Global Co-Operation in the New Millennium
The 9th European Conference on Information Systems
Bled, Slovenia, June 27-29, 2001

INTENTION DOES NOT ALWAYS MATTER: THE CONTINGENT ROLE OF HABIT ON IT USAGE BEHAVIOR

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ABSTRACT

The ability to predict IT usage behavior has been an important area of inquiry in IS research for many years. Yet, to date, the predominant approach has been on the conscious cognitive aspect of this behavior. Consequently, the primary focus has been on the formation of intentions and its impact on the subsequent behavior of IT usage almost to the exclusion of other factors. The purpose of this study is to highlight an alternative viewpoint that suggests the equally important role of the automatic response known as habit. Applying theories of human behavior, we developed a model that shows the impact of both intentions and habit on IT usage. More importantly, we demonstrate that the influence of intention on usage will vary depending on the level of one's habit. This finding implies that there can be situations where intention will, in fact, have no impact on behavior and that further research is needed to understand these conditions and the factors that lead to such situations.

1. INTRODUCTION

In the past two decades of IT adoption and implementation research, the predominant focus has been on cognitive behavioral models. Witness the use of models such as TRA (Fishbein & Ajzen, 1975), TPB (Ajzen and Madden, 1985; Ajzen, 1991), and innovation theory (Rogers, 1983, 1995) in the formation of IT related models such as the TAM and its variants (Davis et al., 1989; Mathieson, 1991; Hartwick and Barki,

1994), the decomposed TPB (Taylor & Todd, 1995), and PCI models (Moore and Benbasat, 1991, 1996; Karahanna et al., 1999). In all instances, great effort has been expended on understanding the antecedent factors that combine to influence the actual IT usage behavior. In almost all situations, the factors considered are modeled as mediated by behavioral intention. In other words, an individual's planned decision in the form of intentions is viewed as the main conduit by which all other factors must funnel through in order to impact actual IT usage behavior. In a few instances, perceptions or actual measures of conditions external to the individual (i.e., perceived behavioral control and facilitating conditions) that may constrain or help one's intention achieve its behavioral goal are included. While the past studies have certainly contributed in our learning about many antecedent factors such as involvement, perceived ease of use, perceived usefulness, and how they relate to intentions, this study argues that we need to focus on other factors that are internal to the individual, yet differ from the rational, deliberate, cognitive decision making the IS academy has pursued thus far. As such, we reintroduce the notion of habit discussed by Triandis (1980) 20 years ago. In contrast to the deliberate rational concept of intention, habit can be seen as the non-deliberate, automatically inculcated response that individuals may bring towards the behavior of IT usage. Consistent with the descriptions and definition to be presented, habit is viewed as having relatively little conceptual overlap with intentions and thus provides potentially additional explanatory power towards IT usage.

This paper begins by presenting a short overview of the major intentional models that have been developed by IS researchers thus far. We then introduce the concept of habit and describe how it fits within the context of existing models. The specific research model to be tested is then described and the methodology used for data collection and analysis presented. Finally, we offer some interpretations and implications to both researchers and IS managers.

2. THEORY

2.1 Prior Intentional Models

Arguably one of the most well known and applied models in cognitive psychology is Fishbein and Ajzens (1975) Theory of Reasoned Action (TRA). It has been used by IS researchers (e.g., Mathieson, 1991) and adapted by others (e.g., TAM by Davis et al. 1989). The focal factor that predicts an individual's intention to perform a given behavior such as IT usage is intention. TRA (see Figure 2.1.) assumes that one's intentions capture the motivational factors that influence one's behavior. Essentially intentions provides the focal point that reflects how hard people are willing to try, of how much of an effort they are planning to exert in order to perform a behavior. As such, the stronger an individual's intention to perform a behavior, the more likely the behavior will be enacted. Intention, in turn, is formed by two factors: 1) one's attitude which reflects feelings of favourableness or unfavorableness towards performing the behavior and 2) the subjective norm which reflects the influence (i.e., social pressure) of significant other referents' desire for the individual to perform or not perform the behavior. An individual's attitude is further described as the summation of the strength of each salient belief (b) multiplied with the subjective evaluation (e) of the belief's attribute. Subjective norm, similarly, is considered the summation of the strength of each normative belief (i.e., how much each referent approves or disapproves of the behavior) multiplied with the person's motivation to comply (m) with the referent in question.

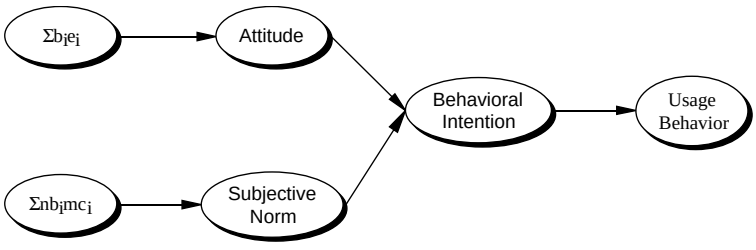

Figure 2.1: *Theory of Reasoned Action*

The Technology Acceptance Model (TAM) is a model adapted from the TRA by focusing on two main beliefs about the IT: perceived ease of use and perceived usefulness. Argued as a more parsimonious approach to predict usage, TAM (see Figure 2.2.) not only excluded other beliefs, but also their evaluations and the subjective norm component. Finally, TAM states that the belief of perceived usefulness also has a direct effect on intention rather than being fully mediated by attitude. Overall, it is argued that the model has practical utility since the two beliefs represent factors that system designer have some degree of control. Empirical studies have subsequently shown that a significant amount of variance in usage intention and self-reported usage can be explained (Venkatesh & Davis, 2000; Mathieson, 1991; Hartwick and Barki, 1994; Davis et al., 1989; Taylor & Todd, 1995).

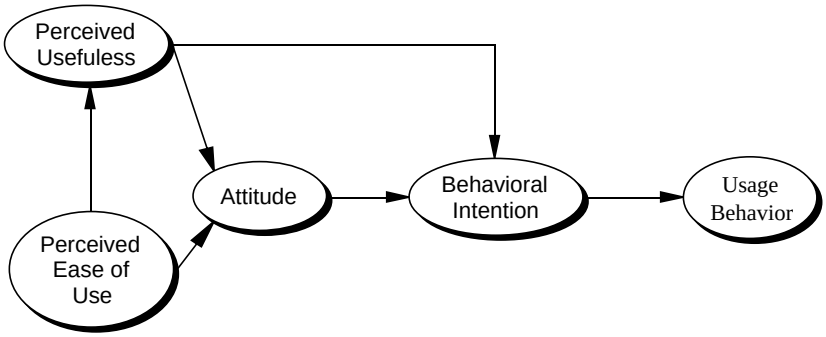

Figure 2.2: *Technology Acceptance Model*

Yet, it has been noted that both the TRA and TAM model assume that the behavior in question is under volitional control (i.e., if the person can decide at will to perform or not perform the behavior). In many situations, the resources and opportunities available to a person must to some extent dictate the likelihood of behavioral achievement. Ajzen (1991) argued that an individual's perceptions of behavioral control (PBC) must also be taken into account since they can impact both intentions and behavior. The individual's PBC is further described as the summation of the strength of each control belief (c) multiplied with the perceived power (p) of the of the particular control factor to facilitate or inhibit enactment of that behavior. The dotted line between PBC and behavior reflects the fact that perceptions need not accurately reflect actual control and therefore may, at times, have little relationship to behavior. The PBC factor coupled with those already modeled in TRA yields the Theory of Planned Behavior as depicted in Figure 2.3. (Ajzen, 1991).

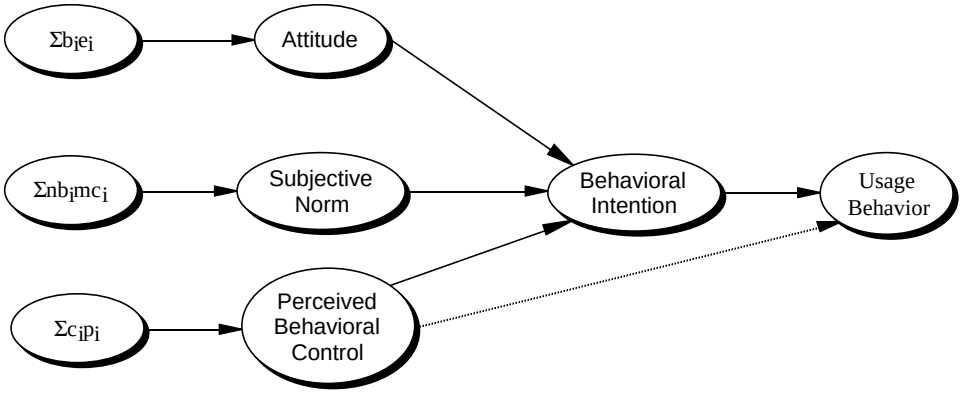

Figure 2.3: *Theory of Planned Behavior (TPB)*

Within the IS discipline, Mathieson (1991) showed that PBC has a significant relationship with behavioral intention. Taylor and Todd (1995) also demonstrated significant links to both intention and usage.

Finally, Moore and Benbasat (1991, 1996) have integrated the intentions and innovations literature (Rogers, 1995,1983). The innovation diffusion research identifies five characteristics of a technological innovation:

relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1983). Moore and Benbasat expanded on these by presenting eight antecedent constructs, termed the Perceived Characteristics of Innovating (PCI), useful for the study of initial adoption and diffusion of innovations (p.193). Overall, these factors are again typically viewed as antecedent to intention.

In summary, past research have established the need to examine the factors that influence IT usage behavior. If we look at those factors immediately antecedent to behavior, we can characterize one as internal and one as external to the individual. External factors refer to those conditions that facilitate or inhibit the IT usage behavior. But the internal factors have primarily focused on the deliberate planning process that an individual may or may not go through before using an IT.

2.2 Habits – Definition and Role

It is the position of this paper, that while the intentional process of prior models may indeed have an important role in the consideration of new IT adoption or usage, other non-planning aspects internal to the individual may have an equally important role both in the early and later stages. In particular, we refer to the automatic response known as habit. Triandis (1980) suggests that habit can have both a direct and interactive effect on behavior. He described it as "situation-behavior sequences that are or have become automatic... the individual is usually not "conscious" of these sequences" (p. 204). Unlike reflexes, they are based in part on the ability of the individual to learn or acquire/absorb the particular behavior into a cognitive schemata or script. Thus habit represents the automatic behavior tendencies developed during the past history of the individual such that a particular situation/stimuli will elicit the behavior even when the individual does not instruct him or herself to perform the act.

In addition to this direct effect on behavior, following Triandis (1980, p. 228) habits should also have an interactive effect; as a particular behavior becomes more routinized, habit becomes more dominant and intention should no longer have as much effect.

2.3 The Habit-Intention Model

In our model (see Figure 2.4.), we are specifically focusing on usage behavior. Therefore, we incorporate the facilitating conditions and intentions along with habit in predicting usage. While we continue to use the term intentions, we decided to apply Triandis' term "facilitating conditions" to reflect the resources and opportunities that facilitate or inhibit the behavioral act from occurring. Consistent with TPB, we model facilitating conditions (which is analogous to TPB's perceived behavioral control) as an external factor that impacts both intention and IT usage. Now, in addition to intention, habit is included as factors internal to the individual and both are seen as directly impacting usage. The interactive effect of habit is modeled as the link pointing at the relationship between intention and IT usage. Essentially, this means that we expect that different levels of habit should change the relative importance of intention on usage behavior. As a test of nomological completeness and validity, we include the antecedent factors of beliefs (termed perceived consequences by Triandis) and attitude with paths consistent with past models.

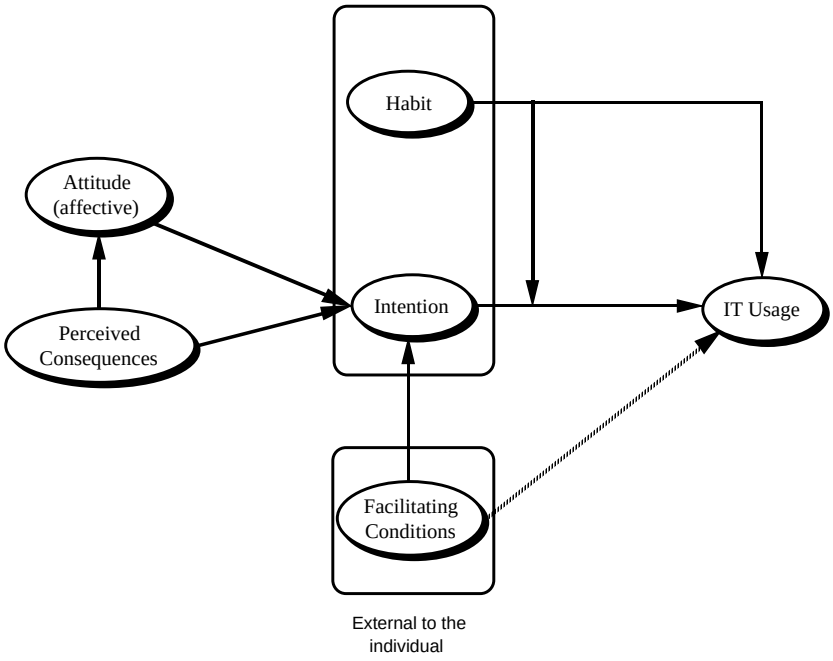

Figure 2.4: *Intention-Habit Model of IT Usage.*

Triandis recognized the difficulty of operationalizing the notion of habit. Ajzen (1991, p. 203) argued, for example, that prior behaviors is not a measure of habit, but rather a reflection of all factors that determine the behavior of interest. Thus the correlation of past with subsequent behavior is more a measure of the stability or reliability of the behavior as opposed to showing a habit to behavior link. As an alternate to past behavior, Triandis suggested using subjects' judgments of the likelihood that such habitual behavior takes place. He noted that while such self-reported measures can be easily distorted (e.g., due to factors such as social desirability), if several measures converge, it is likely that the common elements are reflecting the construct. This paper concurs with Ajzen's concern and while problematic nature have decided to follow subjective assessment discussed by Triandis.

Very few IS papers have discussed the notion of habit. In their literature review of the factors affecting information systems success DeLone and McLean (1992; p. 68), for example, built upon Trice and Tracy's (1986) concept of MIS institutionalization suggesting that "the degree of institutionalization is to be determined on user dependence on the MIS, user feelings of system ownership, and the degree to which MIS is routinized into standard operating procedures." Thompson et al. (1991) explicitly excluded both habits and intentions when studying actual PC utilization. Discussing their results they noted, however, that habits – which was left out for difficulties in operationalization - might have been an important factor in adding explanatory power to their model. In a follow-up study, Thompson et al. (1994) examined the impact of prior experience (but not habit) on various factors related to PC utilization. The authors concluded that prior experience influenced PC utilization both directly and as a moderator of the links between utilization and most of its antecedents. They again recommended that future researchers ought to examine the impact of habit. Bergeron et al. (1995) discussed the role of habits in predicting executive information system usage. Similar to Thompson et al. 1994, they used past behavior as a surrogate. Limayem, Khalifa, and Chin (1999) operationalized habit using 6 items based on the individual's judgment of whether the behavior has become automatic/habitual. They found it to have the second most important effect on intention to pirate software behind perceived consequences. Yet, as noted by our previous discussion, definition of habit, and model, an analysis with a direct link from habit to usage behavior would have been informative, but unfortunately not explored.

In summary, the predominate approach in predicting IT behavior has focused on intentions. Common wisdom has been that intention is a good predictor of behavior, which unfortunately, may have led to the implicit, but widely shared, notion that it is the *only* predictor. Witness the fact that many studies stop only

at intention (e.g., Chin & Gopal, 1995). By bringing back the notion of habit, we suggest that this represents an important new area of inquiry that can eventually provide manager with entirely new insights and leverage points. It is, for example, likely that habit becomes more important in influencing people's IT usage behavior once they have gained more experience on the use of an IT. Equally important, habits with an older technology may need to be factored in when the implementation process of transitioning to a new IT is about to begin. To date, very little research on the automatic nature of habit has been done and no tactics or antecedent factors that form habits have been elucidated.

Our goal in this paper is to begin the process and demonstrate that habit can indeed provide additional variance in the prediction of behavior. Such a results would suggest that in many instances IT usage behavior may be driven by subconscious or automatic processes (habits) in addition to or even to the exclusion of self-instruction (intention).

3. METHODOLOGY

3.1 Data Collection

Our research methodology consisted of three stages: 1) belief elicitation, 2) survey of intentions and beliefs, and 3) survey of behavior (actual usage of IBT). The purpose of the first stage was to elicit beliefs regarding the facilitating conditions and perceived consequences of using WebBoard, a commercially available web-conferencing application. The elicited beliefs were used to develop the measurement models of the various constructs. We then constructed a survey instrument, and pre-tested and validated it in stages 2 and 3, respectively.

A "WebBoard" comprises a collection of messages posted by various participants. To keep track of those messages and foster meaningful information exchange, WebBoard messages are organized in a hierarchy with four levels: Board1, Conference (private or public), Topic, and Message (new topic or response). The instructor, acting as "board manager" decides how to arrange the subject matter of boards and conferences, while the participants (i.e. the students and the instructor) create the topics and messages by posting and replying in conferences that are of interest to them.

During our study, the students could access the WebBoard application through a hyperlink that was added to their respective course websites. (see Figure 3.1).

Belief Elicitation- The belief elicitation was done through a questionnaire and focus groups involving a total of 31 undergraduate and master students in a major university in Hong Kong. The purpose of the belief elicitation was to complement a list of formative items measuring the "perceived consequences", and "facilitating conditions" that were initially compiled from the literature.

Survey 1- In the first survey, a questionnaire measuring intentions to use WebBoard, habits, affects, and perceived consequences was administered to 144 graduate and undergraduate students. Participation in this study was voluntary; 92 students returned the questionnaire.

Survey 2- The second questionnaire was administered one month after the first one to the same 144 students. It included only two questions intended to measure the level of WebBoard usage since answering the first questionnaire. The second questionnaire was returned by 94 students.

In all, 60 students responded to *both* questionnaires, which corresponds to an overall response rate of slightly more than 41%. The demographic profile of the respondents is described in Table 1.

1 We had one Board per course

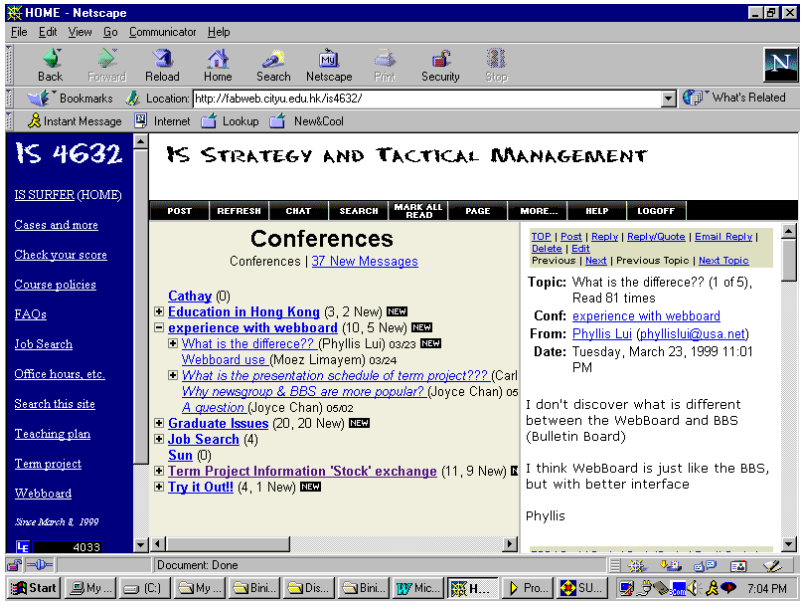

Figure 3.1: *Access to WebBoard application via course website*

Category	**Percentage**
Gender	
Male	54%
Female	46%
Major	
3rd year BBA in (IS)	80%
Master in IS	20%

Table 3.1: *Student demographics*

3.2 Measures

To ensure measurement reliability in operationalizing our constructs, we tried to use items that had been validated in prior research. This was possible for most reflective items except for habit, which represent new measures. The constructs "attitude", "intentions", "actual usage" and "habit" were measured with reflective items while the constructs "perceived consequences" and "facilitating conditions" were measured with formative items. For reflective measures, all items were viewed as parallel (i.e., congeneric) measures capturing the same construct of interest. Thus, the standard approach for evaluation, where all path loadings from construct to measures are expected to be strong (i.e., 0.70 or higher), was used. In the case of formative measures, all item measures can be independent of one another since they are viewed as items that create the "emergent factor". Thus, high loadings are not necessarily given and reliability assessments such as Cronbach's alpha are not applicable. Here Chin (1998) suggests that the weights of each item be used to assess how much it contributes to the overall factor.

4. DATA ANALYSIS & RESULTS

The analysis of the data was done in a holistic manner using Partial Least Squares (PLS). The PLS procedure (Wold, 1989) has been gaining interest and use among researchers in recent years because of its ability to model latent constructs under conditions of non-normality and small to medium sample sizes

(Chin, 1998; Compeau & Higgins, 1995; Chin & Gopal, 1995). It allows one to both specify the relationships among the conceptual factors of interest and the measures underlying each construct, resulting in a simultaneous analysis of 1) how well the measures relate to each construct and 2) whether the hypothesized relationships at the theoretical level are empirically true. This ability to include multiple measures for each construct also provides more accurate estimates of the paths among constructs, which is typically biased downward by measurement error when using techniques such as multiple regression. Furthermore, due to the formative nature of some of the measures used and non-normality of the data, LISREL analysis was not appropriate (Chin & Gopal, 1995). Thus, we chose PLS-Graph version 3.00 (Chin, 1994) to perform the analysis.

In formulating and testing for interaction effects using PLS, one needs to follow a hierarchical process similar to multiple regression where you compare the results of two models (i.e., one with and one without the interaction construct). We applied the procedure described by Chin et al. (1996). The standardized path estimate from habit to the intention-usage path informs us as to how a change in the level of the moderator construct Z (habit) would change the influence of the main construct X (intention) to dependent construct Y (IT usage). Thus, if intention has an estimated beta effect of B on usage, a beta M for the interaction path can be interpreted as a beta change to B+M for the estimated path from intention to usage when habit increases by one standard deviation from the baseline of zero.

You can also compare the R-square for this interaction model with the R-square for the "main effects" model, which excludes the interaction construct. The difference in R-squares is used to assess the overall effect size f^2 for the interaction where .02, 0.15, and 0.35 has been suggested as small, moderate, and large effects respectively (Cohen 1998).2 It is important to understand that a small f^2 does not necessarily imply an unimportant effect. If there is a likelihood of occurrence for the extreme moderating conditions and the resulting beta changes are meaningful, then it is important to take these situations into account.

In the case of our study, the results as shown in Figure 4.1. give approximately equal standardized beta for habit and intention (0.314 and 0.362) with an R-square of 0.461 for usage. The inclusion of the interaction effects (see Figure 4.2.) shows an equally strong beta of –0.328 increasing the R-square for usage to 0.558. Thus, these results imply that one standard deviation increase in habit will not only impact usage directly by 0.314, but it would also decrease the impact of intention from 0.362 to practically zero. The interaction effect, therefore, has an effect size f of 0.183 which represents a solid medium effect and is more than twice the average effect compared to past IS studies (Chin et al., 1996).

What is important to recognize is that this empirically shows that as IT usage becomes more automatic, intention no longer plays a dominant role. Therefore, the need to improve or increase the type or degree of usage may not require cognitive arguments or training to demonstrate the usefulness or other antecedent factors of intention. Rather, techniques or tactics useful in breaking ritualized (habitual) behavior may be called for.

To assess whether the interaction effect and main effects were significant, a bootstrap resampling procedure (Efron and Tibshirani 1993) was performed. The results of 200 resamples indicate that all paths except for attitude to intention were significant at the 0.01 level.4 Furthermore, Table 4.1 provides the weights and loadings for each measure. The items in bold represent paths significant at the 0.01 level. As Chin (1998) notes, loadings should be interpreted for reflective measures and weights for formative ones. For reflective items, all items were above the 0.70 loading level except for two attitude items in the 0.60 range. But Chin (1998) notes that, for PLS analysis, "loadings of .5 and .6 may still be acceptable if there exist additional indicators in the block for comparison" (p. 325). For the formative measures, we see the good understanding and inexpensive access to the Internet were the most important facilitating factors followed by ease of

2 f^2 = [R-square(interaction model) – R-square(main effects model)]/[1- R-square(main effects model)]

3 f^2 = (.558-.461)/(1-.461)=0.18

4 We choose bootstrapping over the use of jackknifing since computational time was not a constraint and jackknifing is considered both less efficient and an approximation to the boostrap (Chin, 1998, p. 320)

Internet access and assistance from experts. In the case of key consequences, general performance improvement as well as with classmates were found to have an effect along with accessing useful information.

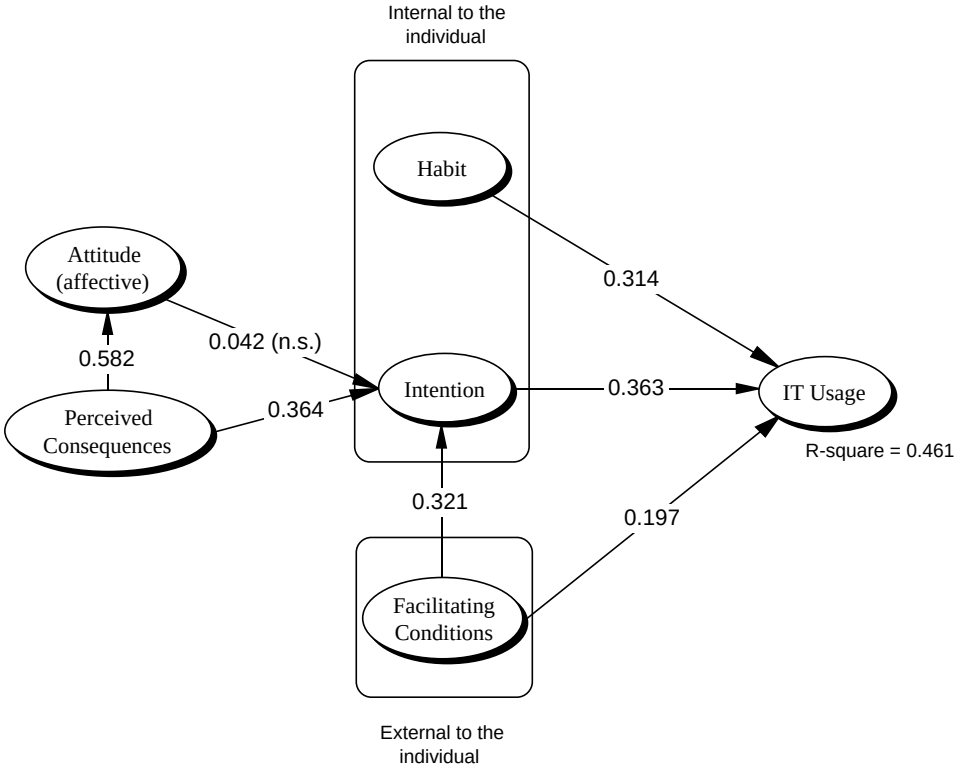

Figure 4.1: *Habit-Intention model (without interaction effect).*

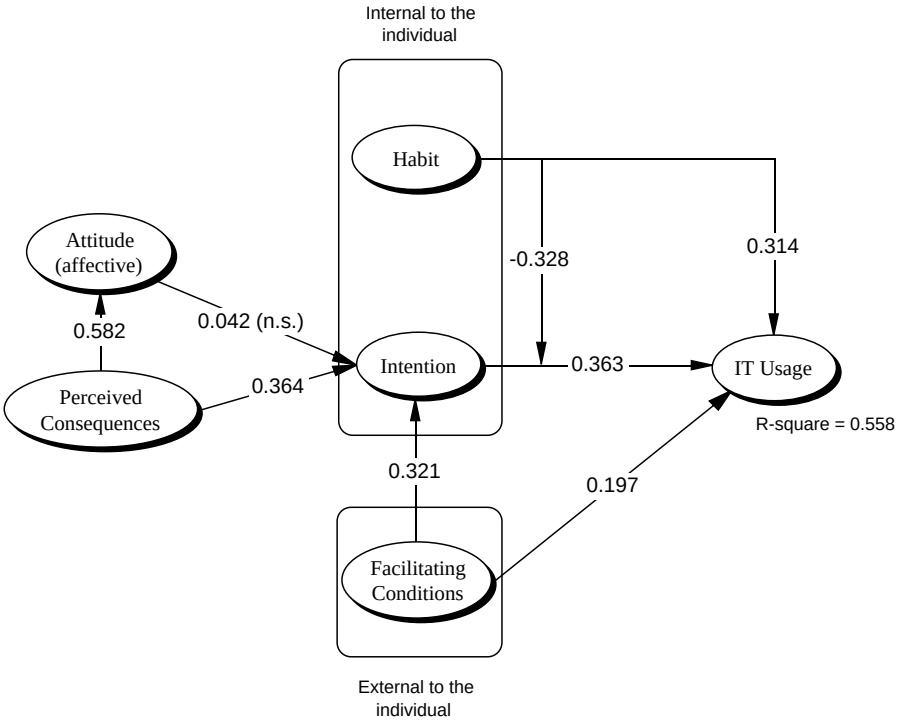

Figure 4.2: *Complete Habit-Intention model (with interaction effect).*

Variable	Weight	Loading
Intention (R)		
I1	0.5345	**0.9369**
I2	0.5331	**0.9365**
Habits (R)		
H1	0.2638	**0.8400**
H2	0.2630	**0.7721**
H3	0.2040	**0.8049**
H4	0.3012	**0.8409**
H5	0.2220	**0.7108**
Attitude (R)		
A1	0.3529	**0.7970**
A2	0.4136	**0.8327**
A3	0.3404	**0.6344**
A4	0.2553	**0.6204**
Perceived Consequences (F)		
P1	**0.3726**	0.6199
P2	0.2143(ns)	0.6477
P3	0.0207(ns)	0.2614
P4	0.1118(ns)	0.4810
P5	**0.4583**	0.7042
P6	**0.3588**	0.7224
Actual Usage (R)		
U1	0.5627	**0.8966**
U2	0.5546	**0.8934**
Facilitating Conditions (F)		
FC1	**0.7722**	0.7105
FC2	**0.4259**	0.0758
FC3	**0.6428**	0.4913
FC4	0.1789(ns)	0.1718
FC5	**0.3665**	0.2108
FC6	0.2108(ns)	0.2874

Table 4.2. *Measurement model of weights and loadings.*

5. DISCUSSION

To our knowledge, no one to date has studied the tradeoff (i.e., interaction) between habit and intention – although it has been suggested in Triandis (1980) work in attitude research as far back as two decades ago. This paper is a first attempt at closing this gap. Applying theories of human behavior, we developed a model that shows the impact of both intentions and habit on IT usage. More importantly, we demonstrated that the influence of intention on usage will vary depending on the level of one's habit. .

In discussing the importance of habits versus intentions, Triandis (1980, p. 216) notes that as long as a behavior is new to a person, the person's intention to perform the behavior clearly influences his or her actual behavior. However, as the person gains more experience with the behavior over time, i.e. "as an act occurs more frequently", we should be able to observe a shift in importance from consciously-driven behavior towards habitual behavior. If we apply this reasoning to IT adoption and usage, we can argue that while it might be reasonable to try to shape people's intentions during the early adoption stages, later on, the same strategies won't have the same effect since it is not intentions but habits that "govern" a person's behavior. This raises particularly interesting questions with respect to the introduction of interactive communication technologies which are – if we follow Markus (1987) argument - subject to reciprocal as opposed to sequential interdependence. Thus, in its attempt to promote successfully the usage of a particular communication technology, management may see itself forced to develop different tactics for early and late adopters instead of applying a "one size fits all"- type of strategy.

As a new information technology gets introduced into an organizations, it usually replaces another – "older " technology - that people have become accustomed to in usage. Recent challenges of that kind include the

introduction of ERP systems to replace other less integrated applications or the development of intranets to replace (at least partially) more traditional communication tools such as e-mail or fax. Management's traditional approach to promote the successful implementation of the new technology is to inform future users about the new system's many advantages as compared to the old (e.g. its higher degree of usefulness, higher user-friendliness). In other words, the usual approach focuses on shaping the attitudes of the future users by informing about the benefits associated with the use of the new technology. Completely neglected by this approach is, however, the possibility that the behavior in question may not be changeable through rational arguments at all. How can people be trusted to reasonably compare advantages and disadvantages of two systems, if their current usage (of the old system) is primarily driven by subconscious or automatic processes? Thus, rather than trying to influence user attitudes with rational arguments they are not interested in, what may be called for are tactics that help management "break" users' old habits to open them for the acquisition of new ones.

In conclusion, we would like to reiterate that processes underlying the formation of habits have yet to be extensively studied in the IS area. The same holds true for the questions of how to break habits and addictions associated with IT usage. Similarly, we feel there is a need to explore how individual habits spread and how they relate to the establishment of organizational routines. We hope this article serves as a first step in interest and inquires towards this direction.

ACKNOWLEDGEMENT

The work described in this paper was fully supported by a grant from City University of Hong Kong (Project No. 7001162)

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