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Perceptions of Sunk Cost and Habitual IS Use

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ABSTRACT

As technology use becomes more ubiquitous, systems that are able to bypass users' *intentional* behaviors through the creation of *automatized,* or habitual behaviors, are tapping into a potentially powerful aspect of the human psyche. This study contributes to both sunk cost theory and technology continuance research by examining the relationship between the drivers of habit and habitual IS use, and how perceptions of sunk costs play a mediating role in this relationship. Through the conceptual development of an habitual IS use model, the technology-enabled features which contribute to stickiness and encourage the formation of habitual IS use behaviors are explored. This research in progress contributes to the IS usage literature by focusing on automatic use that is non-work related.

Keywords

Habit, Stickiness, Sunk Cost, Continuance, Automatic Behavior

INTRODUCTION

Habitual technology users represent an underexplored type of technology user. To date, little research has focused on the phenomenon of habitual information systems (IS) use. Much of the current IS usage literature and research has focused on the intentional acceptance and intentional use of technologies, as acceptance and use have been deemed appropriate measures for system success (Davis, Bagozzi, and Warshaw, 1989; Venkatesh, Morris, Davis and Davis, 2003). As technology use becomes more ubiquitous, systems that are able to bypass a users' *intentional* behaviors through the creation of *automatized,* or habitual behaviors, are tapping into a potentially powerful aspect of the human psyche.

To stay competitive, companies strive for stickiness. They want customers or users that visit their website or use their product or service to visit often and stay for long time during each visit. Arguably technologies that have this stickiness factor such as Facebook, Farmville, Netflix, Pandora, LinkedIn, Twitter, and even Angry Birds rely on habitual technology users for their success. Industry estimates for consulting firms that help companies develop aspects which increase stickiness foresee revenues totaling $1.6 billion by 2015 (MacMillan 2011).

Despite the powerful practical implications for business, habitual IS use is an understudied concept in the IS continuance literature. Our purpose in this research is to explore how technology can influence and manipulate user experiences in such a way that an automatized behavior results. In our conceptual development of an habitual IS use model, the technology-enabled features which contribute to stickiness and encourage the formation of habitual IS use behaviors are explored. Further, we explore how the user's perceptions of sunk costs (e.g., time spent previously with the technology, the effort spent learning the technology, effort spent customizing the experience, money spent on the technology) influences habitual IS use. Our primary research question is *how do perceptions of sunk costs influence the relationship between these technology-enabled features and habitual IS use?* Identifying and understanding the technology-enabled drivers of habit, or technological features which impact a user's automatic and habitual use, will contribute to our understanding of habitual IS use.

THEORETICAL DEVELOPMENT

Figure 1 represents our conceptual model. The technology-enabled drivers of habit are mediated and strengthened by a user's perceptions of sunk costs, which contribute to habitual use. Next, we will review the literature on IS continuance that informs our conceptual model.

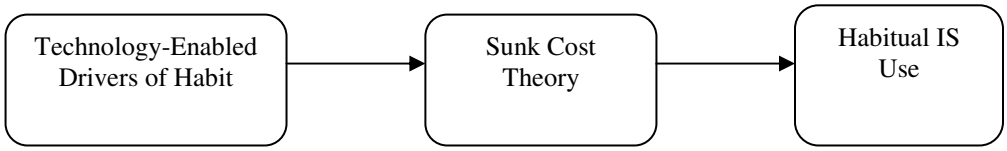

Figure 1. Conceptual Model of Habitual IS Use

IS continuance can be broken down into two different perspectives. First, there is continuance which is mandatory such as daily use of an IS that is required as part your job. There is also use which is voluntary such as use of technology for entertainment or enjoyment or any non-mandated reason. Our focus is on IS continuance as it pertains to voluntary technologies. More specifically, we focus on the users' automatic habitual use of these volitional technologies.

Viewing IS continuance in this light has several important implications. First, the focus on what drives successful IS continuance can shift from an individual and end-user centric view to a more design oriented view. During the initial design of a technology, certain functionalities can be purposefully incorporated to guide a user's experience to habitual IS use. By shifting the focus to the design of the system, we begin to focus on variables that can readily be accessed, changed, removed and manipulated to ensure continued use. This point also reflects the current push for information systems research that is design science oriented (Hevner, March, Park and Ram, 2004). Second, automatic IS continuance extends extant conceptualizations of IS continuance that assume continuance is an intentional behavior thus leading to our conceptualization of habitual IS use.

The dependent variable in this study is habitual IS use. Habit in the context of information technology usage is defined as the extent to which people tend to perform behaviors (use IS) automatically because of learning (Limayem and Hirt, 2007). This development which incorporates habit as a moderator of the influence of intention posits that conscious intent to continue to use decreases when IS use behavior becomes habitual. Habitual IS use behavior is conceptualized as repeated behavioral sequences automatically triggered by environmental cues (de Guinea and Markus, 2009). Therefore, we conceptualize habitual IS use as use that is not driven by a conscious decision to continue to use an IS and not guided by an individual's purposeful intentions. One example of this is the Blackberry user whose email checking has become so habitual that a simple buzz of the phone instigates the automatic behavioral sequence of taking out the phone to check the message. To further understand why individuals are so prone to habitual use behaviors we turn to the IS usage literature and IS continuance literature to gain insight on possible factors that bypass individual intentions but still directly affect individual behaviors.

Most IS usage literature has built on the foundation of individual users' behavioral reactions to the use of technology. In this regard IS use is generally seen as an intentional behavior, specifically behaviors caused by beliefs about technology and behaviors which are affective responses to technology. One of the most prominent theoretical perspectives in this stream of research is the Technology Acceptance Model (TAM) first proposed in 1989 (Davis, Bagozzi, and Warshaw, 1989; Venkatesh and Davis, 1996). TAM's focus is generally surrounding the beliefs a user holds about the perceived usefulness of a technology and the perceived ease of use of the technology. These two key belief constructs have been repeatedly shown to influence users' behavioral intention to use a technology. A variety of acceptance models have been modeled in this regard, with beliefs informing the user of the outcomes of use, thereby influencing their behavioral intent.

In an effort to combine and synthesize the various research and models proposed in MIS literature, Venkatesh, Morris, Davis and Davis (2003) offered the Unified Theory of Acceptance and Use of Technology (UTAUT). In this theory, the authors assessed the similarities and differences of eight competing technology acceptance models, and developed and validated this all encompassing model of acceptance and use. The UTAUT was shown to significantly outperform the competing models, namely: The Technology Acceptance Model, The Theory of Planned Behavior, The Model of PC Utilization, The Innovation Diffusion Theory and The Social Cognitive Theory (Venkatesh et al., 2003).

From the development of UTAUT and other acceptance models we begin to see a shift in focus from literature on IS acceptance to literature on IS continuance. While the focus of the continuance research goes beyond initial adoption and

acceptance of a technology, IS continuance research has grounded itself on the concepts and constructs of IS acceptance. IS continuance is seen as a series of intentional decisions to continue using information systems and technology (Bhattacherjee, 2001). These decisions occur at the level of the individual and stem from a users perception of the ease of use of the information system or technology, and the usefulness of the system or technology. If the users' expectations, which arise from their perceptions and beliefs about using the technology are confirmed they will feel satisfied and they will choose to continue using the technology (Bhattacherjee, 2001; Venkatesh, Brown, Maruping and Bala, 2008). Heightened perceptions of usefulness and satisfaction have been shown to increase intentional IT continuance.

One recent development that can be noted in the literature is the concept that IS continuance is not simply bound by notions of intentional behavior. Recent research has begun to shift focus from intentional action to automatic action by incorporating the concept of habit. Limayen, Hirt and Cheung (2007) developed a model suggesting that continued IS usage is not only a consequence of intention, but also of habit. By integrating past research on habit and IS continuance they further suggested that the antecedents of behavioral intent were related to the drivers of habitualization. Satisfaction and frequency of use were found to be related to habit. Similarly, de Guinea and Markus (2009) reviewed current IS literature regarding continuance and blended the general consensus views from the literature with several other key findings concerning habitualization presented in various psychology research studies. Their assessment provided an alternative view that continuing IS use may be far less intentional and far more automatic than the IS literature would lead one to presume.

Expanding and extending the current theoretical perspectives of IS continuance beyond the limitations of intentional behavior has important implications for our current understanding of why users of particular technologies persist in their use. Moving past intentions allows for an exploration and understanding of behaviors that are automatic in nature. These automatic behaviors or habits are conditioned responses to some sort of stimulus and represent a very powerful psychological association. The associations with habit are represented in learning and memory systems separately from intentions (Wood, Tam and Witt, 2005). Behavior prediction research shows that habitual behaviors are repeated relatively independently from cognitive intentions and normative beliefs (Ouellette and Wood, 1998).

Satisfaction

Satisfaction has been demonstrated to have influence not only on continuance intentions (Bhattacherjee, 2001), but also on habit (Limayem et al., 2007). We view satisfaction as positive emotions of pleasure and satiety resulting from the interaction and use of technology. We believe that the satisfaction a user derives from a voluntary-use technology will contribute to the formation of automatized behaviors. Thus follows our first hypothesis:

H1: *Satisfaction will be positively associated with habitual IS use*

Facilitating Conditions

Once technology use becomes habitual, the mere presence of the technology is stimulus enough to trigger automatic use behaviors whether we realize it or not. This association may be the reason why facilitating conditions have not been found to affect behavioral intention while still influencing actual use (Venkatesh et al., 2003). This coincides with research that has used facilitating conditions as an antecedent to IS use (Thompson, Higgins and Howell, 1991). In support of this Venkatesh et al. (2003) found facilitating conditions to have a direct effect on actual use when developing the UTAUT model, meaning that having strong facilitating conditions (i.e., the presence of technology) directly contributes to technology use. Thus, we believe that facilitating conditions of the technology will have an impact on the habitual use of that technology. Our second hypothesis is:

H2: *Facilitating Conditions are positively associated with habitual IS use*

Technology-enabled reinforcement

One central component to the development of strong habits is the relationship between the behavior and the ensuing reinforcement or reward. Hull's Stimulus Response Theory (1943) demonstrates that the strength of a habit is reflected in the extent to which the behavior has been reinforced in the past. Positive reinforcement occurs when a behavior is followed by a rewarding stimulus thereby increasing the frequency of that behavior. Negative reinforcement occurs when a behavior is followed by the removal of an aversive stimulus, thereby increasing the frequency of behavior. Research in the area of habit formation has shown that feedback in the form of positive or negative reinforcement has a compounding effect on the strength and frequency of habitual behaviors (Dahlstrand and Biel, 1997). In similar fashion the immediacy of the feedback can further strengthen the development of a habit.

If a technology is able to create stimuli to trigger a sense of urgency for use which is followed by a feedback mechanism that rewards the behavior, then habitual use patterns should be strengthened. In addition the more immediate the need is felt and

the more immediate the reward, the stronger the habit use will become. We propose that the use of technology resulting from a sense of urgency which is then followed by an immediate reward will directly contribute to the habitual and automatic use of the technology. This leads us to our next hypothesis:

H3: *The technology-enabled reinforcement is positively associated with habitual IS use*

Frequency of use

Embedded in the notion of habitual IS use is the frequency with which a behavior (IS use) is performed (Bagozzi and Warshaw, 1990). Frequency of use is operationalized as the frequency of prior use of a technology. The higher the frequency, the more likely the behavior will become habitual. This variable has been empirically shown to influence habit (Limayem et al., 2007). Thus we anticipate that the frequency with which a technology is used will enable the formation of habitual use behaviors. This leads to our fourth hypothesis:

H4: The frequency of use is positively associated with habitual IS use

Perceptions of sunk costs

Beyond the technology-enabled features, we believe that a user's perceptions of their irretrievable costs such as time and effort spent with the technology will further strengthen the relationship between the antecedents of habit and the habitual use of technology. Sunk cost theory provides a lens to understand the effect of these irretrievable costs on a user's behavior. The sunk cost effect is manifested in a greater tendency to continue an endeavor once an investment in money, effort, or time has been made (Arkes and Blumer, 1985). The main argument presented in this theory is that the prior investment which is motivating the present decision to continue does so despite the fact that it objectively should not influence the decision. Rationally we should not consider the previously expended money, time, or effort we have put into the use of a technology when we are considering whether or not to continue using the technology. However, past interactions with a technology have been shown to influence the future continued use of the technology (Al-Natour and Benbasat, 2009).

Our expended time and efforts (in finding and building our friends on Facebook, our followers on Twitter, our playlists on Pandora, our ratings on Netflix, our farm on Farmville or mafia on Mafia Wars, or our connections on LinkedIn) should not influence our continued use. However, sunk cost theory suggests that this is not always the case. Tiwana and Bush (2005) developed an expertise-sharing network continuance model which demonstrates how certain factors that emerge through irretrievable investments by individual users after initial adoption influence continuance. Our perceptions of the investment we have made in the use of technology will likely influence our habitual use of the technology. These perceptions demonstrate that we have somehow contributed time, energy, resources, efforts or even money into the technology we are using. Because of our perceptions of this investment, we feel compelled to continue using whatever we have sunk this investment into (Staw and Hoang, 1995; Tiwana and Bush, 2005). Similarly, we propose that a user's perception of sunk costs will play a mediating role with the formation of habitual use behaviors. This leads to our final set of hypotheses:

H5: *An increase in satisfaction increases habitual IS use because it increases the user's perceptions of sunk costs.*

H6: An increase in facilitating conditions increases habitual IS use because it increases the user's perceptions of sunk costs.

H7: An increase in technology-enabled reinforcement increases habitual IS use because it increases the user's perceptions of sunk costs.

H8: An increase in frequency of use increases habitual IS use because it increases the user's perceptions of sunk costs.

Figure 2 gives our research model and hypothesized relationships.

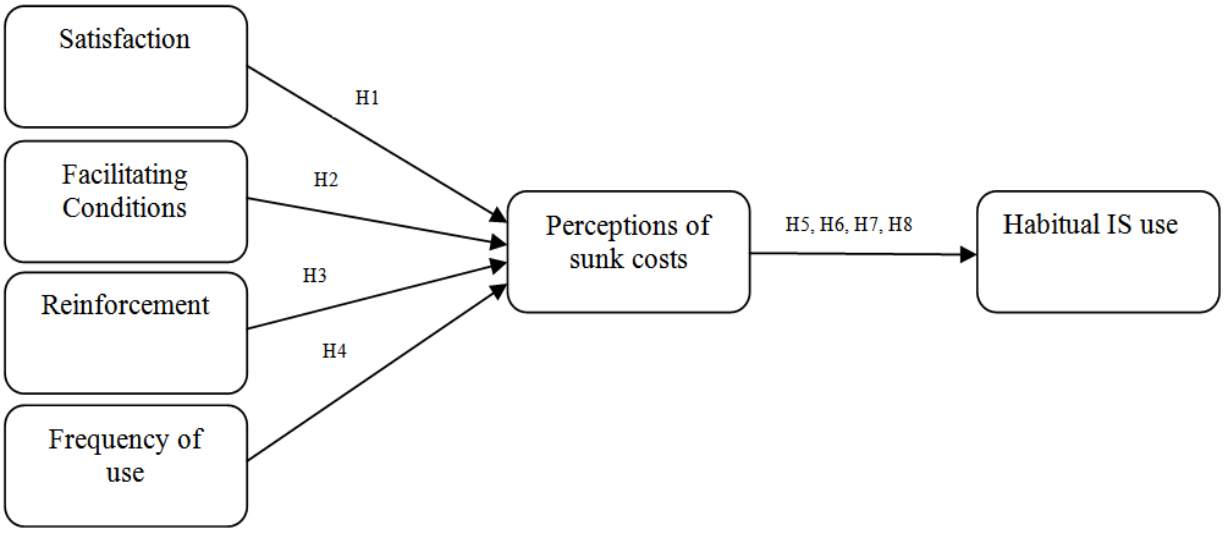

Figure 2. Research Model

Table 1 summarizes the definitions and representative citations for the constructs in our research model. The variables identified as technology-enabled drivers of habit are: satisfaction, facilitating conditions, reinforcement, and frequency of use. The mediating construct we have identified is perceptions of sunk costs. Habitual IS Use is the dependent variable.

Constructs	**Definitions**	**Representitive Citations**
Satisfaction	Positive emotions of pleasure and satiety resulting from the interaction and use of technology	(Bhattacherjee, 2001; Venkatesh et al., 2008)
Facilitating Conditions	Conditions present in either the technology or the environment which enable and facilitate the use of the technology	(Venkatesh et al., 2003)
Reinforcement	Feelings of urgency towards the use of a technology, coupled with immediate positive or negative behavioral reward	(Dahlstrand and Biel, 1997)
Frequency of Use	Frequency of prior interaction with a technology	(Bagozzi and Warshaw, 1990; Limayem et al., 2007)
Perceptions of Sunk Costs	Perceptions of previous investment (money, time, or effort) spent on a technology	(Arkes and Blumer, 1985)
Habitual IS Use	The automatic and repeated use of a technology, triggered by environmental cues	(Limayem et al., 2007; de Guinea and Markus, 2009)

Table 1. Construct Definitions

PROPOSED RESEARCH APPROACH

We anticipate that our proposed research model will be suitable for survey data collection and empirical testing using a cross sectional or longitudinal research design. We anticipate using a web-based survey to collect data on users of voluntary-use systems (e.g., Facebook). The target population for this study is all individuals using voluntary technologies outside of the

context of employment. We anticipate that graduate and undergraduate students will represent a valid sample population to test our hypotheses for two reasons. First, student users of systems such as Facebook are individuals using a technology of their own volition and not in the context of their job. Second, users of systems such as Facebook are exposed to a variety of mechanisms designed to engage users by creating stickiness around the user experience.

To explore and test the proposed hypotheses a survey instrument will be developed by adapting existing measures where possible (See Table 2). The proposed constructs of facilitating conditions, reinforcement, and perceptions of sunk costs will require additional validation and testing since new measures are being developed. Following full measurement and scale development a pilot test will be conducted to ensure both face validity and content validity. Following pilot testing a pretest will be done on the full instrument. Assuming satisfactory reliability and validity results from the pretest, we will proceed with full data collection from our sample population.

Measures

Table 2 contains the proposed measures for our model. Where possible we have adapted measures from existing literature as well as drawing on relevant literature as we develop new measures.

Constructs	**Items**	**Adapted from**
Satisfaction	1. Very Dissatisfied to Very Satisfied 2. Very Displeased to Very Pleased 3. Very Frustrated to Very Contented 4. Absolutely Terrible to Absolutely Delighted	(Bhattacherjee, 2001)
Facilitating Conditions	1. I have the resources necessary to use this technology 2. I have the knowledge necessary to use this technology 3. The system is not compatible with other systems I use 4. A specific person (or group) is available for assistance with system difficulties (Newly developed items to be validated) 5. My use of this technology is restricted to one single computer 6. This technology is available to me on multiple technology devices 7. This technology is compatible with multiple system technologies 8. I have to be at my work to use this technology 9. I am able to access this technology from multiple locations	(Thompson et al., 1991; Venkatesh et al., 2003,)
Reinforcement	(Newly developed items to be validated) 1. This technology has a way of prompting me to use it 2. I often feel a sense of urgency to use this technology 3. I am able to remove or block annoyances produced by this technology 4. This technology has a way of rewarding me for using it 5. This technology provides me with feedback 6. I feel I get something out of using this technology 7. This technology lets me know when there is information for me	
Frequency of Use	1. Today: Very many times to Not at all 2. This week: Very many times to Not at all 3. This month: Very many times to Not at all	(Bagozzi and Warshaw, 1990)
Perceptions of Sunk Costs	(Newly developed items to be validated) 1. I feel like I have some sort of investment with this technology 2. I feel I have spent a great deal of time using this technology 3. I am too invested in this technology to switch to the competition 4. I am aware of the effort I have put into using this technology 5. I feel I have spent a great deal of energy using this technology	(Tiwana and Bush, 2005)
Habitual IS Use	1. Using this technology has become automatic to me 2. Using this technology is natural to me 3. Using this technology is an obvious choice for me	(Limayem et al., 2007; Oullette and Woods, 1998)

	4. Using this technology has become a habit for me 5. I normally use this technology without explicitly planning to do so 6. Using this technology is a habitual act 7. It is a habit of mine to use this technology 8. I use this technology as a matter of habit	

Table 2. Proposed Measures

LIMITATIONS

This study has several possible limitations. Since our focus is on volitional technologies that used outside of the context of a person's job, our findings may not generalize to volitional technologies used in other settings such as work or school as the factors that contribute to the habitual use of work related systems may differ. Future research should explore habitual IS use in a work setting and look specifically at the context specific factors which may affect automatized work behaviors. Another possible limitation of this study is the age of the sample. A technology proficient college student may differ from other groups in motivation to use a volitional technology as well as time available to use one. Another limitation of this study is the focus on habitual use. While we identify possible technology-enabled drivers of habitual IS use, we do not include factors that may deter habitual use.

CONCLUSION

IS use research has been extensive, and has been able to explain a significant amount of the variation in IS acceptance, adoption and continuance. The majority of this research has focused on technologies we intentionally use in a work type setting. This research in progress contributes to this IS usage literature by focusing on automatic use that is non-work related. More technology use today occurs outside the realm of one's employment, and this study contributes understanding to this new type of technology use.

In addition, we anticipate that this research will contribute to our current understanding of IS continuance by extending current IS continuance theoretical perspectives with the inclusion of automatic behaviors. Current research has limited inclusion of use behaviors that are automatic and habitual; rather it has focused on intentional, purposeful behaviors.

Finally, this research will also contribute to our understanding of the role of perceptions of sunk costs on IS usage. This study examines how technology-enabled features can influence a user's perceptions of their sunk costs in an information systems and technology context.

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