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# The dual effect of habits in a current used system on the acceptance of a new IT

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## ***Abstract***

The objective of this study was to identify and analyze the two contradicted effects of the habits in a current used system on the acceptance of a new system. The first one is lock-in to a current used system, which negatively influence the intention of using a new system. The second one is familiarity and expertise for a new system from rich experiences through the repetitive use of similar system, which positively influence two relationships in the acceptance of a new system: usefulness – intention and ease-of-use – intention. For the validation of the hypotheses, 208 university students in Korea, who have enough experiences of word processors, were surveyed for the acceptance of Google Docs. The analysis of data from the survey showed all the hypotheses were supported with relatively low significance level.

## ***Keywords***

Habit, Lock-in, IT acceptance, Experiences

## **1. Introduction**

One of the most outstanding phenomena in recent information technology (IT) markets is that so many new systems, which can substitute for the existing systems, have emerged. For example, desktop based software such as word processors which have been dominated by a few vendors was challenged by online based software, so called software as a service or cloud computing (Barnatt, 2010; Carr, 2008). This change would not only lead to the challenge against the vendors that have enjoyed monopoly for a long time but also derive many users to make a decision about the acceptance of new systems.

Theory of reasoned action (TRA), which provided one of the most important theoretical backgrounds for IT acceptance theories, assumes that for some relatively novel and important behaviors people engage in deliberation and form a conscious decision to perform or not perform behavior under consideration (Fishbein & Ajzen, 2003; 2010). Technology acceptance model (TAM), which is theoretically based on TRA, also explained that the adoption of IT would be determined mostly by two reasoning based rational judgments of the system, usefulness and ease of use (Davis 1989; Davis et al. 1989), which implies that the acceptance of IT is assumed to be one of the new and important behaviors. Other IT acceptance studies including the improvement or extension of TAM also conducted under the similar assumption.

However, IT is not new and important anymore now. Today, IT is no longer the exclusive property of few experts or some specific workers but rather one of popular life items. Moreover, most people have a system which has been continuously used. Thus, in order to account for the acceptance of a new system, the continuance of a currently used system should be considered.

Unlike IT acceptance, one of the determinants for the continuance of a current used system may be habits in addition to the reasoned judgments (Kim 2009; Kim & Malhotra 2005; Kim et al. 2007; Limayem et al. 2007; Oritz de Guinea and Markus, 2009).

Habit is defined as learned behavioral sequences of that have become automatic responses to specific conditions, and may be functional in the attainment of certain objectives or end states (Verplanken and Orbell, 2003). Thus, routine behaviors, if satisfactorily repeated, would be activated by habits, which arise and proceed automatically or unconsciously (Aarts *et al*, 1998; Oullette and Wood, 1998; Verplanken 2006; Verplanken and Orbell, 2003).

Interestingly, habits of current used system may have dual effects that may contradictorily influence on the acceptance of a new system. In general, if a user has the habits of a specific system, then it is not easy to switch another system since it is tiresome to learn a new system and transform files into new forms (Shapiro & Varian, 1999). However, sometimes we can find that those who have strong habit may adopt a new system more easily than others who have no or weak habit. Rich experiences from the current used system may make habitual users adopt a new system without hesitation since they have enough knowledge and expertise for the proper evaluation of a new system.

The objective of this study was to identify and analyze the dual effects of habits of current used system on the acceptance of a new system. For this purpose, the hypotheses were suggested and tested by surveying Korean university students. The data was analyzed by partial least square (PLS).

## 2. Hypotheses

Most habitual users of a specific system may be 'lock-in' to the system, which is known as one of the most ubiquitous phenomena in IS uses (Shapiro & Varian, 1999). The users who are being lock-in to a system are unable to use another system without incurring switching costs such as leaning a new system and converting data or files into a new format. For example, if a new word processor is given to somebody who is habituated to a specific word processor, s/he may hesitate to use a new one since s/he would not want to experience tiresomeness in learning how to use it and transforming the current system's file format into the new one. Moreover, habitual users may be satisfied with the current system (Limayem *et al*. 2007). Therefore, the users who have habit of a currently used system would avoid the acceptance of a new system although they may have favorable attitude toward the new system.

Hypothesis 1: The strength of habit in relation to the current system will negatively influence the intention of using a new system.

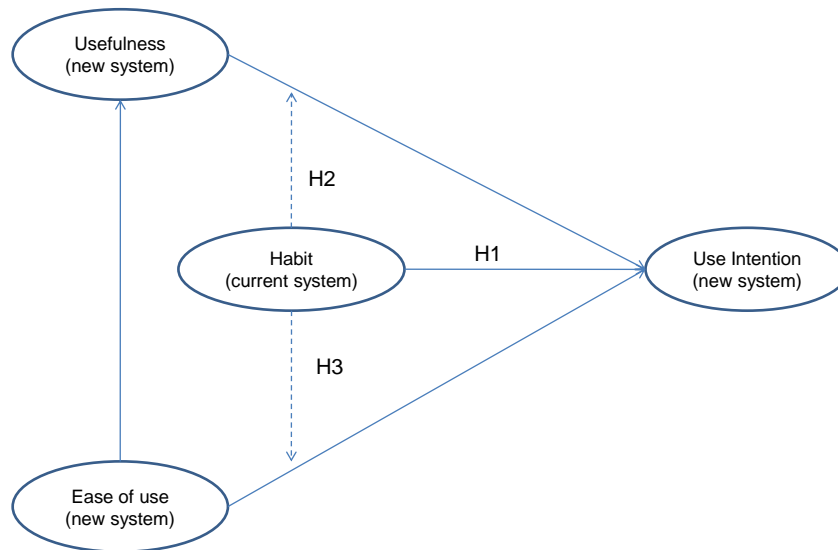
Contrary to being lock-in, the habits of a currently used system would lead to the positive effects on the acceptance of a new system. The habitual uses of the current system, in addition to being lock-in, may imply rich experiences of the system which would easily lead to familiarity and expertise with new systems. According to the attitude-behavior theories in psychology, the direct experiences would provide familiarity and expertise, which would formulate clear attitude toward or intention of performing that behavior (Fazio & Zanna 1981). Moreover, in general, most systems, if they have the same or similar purposes, also have similar functions and interfaces although they are somewhat different from each other. For example, all word processors have similar functions and user interfaces. As being shown by previous studies the experiences positively influence the relationship between attitude toward and intention of using

the system (Gefen et al. 2003; Karahanna et al. 1999; Tayler & Todd 1995). This means that habitual users, who are believed to have rich experiences of a current system, have sufficient familiarity and expertise to evaluate the usefulness and ease of use of new systems.

Hypothesis 2: The strength of habit in relation to the current system may positively influence the relationship between perceived usefulness and intention of a new system.

Hypothesis 3: The strength of habit in relation to the current system may positively influence the relationship between perceived easy-of-use and intention of a new system.

The hypotheses can be represented as a research model as shown in Figure 1. In addition to three hypotheses, three relationships about a new system (usefulness – intention, ease-of-use – intention, and ease-of-use – usefulness) in the research model were not suggested by hypotheses since they were not only suggested but also tested so many times in TAM related other studies.



**Figure 1** Research Model

### 3. Method and Data Analysis

For the empirical validation of the research model, the acceptance of Google Docs, which is a clouding computing based word processor or suite, was surveyed. The subjects were 208 undergraduate students in Daegu, Korea. They (male; 111, female; 97) had enough experience of more than one specific word-processor or suite, but did not have any experience in Google Docs. Before the survey, Google Docs was simply introduced by an explanation of the main features including not only how to use it (it is very similar to the other common word-processors or suites) but also some different functions such as cooperation with other users and file management on the Internet. For all participants, the strength of the habit for the word-processor that they had mostly used was measured by the Self-Report Habit Index (SRHI) which evaluated lack of awareness, difficulty in control and mental efficiency, and repetition (Verplanken &

Orbel, 2003). Usefulness, ease-of-use and intention for a new system, Google Docs, were measured by the items from previous studies (Davis 1989; Davis et al. 1989). Data analysis was conducted via the partial least squares (PLS) method. Before testing the hypotheses, the psychometric properties of all scales were evaluated. As shown in Table 1, the scores of average variance extracted (AVE) and composite reliability (CR) for all constructs were greater than 0.5 and 0.8, and the square roots of all AVE were greater than correlations of each constructs. Moreover, as shown in Table 2, each item's loading in corresponding construct is greater than others. Thus the scales adopted in this study have convergent and discriminant validity.

**Table 1 Psychometric Properties**

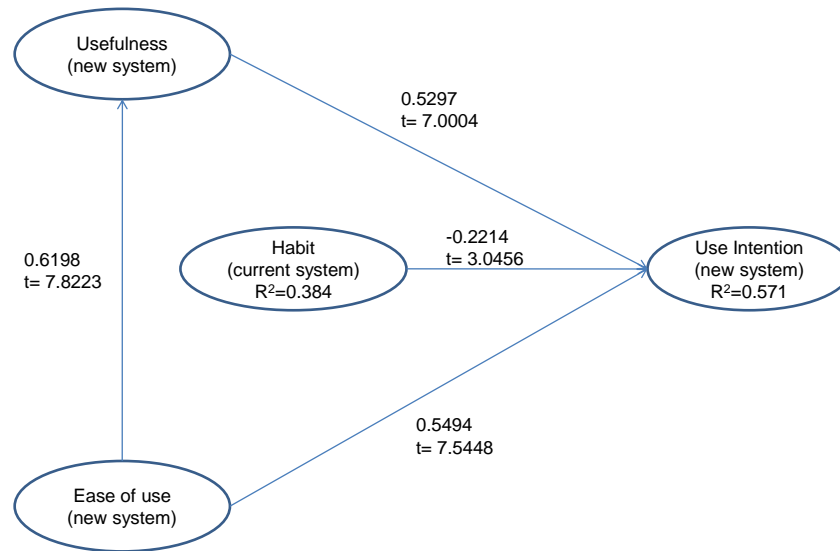
	AVE	CR	Habit	Intention	Ease of Use	Usefulness
Habit	0.5620	0.8992	0.749667	0	0	0
Intention	0.8775	0.9663	-0.3294	0.93675	0	0
Ease of Use	0.7497	0.9472	-0.1521	0.5846	0.865852	0
Usefulness	0.7304	0.942	-0.1423	0.6987	0.6156	0.854634

\* The shaded area in diagnosis: the square root of AVE for each construct

**Table 2 Loadings and Cross Loadings**

	Habit	Intention	Ease of Use	Usefulness
HA1	0.6623	-0.0216	0.0357	0.0414
HA2	0.7181	-0.1129	-0.0037	0.0068
HA3	0.7484	-0.1214	-0.0541	-0.0122
HA4	0.7642	-0.1587	-0.0421	-0.0319
HA5	0.765	-0.3772	-0.2575	-0.2125
HA6	0.8724	-0.3303	-0.1062	-0.1368
HA7	0.6996	-0.1174	-0.0161	-0.0619
INT1	-0.3152	0.9346	0.5378	0.678
INT2	-0.3409	0.9412	0.5161	0.6323
INT3	-0.2918	0.9535	0.5474	0.676
INT4	-0.2867	0.9173	0.5894	0.6303
EU1	-0.0973	0.4964	0.7971	0.5463
EU2	-0.1113	0.465	0.8212	0.6135
EU3	-0.1623	0.4585	0.8785	0.5057
EU4	-0.0909	0.4085	0.8764	0.4306
EU5	-0.1576	0.5232	0.9015	0.4745
EU6	-0.1576	0.632	0.9143	0.6021
PU1	-0.0507	0.5627	0.551	0.8727
PU2	-0.0511	0.5101	0.4898	0.8571
PU3	-0.0926	0.5342	0.4637	0.8766
PU4	-0.1553	0.6017	0.4566	0.8549
PU5	-0.1764	0.6161	0.5197	0.8387
PU6	-0.173	0.7082	0.6385	0.8267

As shown in Figure 2,  $R^2$  values for intention and usefulness of using a new system were shown to be 0.384 and 0.571 respectively and relationships in TAM were supported with significance level of less than 0.01, which were expected in TAM. The path coefficient of habit (current used system) – intention (new system) was shown to be -0.2214 (t-value = 3.0456), which was supported with significance level of less than 0.01.



**Figure 2 Path Analysis**

Hypothesis 2 and 3, which required the analysis of moderation effects, were tested by moderated multiple regression (MMR) (Carte & Russell, 2003). As shown in Table 3, in the case of the relationship between usefulness and intention,  $R_m^2$ , which is for the model adding the product scale of usefulness and habit, was shown to be 0.567, and  $R_a^2$ , which is the value of  $R^2$  for the model including usefulness and habit, was 0.542. Thus, the value of F for the difference between  $R_a^2$  and  $R_m^2$  was 9.122, which was supported at the significance level of less than 0.01. Thus, hypothesis 2 was supported. Similarly, the case of ease-of-use and intention was shown to be  $R_a^2$  as 0.402 and  $R_m^2$  as 0.442 and F value was 11.326, which was also supported at the significance level of less than 0.01. Thus, hypothesis 3 was also supported.

**Table 3 Analysis of Moderation Effects**

	Usefulness-Intention	Ease of Use -Intention
$R_m^2$	0.567	0.442
$R_a^2$	0.542	0.402
$\Delta R^2$	0.025	0.04
F*	9.122**	11.326**

$$*F = F_{(df_m - df_a, N - df_m - 1)} = \frac{\Delta R^2 / (df_m - df_a)}{(1 - R_m^2) / (N - df_m - 1)}$$

\*\* : supported with significance level < 0.01

## 4. Conclusion

The objective of this study was to identify and analyze the two contradicted effects of the habits in a current used system on the acceptance of a new system. The first one is lock-in to a current used system, which negatively influence the intention of using a new system. The second one is familiarity and expertise for a new system, which positively influence two relationships in the acceptance of a new system: usefulness – intention and ease-of-use – intention. For the validation of the hypotheses, 208 university students in Korea, who have enough experiences of word processors, were surveyed for the acceptance of Google Docs. The analysis of data from the survey showed all the hypotheses were supported with relatively low significance level. The principal contribution of this study was to analyze the effects of the habit of a current used system on the acceptance of a new system while the previous studies for habit in IS use were focused on one system (Kim, 2009; Kim and Malhotra, 2005; Limayem et al, 2007). Moreover, this study showed two contradicted effects. Generally, the habit of a behavior inhibits the activation of the other behaviors which have similar features. However, this study showed that the habits of the current used system may lead to the rich experiences for similar system, which positively influence on the acceptance of a new system.

One of the reasons for the contrary results to generality is that the rapid progresses of IT which resulted in more diverse functions with more easily accessibility. At least in a view of user, such progress provided most users familiarity and expertise with any systems. In addition, in order to survive in markets, system designers have tried to eliminate switching costs by various means such as obeying the standards for user interfaces and improving the functions for the transformation of files from different systems.

The positive impact of habits in a current system may imply that many systems would be complements rather than substitutes. Habits may not easily change (Kim 2009; Myers 2007). Thus, the acceptance of the new system would not mean that only new system would be used instead of the current system which has been habitually used, but rather both the new system and the current system would be concurrently used

In spite of the implications, this study had limitations. First, the sample which was collected from university students may have statistical biases. Although university students were included in one of the most important users, the other users such as workers in offices may not be properly explained. Second, the target system, word processor, was one of utilitarian systems which have instrumental values so that there may be some limitations for explaining hedonic systems, which have self-fulfilling values such as online games (van der Heijden 2004).

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