From traditional payment to mobile payment –
Examining the antecedents and consequences of
Hongkonger’s mobile payment habit

Research-in-Progress

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Abstract

Recently, mobile payment platforms such as NFC based Apple pay, and the QR code encrypted Alipay, gradually entered the new mobile payment market - Hong Kong. However, most of the local consumers are hesitating to continue using these mobile payment platforms after an initial try. We believe this is largely because of the presence of the entrenched traditional payment habits. On the basis of psychology theory of habit, this study explores the influence of the traditional payment habit on the new mobile payment habit, especially in the early stage of mobile payment market. It also investigates the antecedents and consequences of mobile payment habit. Based on the two habit learning mechanisms, facilitating conditions (as an associative mechanism) and perceived usefulness and enjoyment (as two reward mechanisms) are predictors of mobile payment habit; continuance intention of mobile payment and continuance use of mobile payment become the outcomes of mobile payment habit.

Keywords: Mobile payment, habit, facilitating condition, continuance intention/use

Introduction

The concept of mobile payment is introduced and gradually taking root globally. Mobile payments were defined as “payments for goods, services and bills with a mobile device by taking advantage of wireless and other communication technologies (Dahlberg et al. 2015).” Examples of mobile payments include NFC based Apple pay, and the QR code encrypted Alipay. Hong Kong mobile payment market shares common features with the rest of the emerging markets, at the same time, it also carries some specialties. For example, compared with Mainland China, Hong Kong possesses a much more mature and reliable credit card system and financial infrastructure, which allow
consumers to finish transactions safely via any Point-of-Sales machine (Soo 2017a). The traditional payment methods such as cash, credit card and contactless card payment system (Octopus card) were well entrenched in people’s mind. In other words, the traditional payment habit is rather strong among the consumers in Hong Kong than those in Mainland China where people jumped directly to the third generation of payment platform via mobile devices.

There are three mobile payments categories: in-personal mobile payments, such as proximity payments; remote mobile payments; and peer-to-peer mobile payments (Karim von Abrams 2017). This research sets it scope with the first category where consumers could use Near Field Communication (NFC) technology and Quick Response (QR) code encryption to conduct in-store transactions. Hong Kong has a relatively short mobile payments history. The first mobile payment platform – Tap & Go was launched in late 2015; and other NFC enabled payment options such as Apple Pay, Google Pay, Samsung Pay emerged quickly in 2016. With the entry of Alipay and WeChat pay in 2017, a mobile payment war among major operators heats up (Soo 2017b). With the strong promotion incentives from the mobile payment providers (Bruinsma 2018), early adopters began to use mobile payments more and more frequently in the past year. Meanwhile, the new mobile payment system by AlipayHK will be rolled out to 91 MTR stations across the city by mid-2020 (Soo 2018). In such a critical moment, we are not sure whether the initial adopters will continue using the new mobile payments and whether the early adopter will jump the chasm and effectively introduce the mobile payments to the mass (Rogers 2003).

One of the major barriers of continuance mobile payments adoption may be the strong existing payment habit (Qi 2018). The importance of habit toward continuous technology usage was also verified in the prior literature, e.g., Limayem et al. (2007) and Venkatesh et al. (2012). First, we believe the co-existence of both old habit and new habit, since even after new habits have been learned, old memory traces are not necessarily replaced (Bouton et al. 2011). Second, habit was previously validated as a predictor of behavioral intentions (Pavlou and Fygenson 2006) and continuous use of IS (Hsiao et al. 2016; Lankton et al. 2010). Habit was defined as the extent to which people tend to perform behaviors automatically because of learning (Limayem et al. 2007); it was developed over a certain period, and slow to change (Wood and Neal 2009). What is more, in practice, the traditional payment methods are familiar to the consumers in Hong Kong and have the advantage of a well-established infrastructure. Consumers are more likely to repeat behaviors that are effortless and cognitively easier than other payment behaviors (Lankton et al. 2010). Therefore, this study specifically focuses on the antecedents and consequences of mobile payment habit, and investigates the influence of traditional payment habit on mobile payment habit.

In this study, we borrow the concepts of habit change and habit formation from psychology theory of habit (Wood and Rünger 2016). For habit change, three methods were discussed to have the potential to change habit; they are exerting self-control, implementation intentions and changing cues (Wood and Neal 2009). The first two are, however, less powerful than changing cues in explaining habit change (Verplanken and Wood 2006). Therefore, in the present study, we intend to emphasize the power of facilitating condition, as the contextual cue in influencing the conversion from the traditional habit to the mobile payment habit. Since habit is a learned behavior, to form a habit, Wood and Rünger (2016) introduced two mechanisms of habit learning – associative and reward mechanisms. The associative mechanism is a context-response association, where contextual cues (e.g., a certain location, a marketing program) trigger a memory representation of habitual response, which leads to habitual response automatically (facilitating condition in this study). Reward mechanism reinforces the process of context-response association - when consumers feel the mobile payments rewarding (perceived usefulness and enjoyment in this study), they tend to repeat the habit in the future. For the consequences of habit, we highlight the moderating role of mobile payment habit in the relationship between intention and usage, since as individuals get into the habit of continuously using a system, the predictive power of intention will be diluted (Cheung and Limayem 2005).

Motivated by mobile payments practice in the new market like Hong Kong and the psychology theory of habit, the research questions are summarized as follows: (1) What is the relationship between traditional payment habit and mobile payment habit? (2) How do the facilitating condition, perceived
usefulness, and perceived enjoyment influence mobile payment habit? (3) How does mobile payment habit affect consumers’ continuance intention and continuance use of mobile payment?

The paper begins with a summary of literature on habit, with a special focus of habit change and habit formation. Further, we present a research model with 11 hypotheses in the mobile payment context. This is followed by the introduction of the research design. Lastly, we discussed the potential contribution of the research-in-progress study.

Literature Review

Habit as a learned automatic response

Habit can be defined as a kind of automatic response that is formed through learning (Schneider and Shiffrin 1977; Wood and Rünger 2016). There are two important discussions to understand habit as a learned automatic response: the first discussion is how habit is learned and formed, and the second one is how habit is activated and performed automatically. A habit forms when the habit is created and represented as the procedural memory in one’s mind (Wood and Rünger 2016). The memory representation of a habit, as a kind of implicit, long-term memory, guides people to perform a sequence of tasks or actions without consciously being aware of prior related experience (Willingham et al. 1989). An important type of memory representation is the association between context cues and behaviors, where context cues are things that trigger or precede one’s actions, such as physical environments, specific type of people or actions (Wood and Rünger 2016). The habit could be activated when the memory representation is created with repeated occurrence of context cues and behaviors. The more often a behavior is performed under a certain context, the richer the memory representation of such context-behavior association is created (Wood and Rünger 2016).

Habit change-from traditional payment habit to mobile payment habit

Once habit forms, the memory trace is slow to change, requiring repeated experiences across multiple occasions to alter old habit memories and develop new ones (Wood and Neal 2009). Given the nature of habit memory, standard interventions, e.g. change people’s beliefs, self-efficacy judgments, and intentions, may not change habitual behavior (Wood and Neal 2009). We believe, similar with any other consumer’s habit, Hongkonger’s traditional payment habit may not be changed easily, especially when the payment platforms based on credit card, debit card and Octopus card are securely developed and well entrenched. If the market players wish to change consumer’s traditional payment, necessary mechanisms are needed to facilitate the conversion. Three mechanisms are recorded: changing habits by exerting self-control, by implementation intentions, and by changing cues (Wood and Neal 2009). Here we focus on the changing cues, since they are believed to be more effective and ideal for long-term behavior change (Muraven and Baumeister 2000). Contextual cues change is a powerful ally in changing habits because they free people to establish new patterns of behavior in the absence of competing habit cues (Verplanken and Wood 2006). Facilitating conditions, such as resources and supports from technology, vendor, and people, could function as contextual cues, where people might change their habitual behavior when they see the QR code and NFC reader, or when they already have a habit to hold a mobile device while shopping.

Habit formation-the associative and reward mechanisms in habit learning

Habit formation is the process by which new behaviors become automatic. There are two types of learning mechanisms to form a habit: associative and reward learning mechanisms (Wood and Neal 2009). In the associative learning mechanisms, one’s cognitive structures are changed incrementally with the repeated performance of habit response under the relevant context cues, and consequently, form the rich memory representation of the habit. In other words, the repeated enactment of behaviors under the context cues strengthens the cognitive associations between context cues and behaviors, and therefore, people tend to repeat the same behaviors automatically when the context cues are presented again in the future (Wood and Neal 2009). Such context cues can be very diversified, such as the external environment, people, or one’s actions. Facilitating conditions reflect the availability of the
resources and supports people could use during their payment transactions, for instance, technology infrastructure, vendors’ mobile payment platform, and on spot help from cashier. People can identify these context cues as the facilitating resources and supports for new behavioral alternatives. In other words, facilitating conditions for a new information technology can serve as the new context cues to trigger the usage. People are able to form new behavioral pattern with the provision of new context cues when they shift their attention from the existing habit. Therefore, context cues become a significant power to form new habit (Verplanken and Wood 2006).

In the reward learning mechanism, a habit is strengthened as people repeat behaviors that are perceived to be rewarding: people tend to conduct a behavior at a repetitive basis depending on how positive the outcome of the behavior is (Wood and Neal 2009; Martin 2008). If the reward can be predicted to be positive consistently, one is more likely to repeat the behavior, and gradually learn it as a habit with gradual changes of biological reactions (Balleine and O’Doherty 2010). In addition, the positive reward also facilitates people to remember the memory representation of the habit (Schultz 2006; Wise 2004; Wood and Neal 2009). Mobile payment, enabled by the information technology, may bring utilitarian and hedonic benefits as rewards of the usage (Venkatesh et al. 2003). Perceived usefulness of mobile payment reflects the extent to which using mobile payment can enhance users’ payment performance; and perceived enjoyment of mobile payment refers to users’ feeling of joy, pleasure and playfulness that is evoked when making the payment.

Consequences of mobile payment habit

Based on the dual-process theory, people’s decision making is constrained by limited capacity of working memory. People may either respond automatically (where habit applies) or go with deliberate information process (where behavioral intention is initiated) (Evans and Stanovich 2013). Therefore, habit is a concept independent from intention. In the IS literature, habit was validated as a predictor of behavioral intention (Pavlou and Fygenson 2006) and continuous use of information systems (Hsiao et al. 2016; Lankton et al. 2010). Habit was further proved to negatively moderate the relationship between intention and continuance behavior, especially when it gets involved with long-term usage of information systems (Cheung and Limayem 2005). In this study, we would like to further explore the consequences of mobile payment habit, particularly the moderating role of habit.

Research Model

Figure 1 presents the research model proposed in this study. There are totally 9 hypotheses in the theoretical model. Among them, H3 and H8 are the moderating effects.

![Figure 1. Research Model](image-url)

Traditional payment habit reflects the extent to which using traditional payments during transactions is an automatic and natural response to an individual (Limayem et al. 2007; Wood and Rünger 2016).
Traditional payment, such as cash and credit cards, has been the dominant payment methods in different transactional situations before mobile payments are available. Therefore, using traditional payment can be considered as old, alternative habitual responses during the transactions. Old habit persists as its memory representation is stored in the long-term memory and becomes activated with specific cues or situations (Wood and Rünger 2016).

When an individual has a strong habit of traditional payment, he or she has formed a strong memory representation of using traditional payment during transactions. The stronger the traditional payment is as a habit, the more vivid and easier such memory representation of traditional payments is recalled by consumers. Given the limited information processing capacity (Wood and Rünger 2016), such persistent recalling activates the responses related to using traditional payment during transactions. Thus, the frequency of activating mobile payment is reduced by the frequent activation of traditional payment. Thus, consumers are less likely to form mobile payment as a habit. Therefore, we propose that:

**H1: Traditional payment habit is negatively related with mobile payment habit.**

Facilitating conditions of mobile payment refer to the extent to which an individual perceives how well mobile payment is supported by the environment, and how such payment is accepted and supported by the vendors. Perception of relevant contextual cues may activate people to trigger their automatic responses (Wood and Neal 2009; Wood and Rünger 2016). Such contextual cues can enable consumers to take the habitual responses. According to the learning mechanism of habit, with the frequent exposure to the cues that trigger a specific response, an individual is more likely to learn such response as a habit (Wood and Neal 2009; Wood and Rünger 2016). When consumers are repeatedly exposed to the context cues enabling mobile payment, they gradually learn the association between the transaction context cues and mobile payment. When the facilitating conditions are high, consumers are more likely to notice the relevant contextual cues and to use the mobile payment as a habitual response. Therefore, we propose that facilitating conditions of mobile payment increase the likelihood of forming the mobile payment habit. Therefore, we propose that:

**H2: Facilitating conditions of mobile payments are positively related with mobile payment habit.**

According to psychology of habit, people with strong habit are more likely to get distracted from their habitual behaviors (Wood and Rünger 2016). The habit of traditional payment has long existed before mobile payment is available, which implies a potential strong habit of using traditional payments. When an individual intends to perform a transaction, he or she has to choose a payment method to finish the transaction. Relevant contextual cues of mobile payment are more likely to direct consumers to notice the availability of new mobile payment methods and distract them from using traditional payment as a natural response; therefore, they are more likely to adopt mobile payment. Based on the above discussion, the impact of traditional payment habit on mobile payment habit can be reduced due to the distracting effect of facilitating conditions on existing habitual behavior. Therefore, we propose that:

**H3: Facilitating condition of mobile payment negatively moderates the impact of traditional payment habit on mobile payment habit in a way that the stronger the facilitating conditions are, the weaker the effect of facilitating conditions on mobile payment habit.**

Perceived usefulness of mobile payment reflects the extent to which using mobile payment can enhance users’ payment performance. Mobile payment not only facilitates monetary exchange between consumers and vendors by providing technological functions but also brings consumers additional monetary rewards. According to the psychology of habit, people are inclined to form habit based on the repetition of rewarded behaviors (Thorndike 1898). Since positive experience could serve as rewards for consumers’ use of mobile payment, the higher consumers perceive the usefulness of mobile payment, the more likely they are going to form mobile payment habit. Therefore, we propose that:

**H4: Perceived usefulness of mobile payment is positively related with mobile payment habit.**
Perceived enjoyment of mobile payment refers to users’ feeling of joy, pleasure and playfulness that is evoked when making the payment. From a neural perspective of habit, the reinforcement process of forming a habit depends on the midbrain dopamine systems. Enjoyment, as a positive emotional state with increased dopamine response, can activate the reinforcement process at a neural level (Balleine and O’Doherty 2010; Wise 2004). The stronger people perceive for the positive experience of using mobile payment, the better the reinforcement system activates the reward mechanism to form the habit of using mobile payment. Therefore, we propose that:

H5: Perceived enjoyment of mobile payment is positively related with mobile payment habit.

The stronger a person has the habit of mobile payment, he or she is more likely to repeatedly conduct a specific behavior. Therefore, we propose that:

H6: Mobile payment habit is positively related with continuance intention of mobile payment.

According to theory of planned behavior, people decide whether to take the action influenced by their attitudes towards the behavior. In the case of mobile payment, consumers with higher intention to use mobile payment are more likely to actually use that payment method. Therefore, we propose that:

H7: Continued intention of mobile payment is positively related with continuance use of mobile payment.

According to the dual systems of habit, when people form a habit, they tend to go through the habitual system rather than deliberate goal system to perform an action (Wood and Neal 2009; Wood and Rünger 2016). Therefore, the stronger the mobile payment has been developed as a habit, the less likely consumers would rely on the deliberate processing system to decide whether to use the mobile payment in the future. In other words, the habit of mobile payment creates a shortcut to mobile payment continuance use (Cheung and Limayem 2005). Therefore, we propose that:

H8: Mobile payment habit negatively affects the impact of continuance intention on continuance use of mobile payment.

When the mobile payment habit is formed, people use mobile payment as an automatic response during transactions. Therefore, we propose that:

H9: Mobile payment habit is positively related with continuance use of mobile payment.

Research Design

To test the research model, this study plans to conduct two rounds of cross-sectional surveys. The participants are undergraduate students from a public university in Hong Kong. In the first survey, we will collect participants’ traditional payment habit, facilitating conditions, perceived usefulness, perceived enjoyment and continuance intention of using mobile payment. In the second round of survey, we will collect participants’ mobile payment habit and continuance use of mobile payment. Demographic variables, including gender, age, and mobile phone use experience are included as the control variables on the continuance use of mobile payment.

The measures of the research are adapted from existing literature. The measures of traditional payment habit, mobile payment habit and continuance use of mobile payment are adapted from Limayem et al. (2007). We adapt the measures of facilitating condition from Venkatesh et al. (2003), perceived usefulness from Davis (1989), perceived enjoyment from Davis et al. (1992), and continuance intention of mobile payment from Bhattacherjee et al. (2001).

Potential Contribution

There are three folds of theoretical contribution of this study. First, this study contributes to the understanding of habit literature in the field of information systems adoption, especially the formation of mobile payment habit by considering the impact of existing payment habit. Prior literature on the formation of new payment habit has overlooked the tradition payment habit, which existed before mobile payment habit and acted as a salient alternative payment method (Cheung and Limayem 2005).
Second, this study introduces two habit learning mechanisms: associative and reward learning mechanisms. Associative mechanism refers to the context cues that trigger the behavior response of using mobile payment. The higher perceived facilitating conditions, the more available and accessible the context cues are to trigger the usage of the mobile payment. Reward mechanism refers to the utilitarian and hedonic outcomes of post-adoption experience of mobile payment. Third, this study introduces the moderating effect of habit learning mechanisms (facilitating condition) on the relationship between traditional payment habit and mobile payment habit. These propositions on mobile payment habit are yet to be studied sufficiently in the relevant IS literature.

As to practical implications, first, the findings of this study suggest that companies should be aware of challenges induced by the prior existing habit when introducing a new payment method to consumers. Even when the mobile payment habit has been formed, consumers may still carry the traditional payment habit, which pre-exists and/or co-exists with the mobile payment habit. In view of this, companies should be ready to develop long-term plan for the introduction of new mobile payment. Second, to tackle the negative effects of traditional payment in forming mobile payment habit, our findings may suggest that there are two types of strategies. On one hand, companies should provide sufficient mobile payment facilities and occasions. The better the provisions of the mobile payment, the more likely the mobile payment is triggered and activated to develop. In this way, facilitating conditions may lower the activation of using tradition payment. Therefore, even when the traditional payment habit is high, consumers may still adopt mobile payment as a new payment method. On the other hand, companies may also consider deploying marketing campaigns that involve gamification elements to promote the hedonic experience of the consumers.

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References


