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Research-in-Progress

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Abstract

The proliferation of mobile devices ushers a new era of financial services. Although various users already adopted mobile banking systems, their insufficient utilization of systems become a pressing issue. Encouraging individuals to engage in extended use, that is, applying more available system features to support their financial tasks, is an efficient approach for financial institutions to extract value from customers' already-in-use mobile banking systems. However, a relevant theoretical account for such discretionary post-adoptive usage is still in its infancy. Based on the switching cognitive gears perspective, this study proposes four types of triggers (i.e., new tasks, changes in system environments, other people's uses, and deliberate initiatives) that will prompt the active cognitive processing of individuals that leads to their extended use of mobile banking systems. We further propose the methodology to operationalize extended use and empirically validate the research model, and then discuss the possible theoretical contributions and practical implications.

Keywords: Extended use, mobile banking system, switching cognitive gears

Introduction

Mobile banking systems provide a wide array of financial services that can be accessed regardless of geographic and time constraints, and ushers a new era of financial services. However, the potential advantages and benefits of these information systems are proven to be underutilized (Jasperson et al. 2005). Even though mobile banking system provides a wide range of features such as financial management, utility bill payment, most users are just accustomed to utilize a few features like transfer or account management. Only if they can recognize a fit between mobile banking system and their financial tasks and if they can actively appropriate the available system features, will users truly benefit from mobile banking systems. At the same time, given the high penetration rate of mobile banking system, financial institutions will be able to leverage their investments in mobile banking systems and acquire considerable economic benefits from them if they can enable users to enrich their utilization of the already-adopted systems in the post-adoptive stage (Jasperson et al. 2005). Encouraging their users to enrich their post-adoptive usage was considered an effective approach for financial institutions to extract more value from the already-implemented mobile banking systems (Hsieh et al. 2011; Rai et al. 2002) and a promising way for governments to increase financial inclusion (De Koker and Jentzsch 2013). But existing literature on mobile banking system mainly focused on individuals' adoption

decisions rather than their post-adoptive usage behaviors (Afshan and Sharif 2016; Baptista and Oliveira 2015). Therefore, investigating what factors, and how these factors will facilitate users to enrich their post-adoptive usage is crucial to realize the true value of mobile banking system and its features.

To dissect users' utilization of mobile banking system, a feature-centric view of system use is required to examine users' post-adoptive usage at system feature level. After an information system is adopted, the existence, nature, and potential usability of all its system features may gradually emerge and, over time, flesh out (Jasperson et al. 2005). The functional potential and the value of information system are most likely be fulfilled if users can recognize a match between the tasks to be performed and the features in the system. In the existing literature, information system is mostly regarded as "a black box", rather than the aggregation of various system features (Jasperson et al. 2005). Only few studies have revealed the usage at feature level and have empirically explored the factors that affect post-adoptive usage (e.g. Sun (2012)). The wide range of available features in mobile banking systems allows users to apply and utilize it to varying degrees (Wang and Hsieh 2006). To address the underutilization issue of information system from the feature-centric view of system use, recent research apply the notion of extended use, which refers to users of an already-adopted system apply a wide array of available features to support their tasks, to examine users' post-adoptive behaviors (Hsieh et al. 2011). Extended use not only captures the myriad adoption decisions of system features, but also the feature use and extension behaviors (Jasperson et al. 2005; Saga and Zmud 1994). Seen in this light, examining users' extended use is the key issue to encouraging their utilization of mobile banking systems.

Unlike the usage of information systems within organizations, the usage of mobile banking system is fully voluntary for users. However, existing studies on post-adoptive usage mostly focus on the mandatory usage in the organizational context while individual discretionary usage was largely understudied. Significant differences exist between organizational mandatory usage and individual discretionary usage. Unlike mandatory usage under the organizational pressure, individual discretionary usage will not be passively forced. In this type of usage, users have more autonomy to explore actively and modify their system usage to fulfill certain tasks. However, they also have the right to terminate their use. Meanwhile, resources and supports that help facilitate the individual discretionary usage are insufficient in comparison with those for mandatory usage in the organizational context. Therefore, figuring out what motivates individual discretionary usage into realizing the functional potential of information system is particularly important for understanding mobile banking system usage.

Recently, some scholars have characterized post-adoptive usage as adaptation cycles of users, during which they use and revise their use of information system concurrently to achieve a better fit between information and their specific context (Sun 2012). In reflective adaptation cycles, users with pre-existing cognitive scripts consciously respond to the informational cues about system features in their surrounding (Langer 1989; Louis and Sutton 1991) and actively engage in modifying their use. In IS domain, similar phenomena were also recognized. Prior research argued that only when there occur some triggers that induce changes in individuals' cognitive scripts, will individuals actively appropriate their post-adoptive use (Jasperson et al. 2005). Here triggers refers to either purposeful initiatives or emergent situations that disrupt the established habitual use (Orlikowski et al. 1995). Such triggers were proven to trigger users' active cognitive processing, and in turn encourage users' post-adoptive innovative behaviors (Sun 2012). Therefore, a comprehensive examination of how triggers enable individuals engage in reflective cycles and improve their extended use is urgently needed (Jasperson et al. 2005).

The availability of archival data of mobile banking systems provides an unprecedented opportunity to probe into users' post-adoptive usage. Prior studies on post-adoptive usage mainly relied on conventional research methods, such as survey and interviews, to empirically capture users' extended use of information systems and brought abundant research findings and advances (e.g. Hsieh and Wang (2007)). However, with the rapid development of technology, information systems have evolved into more sophisticated structures. It becomes more difficult to capture users' extended use of complex information system via such conventional research methods. Given the availability of secondary data in mobile banking systems, innovative measurement of usage is essential and possible to fill the research

gap. Hence, this study intends to operationalize extended use based on both survey and archival data and validate the research model.

The rest of this study is organized as follows. First, we introduce the theoretical background of post-adoptive usage, extended use and switching cognitive gears perspective. On the basis of theoretical background, we propose our research model concerning user's' extended use. Then we articulate the methodology, especially how extended use is operationalized. At last, anticipated results and potential contributions of this study are discussed.

Theoretical Background

Post-adoptive Usage

The theoretical investigation on individual's post-adoptive usage has attracted the interest of researchers in the information systems (IS) domain for a long time, and post-adoptive usage has been the crucial measure for the success of information systems (Delone and McLean 2003). To achieve further insight into the evolvement of users' post-adoptive usage, recent studies have drawn attention to the dynamics of emergent interactions between users and information systems.

Among the few studies concerning reflective adaptation and cognitive engagements, Jasperson et al. (2005) conceptualized such reflection cycles as the technology sensemaking process. The sensemaking perspective of technology considers the usage of an information technology as users' cognitive processes, during which users gradually construct the meaning of the technology and alter their subsequent interactions with it accordingly (Hsieh et al. 2011). Similarly, on the basis of structuration theory, Orlikowski (2000) also revealed the dynamic nature of post-adoptive usage and considered it as a process of enactments during which individuals actively enact emergent system structures through interaction with systems. Therefore, in this study, we view the post-adoptive usage as a cognitive sensemaking process of users and examine users' interactions with information systems to advance our understanding of post-adoptive usage.

Moreover, although a great many studies tapped into the determinants of individuals' post-adoptive usage, the majority of them have focused on the mandatory usage in workplace in an organizational context and unintentionally overlooked the phenomenon of individuals' discretionary use of information systems in their lives. It is worth noting that significant differences exist between organizational mandatory usage and individual discretionary usage. On one hand, unlike mandatory usage under the organizational pressure, individual discretionary usage will not be passively forced. In the case of individual discretionary usage, users are not obligate to use the information system (Wang and Hsieh 2006) and have more autonomy to explore actively and modify their system usage to fulfill their own tasks. On the other hand, resources and supports that help facilitate the individual discretionary usage are insufficient in comparison with those for mandatory usage in the organizational context. Given the differences between organizational mandatory usage and individual discretionary usage, factors contributes to these two types of post-adoptive usage tend to be distinct. Therefore, figuring out what motivates users into further utilizing the information system is particularly important for individual discretionary usage, just as in the case of mobile banking system.

Besides, as a rapidly developing technology, mobile technology received relatively little attention from scholars. Only several studies explored the continued usage of mobile technology (Ding and Chai 2015). But, as far as we know, no existing study has empirically investigated the nature of post-adoptive usage of mobile technology.

Furthermore, most conceptualizations on post-adoptive usage in IS domain are evaluative (Burton-Jones and Straub 2006) and were usually operationalized as duration and frequency of use (Bagayogo et al. 2014; Burton-Jones and Straub 2006). To obtain a comprehensive understanding of post-adoptive usage, a thorough investigation of the patterns of post-adoptive usage that examining features in system, tasks to be performed, and users at the same time is therefore needed (Burton-Jones and Straub 2006). Hence, in this study, we centered on the concept of extended use, which captures individuals' employment of system features for their own tasks (Saga and Zmud 1994), and operationalize it utilize both survey and secondary data.

Extended Use

With the accumulation of experience about using information system, the range of system features that is considered valuable has increased (Hiltz and Turoff 1981). In addition, users may actively search for new features, find more unique features for themselves, and go beyond the feature uses delineated by system designers or implementers after gaining experience with the information systems (Cooper and Zmud 1990; Goodhue and Thompson 1995; Hiltz and Turoff 1981; Jasperson et al. 2005).

Saga and Zmud (1994) proposed a concept to capture such feature extension behaviors called extended use, which refers to an individual's use of more features of one information technology or system to accomplish a comprehensive set of tasks. After the implementation of information system, users frequently start their use of system from a small range of system features and gradually become familiar with the system and its available features (Saga and Zmud 1994). In the analogy of Hsieh et al. (2011), extended use resembles the learning process, during which users gradually learn about the available features. With the increasing familiarity of information system and its features, individuals may utilize the system and its wide range of features to support their tasks rather than applying the system in a limited manner (Robey et al. 2002). Meanwhile, the experiences gained from the interactions between users and information system affect the users' subsequent interactions with the system and modify their extended use to better support their tasks in a recurrent manner (Hsieh et al. 2011).

Extended use, by its nature, is always voluntary (Jasperson et al. 2005) and is specifically salient in the context of individual discretionary usage. However, existing studies have mostly examined extended use in the work context within organizations. Wang and Hsieh (2006) examined extended use in mandatory organizational contexts of two large manufacturing firms and found that perceived usefulness, satisfaction, and symbolic adoption significantly affect extended use. Hsieh et al. (2011) investigated customer service employees' extended use of customer relationship management technology within telecommunication service companies and found that it was influenced by the technology quality assessed by the employees and the service quality assessed by the customers. Although these studies were claimed to focus on employees' voluntary post-adoptive use after organizational adoption, employees in organizational contexts only retained limited discretion to decide whether, and how they use the information system to support their work (Wang and Hsieh 2006). To provide a fine-grained understanding on extended use in a discretionary setting, this study investigates the users' extended use of already-adopted mobile banking systems, which is under no pressures from the providers of mobile banking systems and is entirely voluntary. For innovative post-adoptive usage such as extended use, users' active engagement is required. And the extent of such active engagement was argued to vary across different situations (Bagayogo et al. 2014). In this study, we intend to explore the determinants of extended use by investigating the impacts of different triggering situations.

Switching Cognitive Gears Perspective

Psychology research suggested that individuals' habitual/routinized use were guided by their previous cognitive scripts (Bargh 1989; Bargh 1994) and will be altered and turned into novel usage behaviors like adaptive use under circumstances that individuals are intrinsically or extrinsically induced to deliberate their own actions (Louis and Sutton 1991). These novel usage behaviors will be incorporated into regular usage over time, such adaptive use thus become habitual or routinized use (Bargh 1989; Bargh 1994). In IS domain, similar phenomena were also recognized. Prior research argued that only when there occur some triggers that induce changes in individuals' cognitive scripts, will individuals actively appropriate their post-adoptive use (Jasperson et al. 2005). Here trigger refers to either purposeful initiatives or emergent situations that disrupt the established habitual use (Orlikowski et al. 1995). Such triggers can be generated internally from the individuals themselves, or externally from others, such as their peers or technology experts (Jasperson et al. 2005). Louis and Sutton (1991) argued that there are three kind of stimuli that serve as triggers: when an individual encounters a novel situation; when an individual perceived a discrepancy between expectation and reality; and when an individual is intrinsically or extrinsically induced to initiate deliberate actions toward the information system. Once individuals encounter the stimuli, they will tend to try unused features, to utilize already-used features in an advanced manner, or to explore new uses of those already-used features.

In the IS domain, there are similar findings, that individuals' different adaptations of information system in post-adoptive stage across various contexts are emerged from external and internal interventions (Jasperson et al. 2005). Aside from intentionally revising their use in response to new rules and regulations regarding the technology in organizations, individuals may spontaneously appropriate their use in response to unanticipated challenges or unexpected opportunities that arise from their everyday life (Orlikowski 2000).

To investigate the antecedents of extended use, we build upon and extend the research on switching cognitive gears of Louis and Sutton (1991). Louis and Sutton (1991) posited that there are triggers serve as switching cognitive gears between individuals' habitual and active thinking that will prompt individuals to engage in active thinking, which serves as the essential prerequisite toward actively engaging in post-adoptive behaviors (Jasperson et al. 2005). While characterized active cognitive processing as "noticing of oneself, one's task, or one's context", they identified three kinds of triggering conditions for cognitive processing. First, active cognitive processing is provoked when one experience a novel situation, during which something is unique, unfamiliar, or stands out of ordinary. Second, discrepancy that results from a disruption, a failure, or a trouble situation, may also triggers the active cognitive processing. Third, switching to active cognitive processing may occur in response to one's internal or external request for additional conscious attention. Sun (2012) further categorized these switching gears into three types in terms of the mandatory organizational usage, namely, novel situations, discrepancies, and deliberate initiatives. He considered novel situations as contradictions between existing and new situations, discrepancies as contradictions among the elements of post-adoptive use, and deliberate initiatives as contradictions between different activities (Sun 2012).

Triggers exert their impacts on individuals' innovative behaviors through active cognitive processing (Langer 1989; Louis and Sutton 1991). Individuals form their own cognitive scripts as the reference for how to perceive and behave (Langer 1989; Louis and Sutton 1991). When individuals encounter triggers, they will initially refer to their pre-existing cognitive scripts to make sense of them and alter their cognitive scripts by engaging in active thinking if needed. Such active cognitive processing is "characterized by awareness, attention, reflection, by noticing of oneself, one's task, or one's context" (Louis and Sutton 1991, p.58).
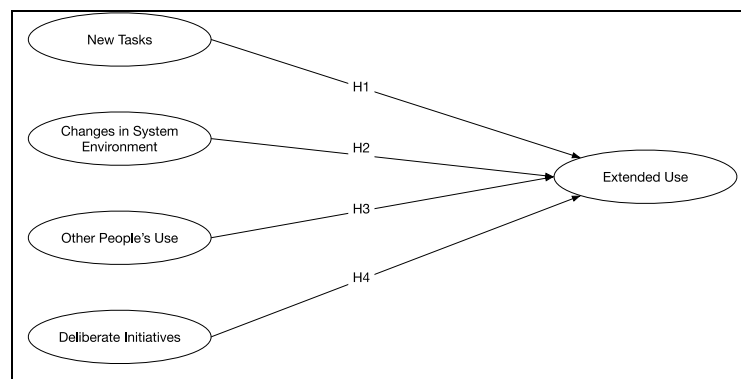
Research Model

Figure 1. Research Model

Based on the work of Louis and Sutton (1991) and Sun (2012), and our specific context of mobile banking systems, a research model is proposed in this study, as presented in Figure 1. We develop the hypotheses regarding the direct impacts of four distinct types of triggers, namely, new tasks, changes in system environment, other people's uses, and deliberate initiatives, on extended use.

In this study, new tasks refer to the situation wherein individuals have an unfamiliar financial task to perform. As one of the key elements of technology usage, task is a critical component of novel situations (Sun 2012) that will promote users' active reflection and engagement in information system. Task modification will trigger individuals to alter the means of utilizing an information system and applying the system features (Jasperson et al. 2005). To perform additional new tasks, users will employ a (set

of) unused available features (Bagayogo et al. 2014). For example, if users encounter the new task of remitting home to their parents while their frequently used features are "transfer" and "balance inquiry," they may explore in the mobile banking system and attempt the "remittance" feature in mobile banking for the first time. Hence, we propose that

H1 *New tasks are positively associated with users' extended use of mobile banking systems.*

Here, changes in system environments include the alterations in hardware, software, and peripherals of mobile banking systems, as well as the financial situation of users. Therefore, the influences of changes in system environments may be three-fold. These changes may not only influence the information system but also cause changes to individuals and their tasks to be performed. Individuals are forced by these changes to reflect on their interactions with the information system under new circumstances. When changes occur in the hardware, software, or peripherals of mobile banking systems, the effectiveness and efficiency of applying system features to fulfill tasks will be altered and individuals will be prompted to apply the system innovatively (Benamati et al. 1997). On the other hand, when changes occur in individuals' financial situations, the mobile banking usage of individuals and their tasks to be performed will most likely change and thus trigger individuals to modify how they utilize the system. Thus, we propose the following hypothesis:

H2 *Changes in system environments are positively associated with users' extended use of mobile banking systems.*

Individuals usually display different usage patterns of information system where they apply distinct sets of system features to fulfill different tasks. The existing differences in the usage pattern provide the basis for individuals to learn about system use by observations (Sun 2012). Individuals will be motivated to change their usage once they become aware of the alternative ways to utilize information system from others' practices (Orlikowski 2000). In this way, other people's uses influence the way individual adjust their own use by unintentional demonstration of system use. Such impact of other people's uses on individuals' system usage has long been established in the literature (Compeau and Higgins 1995). Individuals may learn from their peers and more experienced individuals that interact extensively with information system (Boudreau and Robey 2005). Although the influence of other people's uses may not be realized immediately, individuals will be prompted to revise their usage if they encounter similar conditions, such as performing similar tasks. On the basis of the abovementioned conditions, we propose that

H3 *Other people's uses are positively associated with users' extended use of mobile banking systems.*

Deliberate initiatives in response to internal and external requests also enable individuals to reflect and alter their usage of information system actively (Louis and Sutton 1991). Here, internal requests are obtained from individuals themselves, such as when individuals decide to "try something new" (Louis and Sutton 1991). On the basis of previous studies on learning how to use an information system, users not only observe and exchange information about new means of performing tasks (Papa and Papa 1992) but also engage in active learning by themselves, such as browsing the features provided in a system. Such independent exploration behaviors of users aim at improving one's own mastery of the information system (Barki et al. 2007). These deliberate initiatives will not only alter individuals' cognitions about information system and its features but will also modify their cognitions about how the system and features support their particular tasks (Orlikowski et al. 1995). Hence, these self-initiated actions serve as the influential means that enable individuals to extend their post-adoptive usage. For the deliberate initiatives in response to external requests, individuals' level of attention will increase, and mindful thinking will occur when they are explicitly asked to utilize or are questioned about the system usage in general or specific system features (Langer 1989; Louis and Sutton 1991). Existing IS literature also demonstrated that individuals' system use can be altered by explicit questions (Sun 2012). In the context of discretionary use of mobile banking system, individuals will be recommended to utilize out new features or an already-in-use feature in a novel way by people around them. In the presence of explicit recommendations or questions, individuals are expected to reflect on their own usage actively and engage in extended use. Hence, we propose that

H4 *Deliberate initiatives are positively associated with users' extended use of mobile banking systems.*

Research Methodology

To empirically validate the research model, we will collect our data from two sources, i.e. a two-wave survey and archival data. We adopt such a strategy to utilize available sources of archival data, to complement existing literature on extended use and overcome potential measurement method bias. On one hand, we will collect data directly from customers of mobile banking systems through a field survey at two time points, which will depict customers' perceptions of encountered triggers and accounted for the changes in their extended use of the mobile banking systems (Jasperson et al. 2005). As suggested by Sun (2012), we will go through a comprehensive literature review, semi-structured interviews, a two-stage Q-sorting, and a pretest study among actual users of mobile banking systems to ensure the constructs were thoroughly covered by their measurement items. On the other hand, for each customer participated in our survey, we draw their monthly archival data from the banks. Such operationalization is consisted of two parts: 1) development of a new method to compute users' extended use based on archival data and 2) validation and evaluation of the research model with such operationalized extended use. To analyze the data, we will mainly employ structural equation modelling (SEM) approach to examine the measurement and structural model. Specifically, we will utilize SPSS and LISREL.

Conclusions and Expected Contributions

From the switching cognitive gears perspective, this study aims to extend our knowledge about individuals' extended use by delineating the mechanisms of how the triggers encountered by individuals prompt their extended use.

We expect this study to provide significant theoretical and practical implications. First, this study will advance our knowledge of individuals' discretionary post-adoptive usage. Second, building upon and extending the work of Louis and Sutton (1991), we will empirically examine four types of triggering conditions in an episode of extended us. Third, by focusing on users' extended use of mobile banking system, this study goes one step further and advances current understanding of the post-adoptive usage of mobile technology. Furthermore, one key contribution of this study is the operationalization of extended use. In this study, we propose to operationalize extended use via archival data computing. By doing so, we provide a new means to capture a classical user behavior construct with objective secondary data, which makes it more applicable and insightful for information system designers and providers. Besides, this study will also contribute to practice by providing valuable insights on how to leverage these triggers to encourage users' effective utilization of mobile banking system.

Acknowledgements

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