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UNDERSTANDING MOBILE APPS CONTINUANCE USAGE BEHAVIOR AND HABIT: AN EXPECTANCE-CONFIRMATION THEORY

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Abstract

With the growing development of information technology and the wireless telecommunication network nowadays, mobile devices have been expanding rapidly and have been emerging as important tools for consumers. Using m-services and applications (apps) on mobile devices becomes custom in people's daily lives. This study proposes a theoretical model to explore the continued usage behavior for smartphone. The objective of this study is to explore how perceived usefulness, perceived enjoyment, and confirmation influencing satisfaction and habit of consumers, and in turn influencing continued usage behavior, as well as the moderating effect of three characteristics of m-commerce. The proposed model will empirically be tested using survey method and collecting data from smartphone users in longitudinal setting. The structural equation modeling technique will be used to evaluate the causal model and confirmatory factor analysis will be performed to examine the reliability and validity of the measurement model. The findings of this study are expected to illustrate how factors influence individuals to use m-services and mobile apps and become a habit, as well as how these habits influence continued smartphone usage.

Keywords: ECT, Perceived usefulness, Perceived enjoyment, Continuance IT usage, Habit, M-commerce, Mobile apps

1 INTRODUCTION

With the growing development of the wireless telecommunication network, mobile devices have been expanding rapidly and have been emerging as important tools for consumers. The smartphone has moved beyond its fundamental role of communications and has graduated to become an extension of the persona of a user. People use smartphones not just to keep in touch with someone, but to express themselves, their attitude, feelings and interests. Consumers also use m-services or apps to receive E-mail, surf the Internet, search information, read news headlines, conduct online transactions, play games, listen to music or watch short films, or login the social media account to interact with their friends (Huh & Kim 2008; Kleijnen et al. 2007). The smartphone subscribers are beginning to choose their operators on the basis of the m-services or mobile apps they offer. Therefore, cellular relevant industry must offer a variety of value-added services or apps to cater to different users' demands.

Past studied mainly addressed mobile technology adoption by new consumers. To investigate consumers' adoption of mobile technology. Recently researchers move their attention to gaining an understanding of customers' post-adoption use of m-services following their initial adoption (Park et al. 2011; San-Martin & López-Catalán 2013). Another well-known phenomenon is "smartphone addiction". Smartphone addiction is an addiction that can be destructive to social lives outside of smartphones. It is prevalent worldwide, as it causes trauma and anxiety, among other symptoms. Many studies focused on the issue (Sanchez-Martinez & Otero 2009). However, in this study, we suggest that for the majority of smartphone users, the use of mobile phones are not addictive, but should be a habit. From the habit perspective, this study attempts to explore how people form their smartphone usage habit.

What kind of factors of m-services or mobile apps can attract users to use or acceptance is the first step for practitioners toward realizing the success of m-services and apps. However, the eventual success further relies on its continued usage. The expectancy-confirmation theory (ECT), developed by Oliver (1980), was widely applied in IS field to explore the IT continued usage behavior. Confirmation is the degree to which performance exceeds, equals, or falls short of an individual's expectations, resulting in positive, zero, and negative disconfirmation, respectively (Oliver & Swan 1989). Prior research has recognized the need for each performance dimension to have corresponding individual judgments of confirmation. In the WWW or mobile service contexts, many relevant researches divided the perceived benefits into perceived usefulness and perceived enjoyment, and found that these two benefits have significant effect on satisfaction with Internet or m-services (Lin et al. 2007). Perceived usefulness and perceived enjoyment are the antecedents of satisfaction and habit in the mobile apps context.

Verplanken et al. (1997) noted that general habits is particularly important because of the broad relevance to people's lives. If individuals frequently repeat prior behavior in question or are satisfied with the outcomes of the behavior, they will probably take the same actions in the similar condition intuitively, and become the continued behavior. In the IS contexts, if individuals get used to resolve a problem with a specific instrument, next time when he (/she) meet the same situation, in the stable context, he (/she) will probably use the same instrument to deal with the problem, and this habit could form the continued IS usage behavior (Limayem et al. 2007). Therefore, the intention toward continually using the mobile apps and how mobile users use apps becoming a habit and then influencing continued mobile apps usage are critical issues for researchers and practitioners to understand the eventual success about the mobile apps usage. Limayem et al. (2007) was one of the very first studies investigating habit in IS. They found that habit has a moderating effect on the relationship between intention to use WWW and WWW usage. And Limayem and Cheung (2011) identified habit as an antecedence of user continuance usage.

The research question of this study is how the mobile apps usage habit formed and then influencing the mobile apps continued usage behavior. The purpose of this study is to explore the role of habit in the context of continued usage. More specifically, we (1) synthesize prior research on habit and habit formation, highlighting its strengths and shortcomings, and extend current theorizing on

habit. (2) based on the ECT, propose a theoretical model to explore the relationship between perceived usefulness, perceived enjoyment, satisfaction, habits, and continued mobile apps behaviour, as well as the moderating effect of three characteristics of m-commerce. (3) conduct an empirical testing and then provide implications on continued apps usage behaviour and habit for practitioners and future research directions.

2 CONCEPTUAL BACKGROUND

2.1 Expectancy-confirmation theory (ECT)

Expectancy confirmation theory or confirmation of expectation theory is a consumer behavior model that has gained widespread acceptance in the research of explaining and predicting consumer satisfaction and the repurchase intention. Oliver (1980) theorizes that consumer's intention to repurchase a product or reuse a service is determined primarily by their satisfaction with prior use of that product or service. Satisfaction is jointly determined by confirmation and expectation. In this model, confirmation is the most immediate influence on satisfaction. The ECT model assumes that consumers' degree of satisfaction is an outcome of a five step process. First, consumers form an initial expectation of a specific product or service prior to purchase. Second, they accept and use that product or service. Following a period of initial consumption, they form perceptions about its performance on the salient attributes. Third, they compare these perceptions of performance with their prior expectation levels and determine the extent to which their expectations are confirmed. Expectations could be positively disconfirmed (perceived performance exceeds expectations), confirmed (perceived performance equals expectations), or negatively disconfirmed (perceived performance falls short of expectations). Fourth, they form a feeling of satisfaction or dissatisfaction based on their disconfirmation level. A moderate satisfaction level will be maintained by confirmation, enhanced by the delight of positive disconfirmation, and decreased by the disappointment of negative disconfirmation. Finally, satisfied consumers form intentions to reuse the product or service in the future, while dissatisfied users discontinue its subsequent use.

2.2 M-commerce and mobile apps

Past studies had discussed different kinds of characteristics for m-commerce (Clarke III, 2001; Siau et al., 2001; Tsalgatidou & Pitoura, 2001). This study suggested that there are three major characteristics of m-commerce: *ubiquity*, *localization*, and *personalization*.

Ubiquity means that mobile devices users have the ability to receive information and perform transactions from virtually any location and real-time for omnipresence. Ubiquity has features such as mobility and time convenient, can solve the restrictions on movement of e-commerce. M-commerce users can access any m-commerce applications everywhere, or in many places simultaneously. The real-time, everywhere presence of m-commerce environment will offer capabilities uniquely beneficial to users. (Clarke III, 2001; Siau et al., 2001; Tsalgatidou & Pitoura, 2001). *Localization* means that in the m-commerce environment, users can use mobile devices through GPS technology to know the location (Wu & Hisa 2004). This property of localization makes m-commerce service providers can accurately identify the location of the user, therefore m-commerce providers will be better able to receive and send information to users relative to a specific location (Clarke III, 2001; Tsalgatidou & Pitoura, 2001). *Personalization* means that mobile wireless devices are designed for individual-based target marketing, it means m-commerce service providers personalize services and information for a sole individual in m-commerce environment. The most popular information technology is data-mining, this technology offers users to obtain the exclusive personal information and content (Siau et al., 2001; Tsalgatidou & Pitoura, 2001).

The most successful development of m-services is *application (apps)*. Apps are the abbreviation of the application. Applications are software, they can run on the Internet, computers or on any mobile devices or other electronic equipment. Apps play critical roles in m-commerce environment, and they

have developed very fast and smooth. Users are changing their lifestyle through using apps as well as apps make life more convenient and fun. Consequently, apps exert an influence on new life habits (Oulasvirta et al. 2012).

2.2.1 *Perceived benefits of mobile apps*

Consumer's perceived benefits refers to a consumer perceives what he will gain when he using a specific mobile app (Park et al. 2011). Davis et al. (1992), Lin et al. (2005), Mathwick and Rigdon (2004), Moon and Kim (2001), and Park et al. (2011) based on the motivation theories to understand individuals' IT usage behaviors, these researches classified the motivations toward using IT into the extrinsic and intrinsic motivations. Extrinsic motivations are performance-driven or goal-driven activities whereas intrinsic motivations are non-goal-driven or enjoyment-driven activities. Traditionally, most IT usage researches focused on the extrinsic motivations (Zeithaml 1988), the technology-acceptance model (TAM) proposed by Davis et al. (1989) had represented perceived value as perceived usefulness and perceived ease of use and indicated that these two perceived value influence end-user's attitude and intention toward a broad range of IT usage. However, in the Internet or m-commerce environments, usefulness or ease of use may not explain the overall user's behavior toward accepting or using the ITs, many WWW or smartphone users use IT continually because of the intrinsic motivations, such as entertainment or social functionality, therefore, "playfulness" or "enjoyment" is another critical factor that influencing user's acceptance and usage in the Internet context (Moon & Kim 2001; Lin et al. 2005).

Under the extrinsic motivations, Davis et al.'s (1989) and Karahanna et al.'s (1999) research findings show that the relative effects of perceived usefulness and ease of use during pre-acceptance and post-acceptance stages of IS use. Usefulness affects attitude considerably during both stages of IS use, whereas ease of use has inconsistent effect on attitude in the initial stages and seems diminished in later stages. These findings imply that perceived usefulness is more important than ease of use during the post-acceptance stage. This study focuses on the IT (/mobile apps) continued usage behavior which belongs to the post-acceptance stage, so this study excludes the perceived ease of use in the mobile apps context. We synthesize past literatures and propose in this study that in the mobile phone context, perceived benefits are composed of "perceived usefulness" and "perceive enjoyment".

2.2.2 *Mobile apps habit*

Users are changing their lifestyle through using apps because apps make life more convenient and fun. Consequently, apps exert an influence on new life habits (Oulasvirta et al. 2012). The concept of habit has been extensively studied in many disciplines, including social psychology, health sciences, marketing/consumer behaviour, and organizational behavior. Ouelette and Wood (1998) stated that frequently performed behaviors tend to become habitual and thus automatic over time. Triandis (1980) proposed the model of attitude-behavior relationships, where intentions are assumed to predict behavior to the extent that the habit component is weak, or to a lesser degree, when habit is strong. Supporting this line of reasoning, Aarts et al. (1998) found that habit strength attenuates the amount of information acquired before the decision is made. Across disciplines, habits are commonly understood as "learned sequences of acts that become automatic responses to specific situations, which may be functional in obtaining certain goals or end states" (Verplanken et al. 1997). Limayem et al. (2007) define *IS habit* as the extent to which people tend to perform behaviors (use IS) automatically because of learning.

Adapted to mobile apps usage but in line with prior conceptualizations, we define *mobile apps habit* as the extent to which people tend to perform behaviors (use mobile apps) automatically. Defined as this way, habit has relatively little conceptual overlap with intention (Saba et al. 2000; Trafimow 2000; Tyre & Orlikowski, 1994), thus may provide additional explanatory power in explaining mobile apps usage. Mittal (1988) found that if habitual and intentional behavior point in the same direction (i.e., both act either in favor of or against seat belt usage), both habit and intention exerted a direct effect on actual behavior. Tuorila and Pangborn (1988) found support for their hypothesis that habit and intention would act in tandem as predictors of actual food consumption.

2.3 Satisfaction

In the IS context, online shopping offers a good illustration of the close relationship between satisfaction and habit formation (Reibstein 2002). If an online shopper evaluates her shopping experience positively, say, because she received exactly the right books at a considerable discount within the time period specified, it is likely that her willingness to shop.

3 RESEARCH MODEL AND HYPOTHESES

Based on the past researches, this study proposes the research model as Figure 1. The model is adapted from the ECT and integrates with theoretical findings from relevant IT continued usage, IT habits, and characteristics of m-commerce researches. The objective of this study is to explore why individuals use mobile apps continually and get used to become a habit and in turn the continued usage behavior. In order to distinguish the characteristics of m-commerce from e-commerce, the three major characteristics of m-commerce are disused: ubiquity, localization, and personalization.

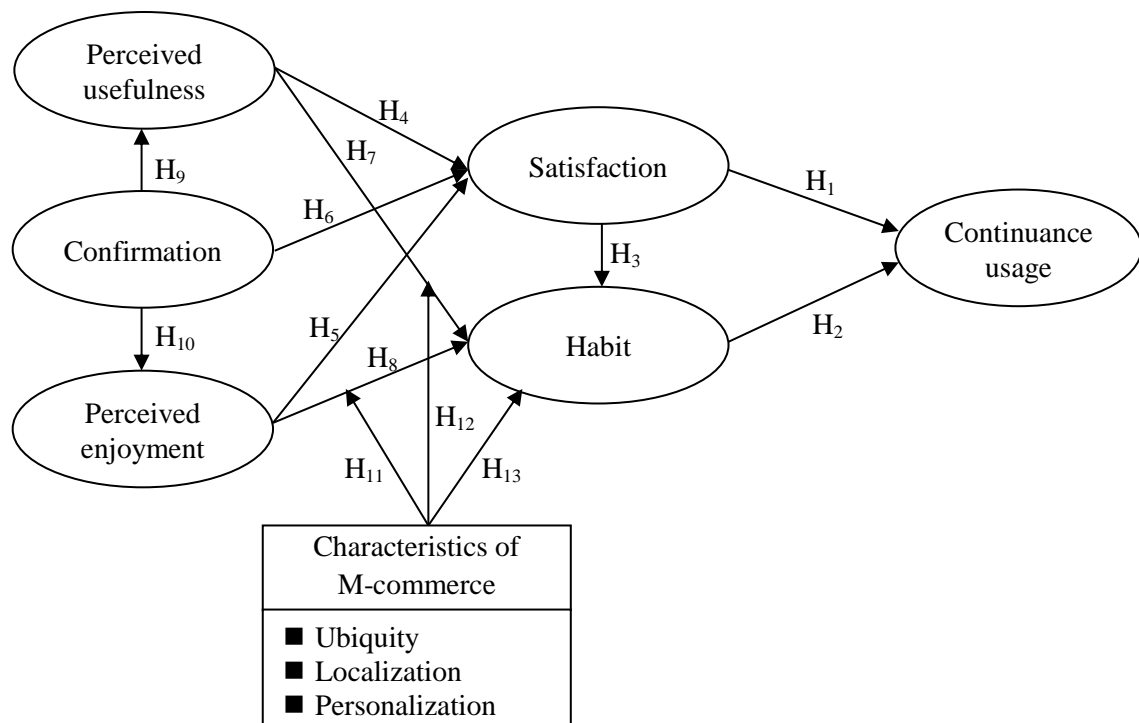


Figure 1. Research model

3.1 Satisfaction, habit and continuance usage

Bhattacharjee (2001) empirically examined the IS continuance based on the ECT, the research findings show that intention to continue using an IS positively relates to IS continuance behavior (i.e., usage). This relationship is moderated by the degree to which the behavior in question has become habitual. Further, we incorporate our theoretical insights about habit. Satisfaction is posited to be positively related to habit. Moon and Kim's (2001) research also show that user's attitude toward using the WWW positively influences behavioral intention and actual WWW usage. Hence:

H1: User's level of satisfaction with mobile apps use is positively associated with their mobile apps continuance usage behavior.

Habit is comprised of much more than satisfaction. Thus, satisfaction is the component that both intention and habit share. So, even though intentions are conscious and habits are unconscious, they both have a common root in satisfaction. It is found that personal habit influences IS continuance without conscious intention and also have an interactive effect on changing the value between intention and IS usage behavior (Limayem et al. 2001). The reason we can simply bypass them is because they are also both comprised of other factors. Hence:

H2: User's habit with mobile apps use is positively associated with their mobile apps continuance usage behavior.

de Guinea and Markus (2009) suggested that emotions such as satisfaction may drive IT usage directly without necessarily being mediated through behavioral intention. Hence:

H3: User's level of satisfaction with mobile apps use is positively associated with their mobile apps usage habit.

3.2 Perceived usefulness, perceived enjoyment and satisfaction

The user's cognitive beliefs in IS contexts will influence his (/her) acceptance and continuance about the new IS (Davis et al. 1989; Bhattacharjee 2001). Igarria et al.'s (1994) and Moon and Kim's (2001) researches showed that IT usage is affected by both perceived usefulness and perceived playfulness. Park et al.'s (2011) research showed that utilitarian value and hedonic value both have positive effect on satisfaction and in term influencing the interest in future m-services.

Limayem and Cheung (2008) identified perceived usefulness as the major determinant of user satisfaction in e-learning continuance usage. Davis et al.'s (1989) and Bhattacharjee's (2001) research findings shows that users' perceived usefulness of IS use is positively associated with their satisfaction with IS use. Hence:

H4: Users' perceived usefulness of mobile apps use is positively associated with their satisfaction with mobile apps use.

Davis et al.'s (1992) research show that some intrinsic motivations will affect user's computer usage behavior in the workplace. Moon and Kim (2001) found that perceived playfulness will influence user's attitude and intention toward using the WWW. Lin et al.'s (2005) research findings also indicated that users' perceived playfulness is positively associated with their satisfaction with a web portal. Hence:

H5: Users' perceived enjoyment of mobile apps use is positively associated with their satisfaction with mobile apps use.

3.3 Confirmation and satisfaction

Bhattacharjee's (2001) and Lin et al.'s (2005) researches both show that users' extent of confirmation is positively associated with their satisfaction with WWW use. If the user's confirmation is closer to his (/her) actual experience toward using the IT, he (/she) will be more satisfied with the IT usage. Hence:

H6: Users' extent of confirmation is positively associated with their satisfaction with mobile apps use.

3.4 Perceived usefulness, perceived enjoyment and habit

Habit is an automatic and intuitive continued usage behavior. Limayem et al. (2007) indicated that antecedents of habit are composed of frequency of prior behavior, comprehensiveness of usage, stable context, and satisfaction. If user gets used to use IT based on the extrinsic or intrinsic motivations, in the stable contexts, he (/she) will probably use the same instrument to deal with the same situation. Hence:

H7: Perceived usefulness is positively associated with individuals' habit with mobile apps.

In addition to resolve the problem intuitively with the similar instrument, some users automatically use their smartphones or mobile apps for intrinsic motivations (enjoyment), such as play game for entertainment, surf the Internet or search information, interact with their friends through the Facebook. If any of these amusing activities become the intuitive behavior in user's daily life, these enjoyments through the mobile will also form the mobile apps habits. Hence:

H8 Perceived enjoyment is positively associated with individuals' habit with mobile apps.

3.5 Confirmation, perceived usefulness, and perceived enjoyment

Based on the original ECT model, perceived usefulness is influenced by confirmation. If the confirmation of perceived benefits is more consistent with the prior IT usage experience, it will be probably that people take the emerging ITs. Bhattacharjee's (2001), Lin et al.'s (2005), and Kim's (2010) researches showed that users' extent of confirmation is positively associated with their perceived usefulness of WWW use. Hence:

H9: Users' extent of confirmation is positively associated with their perceived usefulness of mobile apps use.

Lin et al.'s (2005) research showed that confirmation would also impact on perceived playfulness. If users' prior WWW usage experiences with their playfulness perceptions are confirmed and are more consistent, they will probably accept and usage web portal continually.

H10: Users' extent of confirmation is positively associated with their perceived enjoyment of mobile apps use.

3.6 The moderating effect of m-commerce

Apps are design for mobile devices, so it means that the characteristics of m-commerce have main effect on apps. The development of apps both focus on users' enjoyment and usefulness, it plays a significant role in users' experience. Excellent users' experience makes users to establish habits, so users' habits are moderated by the characteristics of m-commerce. Hence:

H11: Characteristics of m-commerce (ubiquity, localization, personalization) has moderating effect on perceived enjoyment and habit.

H12: Characteristics of m-commerce (ubiquity, localization, personalization) has moderating effect on perceived usefulness and habit.

Oulasvirta et al. (2012) pointed out that in m-commerce environment, for example, using smartphone, some kind of habits are formed. Checking habits are the most common phenomenon for user. Hence:

H13: Characteristics of m-commerce is positively associated with their mobile apps usage habit.

4 RESEARCH METHOD

We studied habit in the context of university undergraduate students' mobile apps usage. We administered questionnaires at three points in time. The sections below describe in detail how the measurement will be developed, how the data collection procedure will be employed, and the data analysis techniques.

4.1 Measurement development

Measurement items in each construct were adapted from the relevant literatures. The operational definition and sources of measurement of each construct are summarized as Table 1. The

questionnaire will be pre-tested with four IS researchers who all have experience in the IS and M-commerce domains. Furthermore, a pilot study will be conducted involving 30 graduate students who all own smartphones more than one year and have the mobile apps usage experiences.

Construct	Operational definition	Sources of measurement
Perceived usefulness	The strength of users' perception of the expected performance of mobile apps use.	Davis (1989)
Perceived enjoyment	The strength of users' perception that interacting with the mobile apps will fulfill their intrinsic motives.	Moon and Kim (2001)
confirmation	Users' perception of the congruence between expectation of mobile apps use and its actual performance.	Bhattacharjee (2001)
Satisfaction	Users' affect with (feelings about) prior mobile apps use.	Bhattacharjee (2001)
Habit	The extent which users tend to use mobile apps automatically	Limayem et al. (2007)
Continuance usage	Users' self-reported frequency and volume of mobile apps use.	Limayem et al. (2007); Moon and Kim (2001)
Characteristics of m-commerce		
Ubiquity	Mobile devices users have the ability to receive information and perform transactions from virtually any location and real-time	Clarke III (2001)
Localization	M-commerce service providers can accurately identify the location of the user through GPS technology.	Clarke III (2001)
Personalization	M-commerce service providers personalize services and information for a sole individual.	Clarke III (2001)

Table 1. Operational definition and measurement of each construct in research model

4.2 Data collection

We will choose the context of university students' usage of the mobile apps since we believe that the use of this technology tends to be optional and that the students have developed different levels of habit in using it. In fact, most students judiciously use the mobile apps service to keep in touch with their friends using instant messaging, web-based e-mail, reading news and on-line game. Commenting on how common the usage of mobile apps is among this group, we liken it to "turning on the tap and getting water or turning on the TV." We note that studying students' habits of mobile apps are beneficial because it yields insight into future trends. Moreover, mobile apps are general applications and the habit of using it falls under the category of general habit.

The data collection involved three rounds. Here we will follow Limayem et al.'s (2007) procedure, who suggested employing the duration of usage along with frequency of use to more completely capture the intensity of usage. To obtain a final aggregate measure for continuous usage, we computed the average of both questions over the two periods. The purpose of round 1 (week 10) will assess perceived usefulness, perceived enjoyment, confirmation, Characteristics of m-commerce (ubiquity, localization and personalization), satisfaction, continuance intention, habit, and usage. A self-administrated questionnaire will be distributed to business students at a university in Taiwan. Data collection in rounds 2 (week 11) and 3 (week 13) will measure the students' continued usage behavior. The e-mail address of the respondent will be used to match his (/her) answers across the three rounds of data collection. Participation in this study is voluntary. In order to encourage subjects to participate in this study, students who answered the three questionnaires will be invited to participate in a lucky draw for three iPod shuffles.

4.3 Data analysis technique

The data analysis will be utilized a two-step approach as recommended by Anderson and Gerbing (1988). The first step involves the analysis of the measurement model, while the second tests the structural relationships among the latent constructs.

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