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Abstract
Habit has been investigated as an antecedent of the information systems usage in a few literatures recent years. But little effort has been found on the determinants of habit itself in the information systems research. Drawing upon the insights from goal-directed behavior, habit/automaticity perspective, and IS continuance model, this paper proposes a research model for understanding the antecedents of the individual information technology usage habit. This study suggest that individual satisfaction, perceived enjoyment and user experience positively influence the strength of usage habit, and that perceived usefulness, confirmation of expectation and perceived enjoyment positively affect satisfaction. The implications are discussed, and contributions of this study are presented.

Keywords: information technology diffusion; routinization; habit; individual

Introduction

Information technology usage has long been of interest to researchers in information systems (IS) field (Davis 1989; Venkatesh et al. 2003). Except for conscious use, some researchers have focus on the automatic use, also known as habits (Jasperson et al. 2005; Kim et al. 2005; Limayem et al. 2003). However, most of the literatures are focusing on the influence of habits on the information system usage; little research has been found on the determinants of automatic use. Habitual usage of information technology is one aspect of the organizational routinization of information technology (Saga et al. 1994), and may lead to high level of infusion (Agarwal et al. 1998). This research will focus on the determinants of individual automatic usage of information technologies.

This paper contributes to the extensive literature on information technologies diffusion by addressing two specific issues that have not yet received due attention. First, we emphasize the value of habituation on the organizational assimilation of information technologies. Research in the individual usage of information technology has resulted in plenty of theoretical models, with roots in information systems, psychology, and sociology. Almost all the prior research has one basic premise that the individuals are rational actors and the behavior is mainly driven by reflective and deliberate cognitive processing (Jasperson et al. 2005). This premise may be true in the initial phase, but with the use process goes on, some usage behaviors will become automatic. To our knowledge, some researchers have focused on the automatic use (Jasperson et al. 2005; Kim et al. 2005; Limayem et al. 2003), but most

of the literatures are focusing on the influence of habits on the information system usage, no literature has put their emphasis on the determinants of usage habit in information systems.

Second, we emphasize the value of deeply understanding of heavy users. The famous 80/20 rule in marketing (Schmittlein et al. 1993) implies that a small number of heavy users account for most number of usage behavior. Continued users and habitual users both belong to heavy users. Most research focus on the continued usage, little effort paid to habitual usage which is also a critical role for the long term performances of the system usage. Louis and Sutton (1991) proposed a cycle in cognitive processing which consists of switching from conscious mode to automatic mode and switching from automatic to conscious mode, and suggested three stimuli for the shift from automatic to conscious processing. However, few research focus on the antecedents of usage habit which is an important for understanding the switching from conscious to automatic mode.

To better understand these issues, we develop a conceptual model grounded in the insights from goal-directed behavior, habit/automaticity perspective, and IS continuance model. The paper is organized as follows. The next section is literature review and we present our model in the third section. Implications for research and practice will be presented in the fourth section. The paper closes with contributions and conclusions in the last section.

Literature Review

Information systems (IS) research has primarily focused on the conscious behavior when trying to explain the Information technology usage. Based on this premise, IT usage is activated by the intention to use the application, while the intention itself is determined by conscious evaluations (Jasperson et al. 2005). From this perspective, large quantities of models such as theory of reasoned action (TRA)(Sheppard et al. 1988), theory of planned behavior (TPB)(Ajzen 1991), technology acceptance model (TAM)(Davis 1989; Davis et al. 1989 2003) and the unified view of the information technology acceptance (UTAUT)(Davis 1989; Venkatesh et al. 2003).

Besides the rational aspect of individual behaviors, there are still another type of behaviors which been known as automatic or habitual behaviors (Aarts et al. 2000; Limayem et al. 2003; Louis et al. 1991). In fact, the majority of human's behaviors are executed in a routine basis (Aarts et al. 2000). The better part of the behavioral repertoire is frequently exhibited in the same physical and social environment and has taken on a habitual character. During the initial use of IT, individuals most likely engage in active cognitive processing; however, with repetitive behavior, reflective cognitive processing dissipates over time, leading to non-reflective, routinized behavior (Jasperson et al. 2005; Ouellette et al. 1998).

Some researchers have focused on the automatic use (Jasperson et al. 2005; Kim et al. 2005; Limayem et al. 2003). Based on theory of planned behavior (TPB) and the Triandis' model, Limayem and Hirt (2003) analyzed the effects of habits on information systems usage and found that besides the intentions, individuals' habits also play an important role in explaining and predicting the usage behaviors. Cheung and Limayem (2005) studied the role of habit in information systems continuance, and found that the moderating effect of habit on the relationship between intention and usage increased and the impact of intention on IS continued usage weaken over time. Kim et al.(2005) made a comparison between two perspectives on the habitual usage: the habit/automaticity perspective (HAP) and the instant activation perspective (IAP). The differences between these two perspectives rooted in that

the former deemed habit as a goal-directed automatic behavior, while the later treated habit merely as an expedited form of conscious processing. Habit/automaticity perspective argue that there is no reasoning process or intentions before action(Aarts et al. 2000). The connection between the goal and behavior itself can make the action automatically taking place. Instant activation perspective argues that automatic use occurs effortlessly but is still a function of evaluation/intention. With a survey on the online news reading, Kim et al. (2005) found that the habit/automaticity perspective would be more robust to depict the effects of the habit on the information usage.

While some researches have been done on the automatic use, they mainly focus on the influence of habits on the information system usage and different perspective about automatic use. Still little effort has been found on the determinants of the individual habit of information technology usage. Based on the insights from goal-directed behavior, habit/automaticity perspective, and IS continuance model, this study is designed mainly focus on the determinants of automatic use and try to find out the antecedents of habit.

Theoretical Background and Research Propositions

There exist two contrasting views in the literature on the nature of habitual usage: the habit/automaticity perspective (HAP) and the instant activation perspective (IAP). Empirical results have demonstrated that the habit/automaticity perspective would be more robust in explicating the effects of the habit on the information technology usage (Kim et al. 2005). In consist with former researches, this study chooses habit/automaticity perspective as one of the theoretical foundations. Habit/automaticity perspective (HAP) maintains that habits are the form of automatic goal-directed behavior (Aarts et al. 2000; Bargh et al. 2001; Custers et al. 2005; Kim et al. 2005). So, the findings of goal-directed behavior must be concerned. In order to attain the automatic use, people are firstly required to continue using the information system. So, this research uses the IS continuance model as another theoretical foundation.
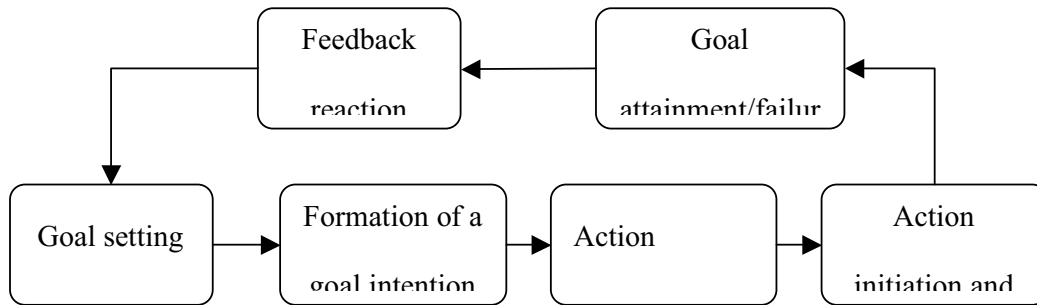
Goal-Directed Behavior

Goals refer to desired, or anticipated, outcomes or end states (Aarts et al. 2000; Bargh et al. 2001). The goal-directed behavior includes six steps: goal setting, formation of a goal intention, action planning, action initiation and control, goal attainment/failure, and feedback reactions (Bagozzi and Dholakia 1999). Figure 1 shows these six steps in the goal-directed behavior.

Goal-directed behavior begins with goal setting (Bagozzi and Edwards 1998). In the formation of a goal intention step, users will form a standard or reference value to be achieved through the execution of instrumental acts. During the action planning step, researches have indicated different mechanisms in producing the action that attains the goal. In one way, individuals will consciously assess the strategies to attain the goal before the action initiation and control, and choose the suitable behavior to attain that goal. And also, individuals can automatically direct action initiation and control at attaining the desired state (Bargh et al. 2001; Custers et al. 2005).

After actual implementation step, the users will engage in a comparison of the outcome achieved with a standard or reference value. After the discrepancy between a person's goal and its achievement is appraised, the reactions of discrepancy such as satisfaction or dissatisfaction will generate (Bagozzi and Dholakia 1999). Reactions to goal attainment will

update the person's knowledge structure about goal, motivation to pursue goals (Bagozzi and Dholakia 1999).

Source: Bagozzi and Dholakia (1999)

**Figure 1 Six Steps in the Goal-Directed Behavior**

Habit/Automaticity Perspective (HAP)

Habit/automaticity perspective (HAP) maintains that habits are the form of automatic goal-directed or goal-oriented behavior (Aarts et al. 2000; Bargh et al. 2001; Custers et al. 2005; Kim et al. 2005). Habits are mentally represented as links between a goal and actions that are instrumental in attaining this goal, hence, the strength of habit is the strength of linkage between goal and action (Aarts et al. 2000; Bargh et al. 2001). One important difference between conscious use and automatic use for the goal-directed behavior exists in the action planning step.

For the automatic use behavior, the knowledge structure linking goals and subsequent actions becomes hard wired in mental representation (Aarts et al. 2000; Kim et al. 2005). As a result, `when goal is activated, the habitual behavior for carrying out that goal is automatically activated with little effort in the step of action planning. When pursuing relatively unfamiliar goals, individuals are likely to ponder the possible actions they can use to achieve the goal before they engage in an action. When goals are reached regularly, however, the need to pay conscious attention to action planning decreased. When individuals select the same actions more often and when these actions lead to goal achievement in a more satisfactory manner, the mental linkage between the goal and the actions become stronger. That is, selecting and performing the same goal-directed behavior frequently and consistently leads to associations between the goal and the instrumental actions (i.e., to the formation of a habit) (Aarts et al. 2000).

IS Continuance Model

Based on the expectation-confirmation theory, Bhattacherjee (2001b) developed an IS continuance model, which is suited in the post-acceptance stages (see figure 2). Viewing IT users' continued usage decisions as similar to consumers' repeat purchase decisions, the model predicts users' intentions to continue usage of an IT with three antecedents: user satisfaction with the IT, extent of user confirmation, and post-adoption expectations which is represented by perceived usefulness. User satisfaction is determined by perceived usefulness and confirmation of expectation following actual usage. In addition, users' extent of confirmation is positively associated with the perceived usefulness of IS use.
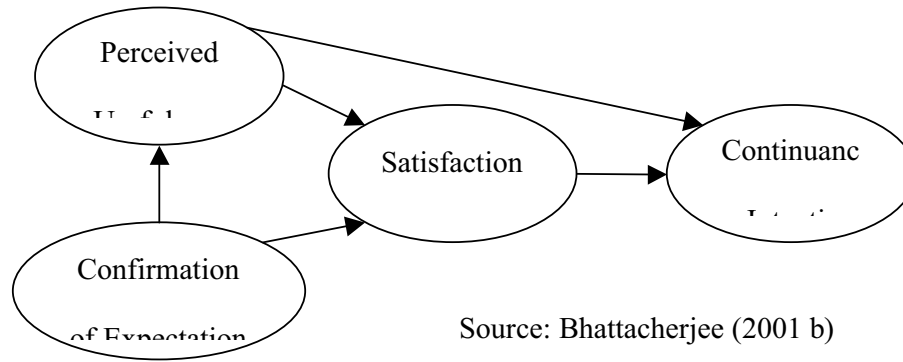
Source: Bhattacherjee (2001 b)

Figure 2 IS Continuance Model

Research Model and Hypotheses

Habit is an automatic goal-directed behavior (Aarts et al. 2000; Bargh et al. 2001; Custers et al. 2005). The exhibition of habits is the result of automatic and immediate activation of habitual actions on the instigation of a goal. The strength of habit is depends on the stable connection between the goal and actions which attain this goal (Aarts et al. 2000). Goal-directed behavior begins with goal setting. After actual implementation step, the users will engage in a final comparison of the outcome achieved with a standard or reference value. After the discrepancy between a person's goal and outcome is appraised, the reactions of discrepancy such as satisfaction or dissatisfaction will generate (Bagozzi and Dholakia 1999). So, satisfaction is a reactions to the degree of goal attainment. Reactions to goal attainment will update the person's knowledge structure about goal (Bagozzi and Dholakia 1999). As a result, when relevant actions lead to goal achievement in a satisfactory manner, the actions will become mentally linked to the goal. If the behavior achieve the activated goal in a dissatisfactory manner, the user will determine whether to maintain or increase efforts at goal pursuit or will try other new behaviors to attain the activated goal (Aarts et al. 2000). So, one influential factor for the strength of habit is the user's satisfaction towards the system use. Hence, the following proposition is postulated:

P1: Users' satisfaction towards the information system is positively associated with the strength of the system usage habit.

Another influential factor for the strength of habit is the user experience. User experience is defined as the time elapsed since the initial use of the application(Venkatesh et al. 2003). The unified theory of acceptance and use of technology (UTAUT) proposes that as user experience increases, nonutilitarian factors such as effort expectancy and social influence will be less important in determining behavior intentions (Venkatesh et al. 2003; Kim et al. 2005). For habits are represented as links between a goal and actions that are instrumental in attaining this goal, the strength of such links is dependent on frequent co-activation of the goal and the relevant actions in the past. The longer the user's experience, the more opportunities the relevant actions attain the activated goal. The more often the activation of a goal leads to the performance of the same action under the same circumstances, the stronger the habit will become (Aarts et al. 2000). Hence, the following proposition is postulated:

P2: User experience is positively associated with the strength of the habit.

Except for the satisfaction and user experience, the positive affect is also an important determinant of the habit. Researches have indicated that people often simply "have" a goal in the sense that it arises automatically because of emotional forces, and these emotional forces

will lead to automatic actions(Custers et al. 2005; Bagozzi and Dholakia 1999; Toates 1986). On the basis of wide variety of evidence showing that affective processes play a fundamental role in motivating human action and can run quite fast without reaching conscious awareness, Custers and Aarts (2005) demonstrated that positive affect played an important role in the unconscious operation of behavioral goals and was an implicit motivator for the automatically goal pursuit. Behavioral states can operate as a goal when these states associated with positive affect during execution or observation of the states, and this will not only cause individuals to be more strongly to attain these states, but also will cause individuals to want to produce these behavioral states automatically. Enjoyment refers to the extent to which the activity of using the IT is perceived to be personally enjoyable in its own right aside from the instrumental value of the technology (Davis et al. 1992; Yi et al. 2003). For the enjoyment is one aspect of positive affect, we can have the following proposition:

P3: Perceived enjoyment is positively associated with the strength of the habit.

Satisfaction is the evaluation rendered that the experience was at least as good as it was supposed to be (Hunt 1977; Westbrook 1987). It depends on the discrepancy between the goal and its achievement and is an reactions of the degree of goal attainment. Affect plays a key role in the formation of satisfaction. Westbrook (1987) proposes that as a global evaluative judgment, satisfaction judgments should be determined at least in part by the affective response. Thus affective responses may be available to exert effects on the evaluative processes yielding satisfaction judgments. Though affect may be transient during execution of the goal, they also can be highly salient through their retrieval from memory, depending on the intensity (Westbrook 1987). In the marketing research, the influence of affect on satisfaction has been demonstrated (Oliver 1993; Westbrook 1987). Abelson et al. (1982) also finds that, in the context of political candidate preferences, evaluative judgments are influenced by both affective response and cognitive beliefs. So, as a comprehensive evaluative judgment, the satisfaction towards the system usage is also influenced by the affect. As one aspect of positive affect, the influence of perceived enjoyment on the satisfaction has also been supported in IS research (Thong et al. 2006). Hence, we can have the following proposition:

P4: Perceived enjoyment is positively associated with the satisfaction.

After the users have gain the experience of using the information system, confirmation of expectation is an important cognitive belief (Bhattacherjee 2001b). Confirmation is the extent to which user's expectation is confirmed. Conversely, disconfirmation occurs when actual performance is lower than expected performance. During the goal setting step, people will form a expectation that is a standard or reference value for the goal. In the goal attainment/failure step, users will engage in a final comparison of the outcome achieved with a standard or reference value. Reactions such as satisfaction or dissatisfaction will be dependent on the discrepancy between the goal and its achievement. So, satisfaction will be an index of the degree of goal attainment. Hence, we can have the following proposition:

P5: Confirmation of expectation is positively associated with the satisfaction.

Davis et al. (1989) asserts that perceived usefulness provides an assessment of the degree to which an individual believes that a particular technology will enhance performance. So, perceived usefulness captures the instrumentality of IS use. In the goal attainment/failure

step, users will engage in a final comparison of the outcome achieved with a standard or reference value. If the perceived usefulness is high, then outcome achieved will be high, then the discrepancy between a person's goal and its achievement will be lower. Because satisfaction is an index of the degree of goal attainment, the above discussion leads to the following proposition:

P6: Perceived usefulness is positively associated with the satisfaction.

Perceived usefulness and perceived enjoyment are salient cognitive beliefs after the users gaining the experience of using the information system. There exists a feedback action step in the goal-directed behavior. Reactions to goal attainment/failure will update the person's knowledge structure about goals and cognitive beliefs (Bagozzi and Dholakia 1999). Once the users have actual experience with the system, their initial usefulness and enjoyment perceptions can be adjusted in this step (Bhattacherjee 2001b; Thong et al. 2006). If their initial usefulness and enjoyment perceptions are not confirmed during the actual interaction, users may experience cognitive dissonance. Hence, uses have the tendency to change their perceptions to be consistent with the reality. That is, confirmation can enhance perceived usefulness and perceived enjoyment. The above discussion leads to the following propositions:

P7: Confirmation of expectation is positively associated with the perceived usefulness.
P8: Confirmation of expectation is positively associated with the perceived enjoyment.

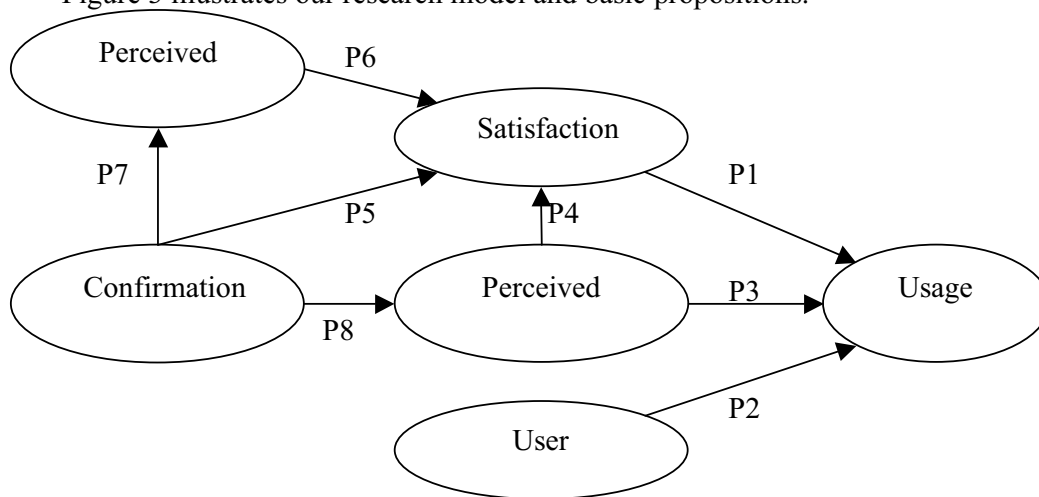Figure 3 illustrates our research model and basic propositions.

Figure 3 Research Models.

Implications
This study yields important implications for scholars. First, an important issue is how information technologies are routinized in organizations. Habit is one aspect of routinization (Saga et al. 1994). To the best of our knowledge, this study is among the very few that have attempted to investigate the determinants of the strength of usage habit. This research has empirically demonstrated the path of usage habituation. Research on usage habituation for information systems will lead to profound understanding in this field. Second, Louis and Sutton (1991) theorized a cycle of cognitive processing that consists of switching from

conscious mode to automatic mode and switching from automatic mode to conscious mode; they also suggested that the shift from automatic processing to conscious processing occurs as a result of stimuli. This study focuses on the shift from conscious mode to automatic cognitive mode and leads to a clearer understanding of this cognitive processing cycle. Furthermore, this study is based on the findings of goal-directed behavior. Since much of behavior is goal-directed (Bagozzi and Dholakia 1999; Bhattacherjee 2001b), this research opens a new perspective to view IS usage behavior.

Our study also has considerable implications for practice. Routinization is an important stage for the assimilation of an IT innovation, and may even determine the success of the company promoting the IT innovation in the marketplace. This study's results suggest that managing users' satisfaction level, as well as perceived enjoyment and user experience, will be critical to encouraging habitual usage. In the past, IT practitioners have paid little attention to the perceived enjoyment associated with IT products or services. Most IT innovations were considered tools for users to attain certain goals within organizations, where performance aspects of IT innovations are considered more important than users' affect towards these IT products or services (Davis et al., 1989). However, as more and more IT innovations become commercially available to individual users in the form of consumer products or services, it is very likely that, in order to attain high level of routinization, IT product/service practitioners should pay more attentions to the users' perceived enjoyment of these IT products or services.

The findings of this research strongly suggest how to increase the level of routinization, by reflecting the important role of satisfaction during the post-acceptance stages. In order to attain a high level of routinization, information system usage behavior must achieve the relevant goals satisfactorily. Our results also suggest that managing users' expectations is important in facilitating habitual usage. Setting a lower level of expectations can encourage habitual usage indirectly through its influence on satisfaction and perceived enjoyment. In addition, for usage patterns of habitual users to differ significantly from those of nonhabitual users, online firms need to align their strategies with consumers' habit levels. Conversely, the leaders of the less successful instant messenger providers should focus on improving service, in order to enhance the satisfaction level or perceived enjoyment of their product.

Contributions and Conclusions

In order to highlight the value added by the proposed model, it is instructive to compare it with IS continuance model (Bhattacherjee 2001b). In order to attain the automatic use, people are firstly required to continue using the system. So, this proposed model is similar to IS continuance model on two counts: (1) Perceived usefulness and confirmation of expectation both positively influences satisfaction, and (2) perceived usefulness both are positively influenced by confirmation of expectation.

However, the proposed model is different from IS continuance model on at least four counts. First, the explained construct of IS continuance model is continuance intention or continuance behavior. But the explained construct of this proposed model is neither intention nor behavior. It is the strength of habit which means the strength of linkage between the goal and actions which attain this goal. Second, the mechanism that satisfaction is an influential factor for the strength of habit is that when relevant actions lead to goal achievement in a more satisfactory manner, the association between the goal and actions will become stronger. But according to TAM, attitude will influence intention (Davis et al. 1989). Hence,

satisfaction, as an attitude, is positively associated with continuance intention (Bhattacherjee 2001b). Third the longer the user experience, the more opportunities the relevant actions attain the activated goal, and the stronger the habit will become. Hence, this proposed model affirms the influence of user experience. But IS continuance model doesn't consider the user experience. Forth, perceived usefulness may override low affect in motivation usage intention in the IS continuance model (Bhattacherjee 2001b). But in this proposed model, positive affect plays an important role in the unconscious operation of behavioral goals, so perceived usefulness can't override low affect in motivation unconscious operation of behavioral goals.

Although some research has focus on the automatic use, our knowledge of automatic use is limited in the influence of habit on the actual usage, little effort has been found on the antecedents of automatic use. The goal of this paper is to focus on the theoretical development and identify salient determinants of IT usage habit and to understand underlying mechanisms that they influence the dependent variable. This research tries to lead to a deeper understanding of the users' automatic use. We hope that it promotes additional theorizing and empirical investigation aimed at better understanding the determinants of automatic use. In addition, the goal of this study is theory development. Theory testing will be conducted in the near future.

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