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The Role of Habit in Post-Adoption Switching of Personal Information Technologies: A Push, Pull and Mooring Model

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Abstract

In recent years, information technologies have broken outside the confinement of business organizations and entered the daily lives of individual users. Unlike users of workplace technologies, users of personal technologies are not bound to specific products by organization mandates, and have the freedom to switch from one product to another that offers similar functionalities and satisfies the same need. In this paper, we approach technology switching as a special form of post-adoption user behavior and propose a comprehensive model that explains post-adoption technology switching. Post-adoption use is usually a highly routinized behavior, and switching to alternative products typically involves interruption of well-formed routines. Therefore, we draw from the social psychology and post-adoption user behavior literature, and argue that habit impacts switching intention and behavior independent of reasoned influences. Furthermore, we apply the push-pull-mooring paradigm from human migration and customer switching literature, and incorporate three sources of reasoned influences: push, pull, and mooring factors. The main contribution of this article is improving our understanding of post-adoption technology switching, valuable to both researchers and practitioners.

Keywords: IT use, Post-adoption behavior, User switching, Habit

Introduction

There has been a vast amount of knowledge accumulation on user adoption of technologies, especially, workplace technologies (e.g., Davis 1989; Venkatesh et al. 2003). With the markets for many business applications matured in recent years, however, many technology providers have turned their attention to personal technologies such as video games, mp3 players, PDA phones, or web search engines for their revenue growth and R&D spending (Hertzberg 2007). Personal technologies such as instant messaging often find their way into corporate IT environment as their popularity increase (Dornan 2006; The Economist, 2006, Perelman 2007). Personal technologies differ from traditional business technologies in many ways. For any given technology, there are typically more than one highly similar and substitutable product offerings in the marketplace. Users are free to choose the product they favor the most; and they can easily upgrade, abandon, or switch from one product to a substitute. Consequently, individual users frequently face the decision to choose between alternatives with similar features and functionalities. Such individual usage behavior has profound implications on how organizations position their products in a highly competitive marketplace.

Take the web browser for example. Between October 2004 and April 2007, the market share of Microsoft Internet Explorer (IE) dropped from 92% to 78%, while the market share of Mozilla Firefox, an open source alternative to IE that offers very similar functionality, increased from 2% to 15% (Net Applications 2007). This indicates that a large number of IE users have switched to Firefox during this time period. Which browser users chose to use has a significant impact on the market of other highly profitable services such as search engines. Like web browsers, the competitive landscapes of many personal technologies are characterized by products with lowering or zero price, low differentiation, and high substitutability. It is crucial from the technology providers' perspective to understand the drivers of user switching behavior between technology products. From IT using firms' perspective, as noted above, many personal information technologies have also become common fixtures of organizational systems.

While the issue of user switching between technology products has obvious practical implications, as a generally unexplored form of post-adoption behavior, technology user switching also has its theoretical

significance to IS scholars. Technology adoption has been one of the central issues in the IS literature. However, without continued usage, initial adoption of a technology is necessary but not sufficient for its benefits to materialize (Bhattacharjee 2001; Devaraj and Kohli 2003). Therefore, there has been growing interests in studying factors influencing technology users' post-adoption usage (e.g., Parthasarathy and Bhattacharjee 1998). Some researchers have also challenged the prevalent view of usage as a one-dimensional construct, and attempted to explore the multi-faceted nature of usage of IT products (e.g., Jaspersen et al. 2005). However, to date there has been few studies that investigated technology users' post-adoption switching behavior (Ye et al. 2006). To address this deficit, the present research draws from several relevant literature streams and proposes a theoretical model that explains the different sources of influence on post-adoption user switching between highly similar technology substitutes.

Literature Review

There are a few streams of literature that provide key insights regarding technology users' post-adoption switching behavior, including post-adoption user behavior studies in the IS literature; consumer switching behavior in the marketing literature; and studies on behavior prediction in social psychology. These literature streams are discussed in the following sections.

Post-Adoption IT User Behavior

User adoption and acceptance of technology innovations have interested IS scholars for decades (e.g., Moore and Benbasat 1991; Venkatesh et al. 2002). While initial adoption is undeniably a crucial step toward overall IS success, recently, researchers have recognized that successful adoption does not always lead to sustained usage (e.g., Bhattacharjee 2001), and it is necessary to pay attention to the issue of post-adoption user behavior (e.g., Parthasarathy and Bhattacharjee 1998; Bhattacharjee 2001). There has been a steadily growing body of research that addresses specifically post-adoption user behavior. Early post-adoption studies typically considered post-adoption behavior as the equivalent of continued use, and focused on what motivate users' continued use after initial adoption. While continuance was used as the key dependent variable in post-adoption, the independent variables often came from IT adoption literature (e.g., Agarwal

and Prasad 1997). These early studies, however, have revealed a general lack of predicting power of pre-adoption beliefs on post-adoption use (e.g., Karahanna et al. 1999), and suggested that post-adoption usage should be treated as an independent issue, rather than as a mere continuation of the initial adoption.

Recently, IS researchers have started to differentiate post-adoption behavior from initial adoption. Several studies have attempted to improve our prediction of continued use by taking into consideration factors such as actual usage (e.g., Speier and Venkatesh 2002; Kim and Malhotra 2005), satisfaction (e.g., Bhattacharjee 2001), and habit (e.g., Jasperson et al. 2005, Limayem et al. 2007), all of which emerged in significance only after users have gained usage experience,

While continued use is often viewed as the equivalent of post-adoption behavior, some researchers have sought for a deeper understanding of post-adoption usage beyond the typical one-dimensional view of technology use. Kettinger and Grover (1997) identified four different types of technology use: task use, social/entertainment use, broadcast use, and other use. Ahuja and Thatcher (2005) introduced another dependent variable - trying to innovate with IT as a form of post-adoption behavior. Jasperson et al. (2005) suggested that we should move below the product level of analysis, and attempt to explore individuals' post-adoption behavior at the feature level, so we can have a better understanding of how users exploit and extend the product's features in their use. Lending empirical support to Jasperson et al.'s suggestions, Desouza et al. (2007) found that as users gain experience and sophistication in using a technology post-adoption, they will personalize, customize, and innovate with the technology depending on their specific needs.

These studies suggested that there are more to the dynamics of user interactions with a technology innovation than what is captured by the one dimensional view of usage. Therefore, we must move beyond the typical user vs. non-user dichotomy and explore the intricacies of technology usage. It is imperative for us to look at not only *whether* users continue to use a technology after the initial adoption, but also *how* users use, and how these mechanisms would play out and modify technology usage patterns over time. In this study, we will address a specific post adoption usage behavior that deserves our attention – user switching between highly similar technology substitutes.

Post-Adoption User Switching Behavior

In most of the existing studies on post-adoption user behavior, users' decision to continue using an *innovation* and the decision to continue using a specific technology *product* is usually treated as one and the same. Such treatment relies on the implicit assumption that the specific technology product is the only representative of the innovation under investigation, and there is no alternative product available to the users. This is a reasonable assumption under the organizational field settings most of these studies were conducted. However, for many personal technologies, there are often multiple products that are similar in functionality, highly substitutable, and directly competing with each other. A user's decision to discontinue the usage of a specific product does not necessarily imply a decision to discontinue the usage of an innovation, because she could easily switch to a substitute product that offers similar functions.

To illustrate the difference between discontinuance of using an innovation and user switching between substitutable products, let us imagine a user who first heard about instant messaging and decided to start online chatting with her friends and family using AOL Messenger. She was satisfied with instant messaging as a communication tool, and gradually using instant messaging became part of her daily routine. Some point later she decided to use MSN Messenger as her new primary instant messaging client. In the mean time, she reduced or stopped using AOL Messenger. Her initial decision to use AOL Messenger is a typical case of technology adoption – she adopted instant messaging as a new communication technology. Her later decision to drop AOL Messenger might be viewed by some as a case of post-adoption discontinuance behavior. However, as Bhattacharjee (2001, pg 352) noted, continuance, or continued use, similar to what Cooper and Zmud (1990) refer to as “routinization”, or the “confirmation” stage described in innovation diffusion theory (Rogers, 2003), is “a post-acceptance stage when IS use transcends conscious behavior and becomes part of normal routine activity.” Therefore, the discontinuance of usage of an innovation would mean the opposite of continuance - the complete removal of an innovation from a user's routine activity. In this example, it would be considered a discontinuance behavior if at some point the user decide to abandon instant messaging as a communication tool and rely on other mediums such as email or

telephone to satisfy her communicating needs. Since our user terminated or reduced using AOL Messenger in favor of a substitute product with similar functionality - MSN Messenger, and *continued* her use of instant messaging as a communication tool, it should not be viewed as a discontinuance behavior. Her behavior represents a different form of post-adoption behavior - a switching behavior.

Given the theoretical and practical significance of technology user switching, it is interesting to note that little research effort has been invested on this issue. Among the only few empirical studies addressing technology user switching, Chen and Hitt (2002) conducted a firm level analysis on online brokers, and found that user switching between online brokers are influenced by both user usage patterns, and ease of use, quality, and breadth of offerings of their web sites. This study, however, relied on archival or secondary data such as click-streams, user logs, and aggregated user rankings, and did not evaluate the influences of users' beliefs and perceptions on their switching behavior at the individual level. Kim et al. (2006) verified that customer satisfaction, switching costs, and availability of attractive alternatives, three factors shown in the marketing literature as determinants of switching intention, also determine email service users' intention to switch. In a study on college students' switching from IE to Mozilla Firefox browser, Ye et al. (2006) found that switching behavior is influenced by individual user's breadth of use and satisfaction toward IE, and their perceptions on the ease of use, relative advantage, and security of Firefox as compared to IE. This study suggested that a user's decision to switch from an incumbent product to an alternative is influenced by beliefs and perceptions on both products involved. As noted by Ye et al. (2006), the user who has switched her primary instant messaging tool to MSN Messenger might still use Yahoo Messenger as a secondary tool. Therefore, Ye et al. (2006) defined technology user switching as "*users' termination or significant reduction in usage of one technology product while replacing it completely or in large part with an alternative product that satisfies identical needs.*" We adopt this definition in this paper.

Consumer Switching Behavior and the PPM Migration Model

Consumers' brand choice and switching behavior has been studied at length by marketing researchers (e.g., Keaveney 1995; Walters 1991). One stream in this literature has examined how marketing practices such as

advertisements, coupons, or price promotions affect product or brand substitution of frequently purchased consumer products (e.g., Dodson et al. 1978; Kumar and Leone 1988; Walters 1991). Another body of literature has studied how individual customers' perceptions, beliefs, attitudes, and personal differences influence their switching behavior between different providers for services ranging from banking (Ganesh et al. 2000) and credit cards (Burnham et al. 2003), to Internet Service Providers (Keaveney and Parthasarathy 2001) and mobile phones (Kim et al. 2004). Findings in this stream suggested that consumers are motivated or inhibited to switch under a variety of influences, including their perceptions and experience of the incumbent product or service, such as satisfaction (Bansal and Taylor 1999; Ganesh et al. 2000; Keaveney and Parthasarathy 2001; Burnham et al. 2003; Kim et al. 2004) and breadth of use (Keaveney and Parthasarathy 2001); their beliefs and attitudes on the switching itself, such as perceived switching costs (Burnham et al. 2003; Kim et al. 2004); and individual traits such as risk aversion (Ganesh et al. 2000; Keaveney and Parthasarathy 2001).

In a recent study, Bansal et al. (2005) attempted to build a unified model for explaining consumer service switching behavior. Drawing from the human migration (the switching of people from one locale to another) research in the geography literature, they proposed and tested a PPM (push, pull, and moorings) migration model for service switching. In this model, two second order latent factors – push effects and pull effects capture the collective force of perceptions and beliefs on the incumbent and alternative provider, respectively. Another latent factor – mooring effects represents the collective effects of situational and contextual constraints such as switching costs or subjective norms, and personal traits such as variety seeking. While push effects, pull effects and mooring effects were hypothesized to directly influence switching intention, mooring effects was also hypothesized to moderate the main effect of the other two second order factors. The proposed model was able to explain a substantial amount of variance in both switching intention and switching behavior (Bansal et al. 2005).

While marketing literature has provided us with some useful insights into the phenomena of consumer switching, they are not sufficient in explaining user switching between technology substitutes.

Research on brand switching typically focuses on products that are mainly differentiated in price and purchased repeatedly and frequently by the consumers. However, consumer technologies bears little resemblance to household items such as margarine and flour (Dodson et al. 1978), cake mix, frosting, and spaghetti (Walters 1991), or diapers (Kumar and Leone 1988) in their procurement and consumption. Therefore, how marketing practices such as store promotions influence consumers' product or brand substitution has limited implications on our understanding of technology users' switching behavior. Unlike services such as banking or insurance, the focus of research on service switching on the other hand, users of personal technologies do not always have to commit to ongoing relationships through subscriptions and contracts. Therefore, to fully understand technology user switching, a research issue where the IT artifact is clearly present, we also need to draw from past literature on technology user behavior and incorporate the factors that are salient and unique to technology products.

Reasoned Action and Habit

Studies on post-adoption user behavior in the IS literature and consumer switching in the marketing literature have generally built on the assumption that individual decision to perform a specific action is solely the results of deliberate reasoning. However, research in social psychology have revealed that social behaviors, especially, frequently repeated social behaviors are influenced by two competing mechanisms – a controlled or deliberate process, and an automatic or spontaneous process (e.g., Schneider and Shiffrin 1977; Fazio 1990). As the result of the automatic cognitive process, many frequently and repeatedly performed behaviors are guided as least partially by habits, as opposed to purely by reasoned influences (Wood et al. 2002).

The concept of habit was introduced in the early days of psychology (e.g., James 1890; Hull 1943). Currently, habit is defined as "...learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end states" (Verplanken and Aarts 1999, pg. 104). Given this definition, there are two key characteristics of a habit: its automatic performance without any conscious control, and its triggering by a stimulus cue in the environment. Therefore, for a given behavior,

the formation of habit is accomplished by achieving a level of automaticity through an associative learning process (Hull 1943).

To illustrate with an example, let us imagine a new employee who walked into her office in the morning for the first time. Facing with a list of different tasks to accomplish, she weighted the pros and cons of many different alternative actions, and decided to check her company email account first to see if there is anything requires her immediate attention. She found this action (checking her email when she comes into her office in the morning) to be a productive way to start her day at work, and would repeat it over and over. As time goes by, every morning she would walk into her office, sit down in front of her computer, and logon to her email account without even giving any thoughts on any other alternatives. In other words, a habit has formed, and walking into her office in the morning has become the stimulus cue that would lead her to the automatic behavior of email checking.

A large number of studies in social psychology and other applied fields have demonstrated the importance of habit through its interactions with intention and behavior, in a variety of social contexts ranging from seat-belt usage (Mittal 1988) to food consumptions (e.g., Mahon et al. 2006; Reinaerts et al. 2007; Kremers et al. 2007). Drawn from Triandis' (1977) theory that behavior is a function of the weighted influences of habit and intention, habit was predicted to have a direct impact on behavior independent of intention. Various studies have found empirical support for the independent effect of habit on behavior, especially, behavior performed frequently under stable contexts (e.g., Mittal 1988; Verplanken and Faes 1999; Saba and Vassallo 2000; Mahon et al. 2006; Reinaerts et al. 2007).

While many studies have mainly addressed habit's independent contribution to behavior, advances in both theoretical and empirical fronts have revealed that habit not only competes with intention in determining behavior, but also influence intention directly. The direct influence habit exerts on intention was proven under a wide range of circumstances (e.g., Saba and Vassallo 2000; Knussen et al. 2004; Honkanen et al. 2005; Mahon et al. 2006; De Pelsmacker and Janssens 2007).

One crucial point we should keep in mind in our understanding of the role of habit is that: habit guides intention and future behavior only when behavior has been habitualized. In other words, habit would

not matter if it can not, or has not been formed at the first place. The formation of habit requires a certain action to be performed repeatedly and frequently, in a fairly stable environment for a reasonable amount of time. Therefore, habit is mostly like to play a role in daily behaviors that are repeated frequently. Behaviors performed at high intervals, such as paying rent each month or celebrating anniversaries do not usually form habits despite the repetitive nature.

The importance of habit in understanding behavior has not escaped the attention from IS researchers (Thompson and Higgins 1991). Post-adoption behavior, by definition, implies the continued and repeated use of a specific technology after the initial adoption. Therefore, as technologies permeate average persons' daily lives, it is plausible that individuals' habits would influence how they adopt and use technologies. In recent years, several studies have incorporated habit as a factor that impact technology adoption and post-adoption IS usage (Thompson et al. 1994; Bergeron 1995; Gefen 2003; Limayem et al. 2003; Limayem and Hirt 2003; Kim et al. 2005; Liao et al. 2006; Limayem et al. 2007). Findings from these studies are consistent with conclusions from studies in other academic disciplines. Limayem and Hirt (2003), for instance, found habit to be antecedent to affect and actual IS usage. Similarly, Kim et al. (2005) found the effect of past use on future use of IT is better explained by habit. Limayem et al. (2007) also found stronger habit leads to diminished predictive power of IT continuance intention on continued usage.

Research Model and Propositions

Building on past research in relevant research streams, and with a goal to balance between predicting power and parsimony, we propose the research model as illustrated in Figure 1.

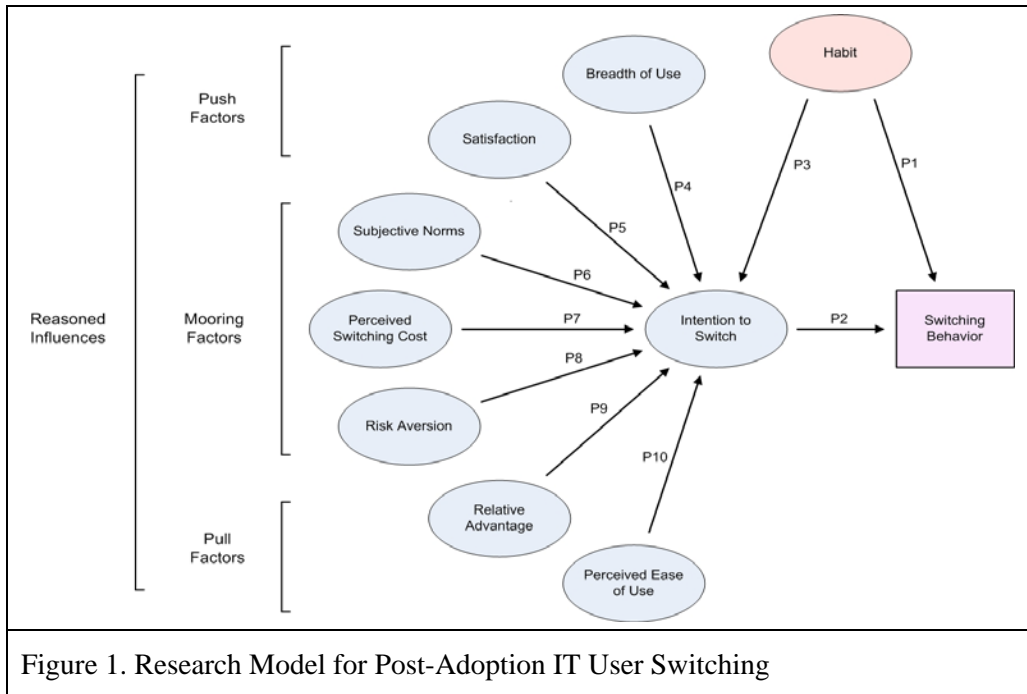


Figure 1. Research Model for Post-Adoption IT User Switching

Drawing from Bansal et al.'s (2005) PPM migration model for consumer switching, which was based on the PPM paradigm in human migration research, we group reasoned influences into to push, pull, and mooring factors. Two variables, breadth of use and satisfaction of the incumbent product, are incorporated as push factors. Two pull factors, relative advantage and perceived ease of use are included to embody the perceived advantages of the alternative product over the incumbent. In addition, subjective norms, perceived switching cost, and risk aversion are included as mooring factors (Jones et al. 2000; Bansal et al. 2005). In addition to reasoned influences, we also incorporated habit's impacts on intention and behavior in the model. The specific propositions will be discussed next.

Habit, Intention, and Behavior

The main reason habit has attracted scholarly interests in social psychology and other academic fields is because it interplays with reasoned influences in determining social behavior. Human actions are the results of not only controlled but also automatic mental processes. As emphasized by Fazio (1990): "Just as deliberate, planned behaviors sometimes may involve a process that includes automatic components, spontaneous behavior that typically follows from an automatic attitude activation occasionally may involve a controlled component" (pg. 100). Conceptually, habit is the embodiment of the automatic side of this dual

mode of human cognition (Ronis et al. 1989). According to Triandis' theory of behavior (1977), the probability a person actually perform an act is the sum of the strength of habit and intention, adjusted for their respective weight. When habit and intention are consistent, in other words, when a person's intended action matches her previous-formed habit, we are not likely to observe any notable difference between the effects of these two independent antecedents of behavior. However, when habit and intention are not in perfect harmony, for example, when a person intends to drink more water, but has a habit of grab a can of soda out of the refrigerator whenever he feels thirsty, behavior become an outcome of the ensuing tug-of-war between habit and intention. So at the individual level, when habit is strong, intention is more likely to be overpowered by habit; when habit is weak, behavior is more likely to follow intention resulted from reasoned deliberations. Regardless of how habit is operationalized, such relation among intention, habit and behavior has received abundant empirical support (e.g., Ouellette and Wood 1998; Saba and Vassallo 2000; Mahon et al. 2006; Verplanken 2006; Reinaerts et al. 2007).

Like eating, drinking, and traveling to work, the use of personal technologies such as instant messengers has become ingrained into many users' daily routines. The performance of these actions is often frequent and repetitive, providing the ideal ground for them to be habitualized. Therefore, as pointed out by Limayem et al.: "habit has great potential to explain IS related behaviors that may no longer be under total conscious control of the individual" (2007, p. 709). In addition, consumers' choice behavior between substitutes of these technologies is also similar to choice behavior in other daily routines such as travel mode choice. As studies in social psychology have demonstrated, habit toward one choice mode greatly influences choice of other alternative modes (e.g., Verplanken et al. 1994). Specific to switching, when individual has formed a strong habit of using the incumbent product, she is less likely to actually switch to the substitute product, even when she has the intention to switch following careful evaluations of the pros and cons of the two alternative products. Therefore, in our first two propositions, we address the independent effect of habit and intention on individual users' switching behavior from one incumbent to an alternative.

P1: Individuals with stronger habit to use the incumbent product would be less likely to switch to an alternative.

P2: Individuals with stronger intention to switch to an alternative would be more likely to switch.

While habit and intention have been viewed as two independent determinants of behavior, there is also compelling evidence that habit not only competes with intention, but also directly influences intention. The theoretical backing for such effect is provided by social dissonance theory. According to social dissonance theory (Festinger 1957), incompatible beliefs and behavior held by a person create internal conflicts, and individuals are motivated to avoid such dissonance. When dissonance occurs, individuals will attempt to reduce it by modifying their beliefs, and ignoring information that will increase the dissonance. For example, for a person who tend to eat unhealthy food and does not exercise, if he heard one of his friends who shares similar life style just had a heart attack, a dissonance is created. In this case he might choose to reduce the dissonance by forming an intention to eat healthier and start exercising. However, he might also seek information to convince himself that healthy food and regular exercise do not necessarily reduce risk of heart attack. This way, he reduces his dissonance by aligning his beliefs and intention to his existing behavior.

There has been ample empirical evidence that while predicting behavior above and beyond intention, habit also influences behavior indirectly through intention (e.g., Saba and Vassallo 2000; Knussen et al. 2004; Honkanen et al. 2005; Mahon et al. 2006; De Pelsmacker and Janssens 2007). When a user has habitualized the use of a particular technology product, she will be less likely to have the intention to use an alternative despite what other beliefs she has on the two alternatives. Therefore:

P3: Individuals with stronger habit to use the incumbent product would have lower intention to switch to an alternative.

Reasoned Influences

Reasoned influences include beliefs, perceptions, attitudes, and conscious decisions that impact behavior (Ronis et al. 1989). An individual's decision to switch from one product or service to another product or service usually follows careful reasoning, taking into consideration a variety of factors. As noted by Bansal et al. (2005), such process resembles how humans decide to migrate from one locale to another locale. Drawing from the push-pull-mooring paradigm developed in the human geography literature to explain human migrations, Bansal et al. (2005) developed the push-pull-mooring model of consumer switching,

wherein the pull effects from user beliefs on the incumbent; the pull effects from user beliefs on the alternative; and the mooring effects from other considerations all join force in determining consumer's switching intention and behavior. Based on Bansal et al.'s model, we also categorize reasoned influences into the following three groups: push factors, moorings factors, and pull factors. In the next three sections we will present the propositions regarding variables within each group.

Push factors

Push factors represent the effects of the use and perceptions of the incumbent product on an individual's decision to switch. Like many consumer products and services, users of personal technology products differ in how much they take advantage of the number of features and options offered by these products (Tyre and Orlikowski 1994; Griffith 1999). Breadth of use refers to the degree to which a user uses the features and options offered by a certain product or service. Ye et al. (2006) argued that higher breadth of use signifies higher sunk costs into a specific product for a user, and therefore reduce the desirability of a decision to switch because users are not willing to give up the time and effort they have invested into the incumbent product. Breadth of use has also been shown empirically as an inhibitor to consumer or user switching (Chen and Hitt 2002; Burnham et al. 2003; Burnham et al. 2005; Ye et al. 2006).

P4: Greater breadth of use of the incumbent product is negatively related to intention to switch.

According to the expectancy-disconfirmation theory (Oliver 1980), individuals hold performance expectations before consumptions of products. These expectations are used as the standard for post-consumption comparisons to actual performance. Such comparison leads to positive disconfirmation and higher satisfaction when product performance exceeds previously held expectations, vice versa. Consumer satisfaction has been shown in the marketing and consumer behavior literature to be a reliable predictor of a few key dependent variables such as repeated purchase and brand loyalty (Bearden and Teel 1983; Anderson and Sullivan 1993), and consumer switching (e.g., Burnham et al. 2003; Kim et al. 2004).

For IS researchers, user satisfaction is considered as one of the key dependent variables that represents IS effectiveness (e.g., Delone and McLean 1992; Seddon 1997). However, as Melone (1990, pp.

88) pointed out: “user satisfaction alone is not sufficient to adequately capture the full meaning of effectiveness. For one thing, it fails to consider the role user behavior plays in the transformation of inputs to outputs.” Several recent studies have treated user satisfaction an independent variable; and found it to be a predictor of post-adoption system usage (e.g., Bhattacharjee 2001; Wixom and Todd 2005). Studies have also found consumer or user satisfaction of an incumbent to be the strongest predictor of switching (Bansal et al. 2005; Ye et al. 2006). Therefore:

P5: User satisfaction with the incumbent product is negatively related to intention to switch.

Mooring Factors

Mooring factors include any contextual or situational variables that either facilitate or inhibit consumer switching (Bansal et al. 2005). The first mooring factor, subjective norms, was incorporated in the Theory of Reasoned action (TRA) (Ajzen and Fishbein 1980) and the Theory of Planned Behavior (TPB) (Ajzen 1985, 1991) and defined as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein and Ajzen 1975, p. 302). Subjective norms is considered as an antecedent to intention to perform certain behavior. In the IS literature, studies have found subjective norm to be a predictor of users’ intention to use technologies (e.g., Moore and Benbasat 1991; Taylor and Todd 1995). Similarly, consumers are found to be more willing to switch when they perceive favorable social norms toward switching (Bansal et al. 2005). Therefore:

P6: Subjective norms is positively related to intention to switch.

Another prominent mooring factor identified in the consumer switching literature is perceived switching cost. Consumers may be driven to consider switching to a different product or service provider for a combination of push and pull effects; however, the switching process itself is not frictionless. The cost incurred during the switching process can come in the form of time and effort, money, or psychological impacts (Burnham et al. 2003). Studies have shown that the switching cost perceived by consumers play a crucial role in determining customer switching intention and behavior (e.g., Jones et al. 2000; Kim et al, 2004). In the case of personal technologies, even when financial cost may not be always involved, there are

at least procedural costs during the switch. These costs include the time and effort a user has to spend on evaluating, setting up, and learning the substitute technology product if she choose to switch. If a user perceives these costs to be high, she will be less inclined to switch regardless of other perceptions she hold on the two alternatives.

P7: Users with higher perceived switching cost will have lower intention to switch.

Individuals differ in their tendency to seek varieties in their daily lives. Such individual differences are expected to influence how individuals choose products and services. Bansal et al. (2005) included variety seeking as a mooring factor in their research model to account for such effects. Other marketing studies, however, have found variety seeking to be a direct result of individuals' propensity to take risks (e.g., Steenkamp and Baumgartner 1992). In fact, there has been strong empirical support for the notion that consumers high in risk aversion are more likely to stay with the current product or service provider compared with consumer who are less risk aversive (e.g., Ganesh et al. 2000; Keaveney and Parthasarathy 2001). Therefore:

P8: Users with high risk aversion will have lower intention to switch.

Pull Factors

Part of the reason consumers consider switching to a substitute product is because it has at least some advantages over the incumbent. Such pull effect has been conceptualized in the marketing literature as alternative attractiveness (Ping 1993; Bansal et al. 2005). This all encompassing concept, however, does not capture all the salient dimensions individuals would judge upon when comparing a substitute with an incumbent for a specific category of product. Here we drew on literature in technology user behavior and identified two pull factors that are most likely to matter in the context of technology switching: relative advantage and perceive ease of use. Before we discuss these two pull factors, we should note that these factors may seem to qualify as push factors also, because they could be used as the merits to judge the incumbent. However, the key here is in the context of switching, users would use these two pull factors to judge whether the alternative would be *better than* the incumbent. In other words, a user would be more likely to switch to MSN Messenger if she expects it to be *easier to use* than AOL Messenger. The same can

not be said about the push factors – by definition of satisfaction, it is simply impossible for the user to become *more satisfied* with MSN Messenger unless she has already switched to it.

Relative advantage is considered as a manifestation of the outcome expectancy construct in UTAUT (Venkatesh et al. 2003). It was initially introduced in Rogers' innovation diffusion theory as one of the key determinants of adoption of innovations (Rogers 2003). When individual users consider substituting one technology with another technology, they expect the substitute to bring certain beneficial outcomes such as economic advantages or productivity increases. Relative advantage captures the degree to which a substitute technology is perceived as being more beneficial than its predecessor in these aspects. Past studies have shown that users are more likely to adopt and use a technology when they perceive high relative advantage in the technology (Moore and Benbasat 1991; Taylor and Todd 1995). In the context of switching, individual would also prefer to switch to a substitute that can help them to improve productivity. Therefore:

P9: Relative advantage of the alternative product is positively related to intention to switch.

Perceived ease of use (PEOU), defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis 1989, pg. 320), is considered as a manifestation of the effort expectancy construct in UTAUT (Venkatesh et al. 2003). It is one of the key variables in the technology acceptance model (TAM) (Davis et al. 1989). PEOU affects users' intention to use information technology directly or indirectly through perceived usefulness. Users with higher perceptions of ease of use are more likely to use a particular technology than users who perceive it to be difficult to use (e.g., Moore and Benbasat 1991; Pavlou and Fygenson 2006). In the context of technology switching, Ye et al. (2006) found that higher PEOU leads to higher tendency to switch. Therefore:

P10: Perceived ease of use of the alternative product is positively related to intention to switch.

Implications for Research and Practice

Unlike business applications such as an ERP system, technologies such as PDA-phones are more consumer-oriented, and there are usually multiple products highly substitutable available to the users. Without any organizational mandates, users have more freedom to make proactive and complex decisions regarding how

they use these technologies, including seeking out and trying different alternatives, and switch from one product to another. Therefore, the overall goal of this study is to contribute to a deeper understanding of the broader issue of user switching between competing offerings of highly substitutable personal technology products – an issue of both high practical and theoretical significance.

Drawing from the push-pull-mooring model for customer switching from the marketing literature, and prior studies on IT user behavior, we proposed a model that includes different push, pull, and mooring factors that influence technology users' switching intention and behavior. In addition, we also integrated the habit perspective from the field of social psychology to capture the influence of routinized use. While habit has been studied in the post-adoption user behavior literature, its effect on consumer or user switching has not been taken into consideration in either marketing or IS literature. By incorporating habit, we offer a more comprehensive model that accounts for the effects of both reasoned influences and automatic behavior on user switching.

Our research model is empirically verifiable. For all constructs in the model, there are previously validated instruments in the relevant literature that could be adapted. One issue worth noting is the measurement of habit. The relatively small number of habit related IS studies may be attributed to the lack of an independent measure of habit in the past. As noted by Thompson and Higgins: "At a conceptual level, ... habit should play a role in the utilization of a PC; ... At a measurement level, however, difficulties exist. Triandis (1980) notes that habits can be measured by the frequency of occurrence of behavior. This is precisely identical to our measure of utilization, which leads to a tautology. For this reason, we did not include the habit construct in this study" (1991, pg 130). Recent developments in social psychology, however, has led to independent measurements such as response frequency (RF) (Verplanken et al. 1994) and Self Reported Habit Index (SRHI) (Verplanken and Orbell 2003), this should help researchers in further our understanding of the role of habit in technology usage.

As we aimed to build a parsimonious model, we only capture the key factors that are likely to influence user switching regardless of the type of technology products or services. Further research can expand our model by including other factors that may be salient for specific type of technologies. For

example, perceived security and privacy are likely to matter when personal information is involved in using the technology. For technology services such as online photo sharing, trust and commitment toward the service provider would be determinants of switching. For services that users have to pay significant amount of fees, price differentiation is an obvious factor.

In our model, we only hypothesize on the direct impacts of individual factors on switching. It would also be interesting to theorize and test the interactions among the reasoned influences. For example, does switching cost moderate the effect of relative advantage? In aggregation, do mooring factors moderate the effects of push or pull factors? We are not able to accommodate these possible interactions in this paper.

Our model is intended to explain the switching behavior of individual technology users. Business organizations, however, also have to frequently choose between alternative technology products and services, and often times have to switch from one product to a substitute with similar functionalities. It could be a choice to switch from one brand of network routers to another brand, from one anti virus software to a competitor's offering, or from one outsourced data center operator to another vendor. The switching of IT products and services at the enterprise level also has profound implications for both IS researcher and practitioners.

Our model also has considerable implications for practitioners. The fight for market share is intense for many technology vendors. To excel in the competition, it is crucial to understand how users choose between alternative products. For a technology vendor to hold on to their existing customers, they should always strive to offer better products with valuable features, encourage broader usage, facilitate habitualized use, and improve user satisfaction. On the other hand, for technology vendors that face the challenge of entering an existing market, it is critical that they understand how the consumers use the incumbent products and how they decide to switch to a new product. A better knowledge of how factors such as relative advantage and perceived switching cost impact user switching will help technology providers tailoring their products to achieve the tricky balance between being innovative and in the mean time being sufficiently similar to an entrenched incumbent.

Conclusion

We have proposed a conceptual model for explaining post-adoption user switching between substitutable consumer technology products. Our model integrates theories discussed in information systems, marketing and consumer behavior, and social psychology literatures. As we have strived to outline a parsimonious and empirically verifiable model, we hope our ideas would encourage others to expand upon our model to improve both theoretical and empirical understanding of post-adoption user switching, an issue that should interest both scholars and practitioners alike.

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