second, researchers compared
correlations among constructs by following the procedure established by Pavlou, Liang, and Xue (2007). The results revealed no constructs with correlations over 0.7. Third, the unmeasured latent method construct (ULMC) technique (Liang et al. 2007) was performed. The ratio of substantive variance to method variance is about 207:1. All results indicate that common method bias is unlikely to be a serious concern for this research.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Item</th>
<th>Users (n=220)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;21</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>&gt;35</td>
<td>15</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>70</td>
</tr>
<tr>
<td>Education background</td>
<td>Some college or less</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>Master</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>PhD or more</td>
<td>9</td>
</tr>
<tr>
<td>Time of using mobile payments (Month)</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>0-6</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>7-12</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>13-18</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>More than 18</td>
<td>84</td>
</tr>
</tbody>
</table>

Table 1. Demographic Information

**Measurement Model**

Perceived ease of use does not have a significant relationship with consumers’ intention to continue use mobile payments, and thus results with perceived usefulness were reported below. This research adopted the two-stage analytical procedure (Hair et al., 1998). As shown in Table 2, composite reliability (CR) ranged from 0.902 to 0.964, indicating valid internal consistency reliability (Chin, 1998). All AVEs are larger than 0.5, indicating that convergent validity is met (Fornell & Larcker, 1981). Additionally, all squared roots of AVEs are greater than the correlation shared between the construct and other constructs in the model, and all items load appropriately on their intended construct, indicating discriminant validity (Chin, 1998). None variance inflation factors (VIFs) of the independent variables exceeds 3.3, suggesting that multicollinearity is not a concern (Petter et al. 2007).

**Structural Model**

The path coefficients and explained variances of the structural model are shown in Figure 2. PLS model does not generate the model fit statistics but uses $R^2$ to assess the explanatory power of a structural model. The model explained 54.7% of the variance in users’ intention to continue use, validating the predictive power of the model. The Goodness-of-Fit for this model is 0.582, which validates the model globally (Wetzels, Odekerken-Schroder, & Oppen, 2009).
The results indicate that online shopping habit (b=0.253, p<0.01), mobile service usage habit (b=0.201, p<0.05), and cell phone usage habit (b=0.205, p<0.05) each has a positive relationship with users’ mobile payment usage habit, supporting H1, H3, and H6. In addition, mobile service usage habit (b=0.148, p<0.05) and mobile payment usage habit (b=0.277, p<0.001) each has a positive relationship with users’ intention to continue use mobile payments. Thus, H4 and H5 are supported. However, online shopping habit and cell phone usage habit do not have a direct relationship with users’ intention to continue use mobile payments. Hence, H2 and H7 are not supported.
Discussion

Key Findings

Overall, five out of seven hypotheses are supported. The results of our research provide insight into the importance of consumers’ technology usage habits on their intention to continue use mobile payments.

This research distinguishes three antecedents of mobile payment usage habit: online shopping habit, mobile service usage habit, and cell phone usage habit. According to the results, consumers who have formed the habit to shop online and use mobile service and cell phone frequently are more likely to form the habit of using mobile payments. Our research also find two antecedents of consumers’ intention to continue use mobile payments: mobile service usage habit and mobile payment usage habit.

There are two findings that are out of our expectation. First, consumers’ online shopping habit does not have a direct effect on their intention to continue use mobile payments. One possible explanation is that there are safer alternative payment choices such as online banking. Thus, online shopping habit does not guarantee an increase in consumers’ willingness to continue use mobile payments. Second, consumers’ cell phone usage habit does not affect their intention to continue use mobile payments. One possible reason is that using cell phones has become common for consumers. Hence, consumers do not consider cell phone usage habit a factor affecting their mobile payment acceptance decision. Sobel tests were performed to test whether mobile payment usage habit serves as the mediator between online shopping habit and behavioral intention and between cell phone usage habit and behavioral intention. Results indicate that mobile payment usage habit fully mediates the relationship between online shopping habit and behavioral intention (Sobel statistics=2.55, p<0.05) and between cell phone usage habit and behavioral intention (Sobel statistics=2.25, p<0.05).

Limitations and Future Research

As with all research, there are some limitations that should be considered when interpreting the results of this research. First, data was collected by using a self-report survey. Hence there is a potential for common method biases (Podsakoff et al., 2003). However, common method bias is not a significant problem in this research as tested in the methodology part. Second, mobile ecosystem is a complex system with many segments (Basole, 2009). Cell phone, mobile services, mobile payments, and online shopping are just part of technologies in the mobile ecosystem. Future research is needed to systematically research the interrelationships among technologies in the mobile ecosystem.

Implication for Theory

This research highlights the role of technology usage habits in affecting consumers’ intention to continue use mobile payments, contributing to IT acceptance research.

This research explores the post adoption of mobile payments from the perspective of IT ecosystem. The results indicate that mobile service usage habit influences consumers’ intention to continue use mobile payments directly and indirectly through mobile payment usage habit. Moreover, consumers’ online shopping habit and cell phone usage habit each has an indirect relationship with their intention to continue use mobile payments through mobile payment usage habit.

The research also contributes to research on technology usage habit research. Results indicate that consumers’ online shopping habit, mobile service usage habit, and cell phone usage habit each has a positive relationship with their mobile payment usage habit. In addition, we find that transfer of learning theories can be used as the background theory for the effect of habit on behavioral intention.

Implication for Practice

Practical implications for industry can be drawn from these findings. We are in the era of big data, and the combination of social media and big data is promising. This research demonstrates that consumers who shop online, use mobile services, and use cell phones frequently are more likely to continue use mobile payments. Practitioners can predict consumers’ technology usage habits by analyzing information that consumers disclosed in social media. Then, practitioners can distinguish loyal users who are most...
likely to continue use mobile payments based on their technology usage habits and send user-specific advertising messages to their wireless devices. Additionally, perceived usefulness influences consumers' intention to continue use mobile payments. Thus, practitioners should express the usefulness of mobile payments in their marketing activities such as advertisement. They should also pay attention to the information quality of their user interfaces, allowing consumers to realize the usefulness of their mobile payment services.

Conclusion

This research explores the impact of consumers’ technology usage habits on their intention to continue use mobile payments from an IT ecosystem perspective. Drawing on transfer of learning theory, we developed a model suggesting that consumers’ technology usage habits have a direct and indirect relationship with their intention to continue use mobile payments through mobile payment usage habit. Results indicate that mobile service usage habit influence consumers’ behavioral intention directly and indirectly through mobile payment usage habit. In addition, consumers’ online shopping habit and cell phone usage habit influence their behavioral intention indirectly through mobile payment usage habit. This research is the foundation of an understanding of the impact of consumers’ technology usage habits on their intention to continue use mobile payments from an IT ecosystem perspective.

Reference


## Appendix

<table>
<thead>
<tr>
<th>Table A. Measurement Items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online Shopping Habit:</strong></td>
</tr>
<tr>
<td>1. Shopping online has become automatic to me.</td>
</tr>
<tr>
<td>2. Shopping online is natural to me.</td>
</tr>
<tr>
<td>3. When faced with a particular need, shopping online is an obvious choice to me.</td>
</tr>
<tr>
<td><em>Adapted from Setterstrom et al. (2012)</em></td>
</tr>
<tr>
<td><strong>Mobile Service Usage Habit:</strong></td>
</tr>
<tr>
<td>1. Using mobile services other than mobile payments has become automatic to me.</td>
</tr>
<tr>
<td>2. Using mobile services other than mobile payments is natural to me.</td>
</tr>
<tr>
<td>3. When faced with a particular need, using mobile services other than mobile payments is an obvious choice to me.</td>
</tr>
<tr>
<td><em>Adapted from Setterstrom et al. (2012)</em></td>
</tr>
<tr>
<td><strong>Cell Phone Usage Habit:</strong></td>
</tr>
<tr>
<td>1. Using cellphones has become automatic to me.</td>
</tr>
<tr>
<td>2. Using cellphones is natural to me.</td>
</tr>
<tr>
<td>3. When faced with a particular need, using a cellphone is an obvious choice to me.</td>
</tr>
<tr>
<td><em>Adapted from Setterstrom et al. (2012)</em></td>
</tr>
<tr>
<td><strong>Mobile Payment Usage Habit:</strong></td>
</tr>
<tr>
<td>1. Using mobile payments has become automatic to me.</td>
</tr>
<tr>
<td>2. Using mobile payments is natural to me.</td>
</tr>
<tr>
<td>3. When faced with a particular need, using mobile payments is an obvious choice to me.</td>
</tr>
<tr>
<td><em>Adapted from Setterstrom et al. (2012)</em></td>
</tr>
<tr>
<td><strong>Intention to continued use:</strong></td>
</tr>
<tr>
<td>1. I intend to continue using mobile payments in the future.</td>
</tr>
<tr>
<td>2. I predict that I will continue to use mobile payments frequently in the future.</td>
</tr>
<tr>
<td>3. I will strongly recommend that others use mobile payments.</td>
</tr>
<tr>
<td><em>Adapted from Venkatesh et al. (2012)</em></td>
</tr>
<tr>
<td><strong>Perceived Usefulness:</strong></td>
</tr>
<tr>
<td>1. Using mobile payments enables me to pay more quickly.</td>
</tr>
<tr>
<td>2. Using mobile payments makes it easier for me to conduct transactions.</td>
</tr>
<tr>
<td>3. I find mobile payments a useful possibility for making payments.</td>
</tr>
<tr>
<td><em>Adopted from Kim et al. (2010)</em></td>
</tr>
</tbody>
</table>