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RESEARCH ARTICLE

OUT OF DEDICATION OR CONSTRAINT? A DUAL MODEL OF POST-ADOPTION PHENOMENA AND ITS EMPIRICAL TEST IN THE CONTEXT OF ONLINE SERVICES[1]

By: **Sung S. Kim**
Wisconsin School of Business
University of Wisconsin–Madison
975 University Avenue
Madison, WI 53706
U.S.A.
skim@bus.wisc.edu

Jai-Yeol Son
School of Business
Yonsei University
134 Shinchon-dong, Seodaemoon-ku
Seoul 120-749
KOREA
json@yonsei.ac.kr

Abstract

Sustained website traffic through consumers' patronage at the post-adoption stages is known as a key to the survival of an online service provider. Although a firm's survival depends much on repeated use, whether or not a firm survives is also influenced by a variety of other behavioral outcomes that include, but are not limited to, word-of-mouth, willingness to pay, and inattentiveness to alternatives. Whereas post-adoption research has recently paid attention to repeated use, the information systems field still lacks a systematic investigation into other behavioral outcomes that transcend mere usage. In an attempt to extend the horizons of post-adoption research, we develop and test a model that explains post-adoption behaviors in the context of online services. First, drawing on a dual model of relationship maintenance in consumer behavior research, we propose a conceptual framework to study and explain online consumer behavior. In particular, our model predicts that two contrasting mechanisms, that is, dedication and constraint, are the main drivers of post-adoption phenomena (i.e., consumers' post-adoption reactions to online services—beliefs, attitudes, intentions, and behaviors). We empirically test the proposed dual model through the use of data collected from 510 users of online portals. The results of structural equation modeling analysis indicate that, as expected, the dedication- and constraint-based mechanisms simultaneously, yet differentially, determine online consumer behavior. In general, our findings suggest that it is essential in examining the complex nature of post-adoption phenomena to take into account the interplay of the dedication- and constraint-based mechanisms.

Keywords: Online consumer behavior, post-adoption behavior, loyalty, switching costs, service-specific investments, survey research, structural equation modeling

Introduction

Although a great deal of past research was devoted to understanding individuals' acceptance of a new information technology application, more attention has been paid recently to individuals' behaviors at the post-adoption stages, which we

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call post-adoption behaviors (Ahuja and Thatcher 2005; Jasperson et al. 2005; Karahanna et al. 1999). Mere acceptance cannot unleash the full potential of IT investments; thus, post-adoption behaviors have significant implications for organizations that seek to enhance their workers' job performance and thereby reap the full benefit from the high costs of IT infrastructure (Cooper and Zmud 1990; Venkatesh et al. 2000). Accordingly, an increasing number of information systems studies have been performed in the past few years to explain various post-adoption behaviors, especially in organizational contexts such as IT exploration (Nambisan et al. 2000) and innovation with IT (Ahuja and Thatcher 2005).

Sustained website traffic from consumers' patronage at the post-adoption stages is essential for the survival of an online service provider. Thus, post-adoption behaviors, which are the keys to IT success in a work-related context, are also important in an online business-to-consumer (B2C) context (Bhattacherjee 2001, Kim et al. 2005). Unsurprisingly, online firms are eager to effectively manage individuals' post-consumption experiences with their services (Benbasat and DeSanctis 2001, Keen 2001). However, whereas the worker–firm relationship is driven by productivity, the customer–firm relationship is not always productivity driven; thus, post-adoption behaviors that are of great consequence to online B2C companies are not necessarily the same as those examined in past research that emphasized individual workers' productivity. As discussed earlier, a majority of post-adoption research focuses on individuals' behaviors in organizations (e.g., IT exploration, innovation with IT), but little has systematically examined behavioral outcomes that are uniquely salient in the context of online services. Accordingly, the IS literature has little relevance for those who seek to understand online consumer behavior at the post-adoption stages.

As with IS research, research on consumer behavior suggests that post-consumption behaviors are the keys to a firm's survival in the highly competitive marketplace (Reichheld et al. 2000). Repeated use, which drives sustained website traffic, is one such behavioral outcome, but the literature also suggests that others, such as word-of-mouth, willingness to pay, and inattentiveness to alternatives, are critical, especially in the online environment. First of all, word-of-mouth is said to be an effective means to increase the revenues and profits of firms (Reichheld et al. 2000). Probably, this is all the more true in the online world because referrals can spread faster through the Internet than via traditional media. Second, online firms recently have been trying to charge a premium for their services (Cohen 2006). For these firms that are trying to generate an alternative revenue stream, their customers' willingness to pay is an important facet of post-adoption outcomes (Bialik 2004). Finally, most online service providers serve a general population of Internet users who are free to switch to alternative providers. In the face of numerous competitors, a service may not be able to sustain its current popularity over the long term (Jones and Sasser 1995; Lin et al. 2005; Reichheld et al. 2000). Hence, inattentiveness to alternatives is said to be another post-adoption outcome that is critical to a firm's profitable growth (Srinivasan et al. 2002).

Post-adoption research in the IS area has recently paid attention to repeated use in the context of online services (Kim et al. 2005), but the IS field still lacks a systematic investigation into other behavioral outcomes that transcend mere usage (e.g., word-of-mouth, willingness to pay, and inattentiveness to alternatives). In an attempt to extend the horizons of post-adoption research, the present study develops and tests a model that explains post-adoption behaviors in the context of online services. Drawing on a dual model of relationship maintenance in consumer behavior research (Bendapudi and Berry 1997), we propose a conceptual framework to study and explain online consumer behavior. In particular, our model predicts that post-adoption phenomena, that is, consumers' post-adoption reactions to online services (e.g., beliefs, attitudes, intentions, and behaviors), are driven mainly by two contrasting mechanisms: (1) the consumer's *dedication* to the firm as generated by the prospect of long-term mutual benefits (Oliver 1999; Srinivasan et al. 2002), and (2) the *constraint* that makes it difficult for the customer to switch to an alternative (Jones et al. 2000; Lam et al. 2004). More specifically, the dual model of post-adoption phenomena proposed in this study is designed to address the following three interrelated issues:

- First, few in the IS area have examined online consumer behavior from these two distinct perspectives: dedication and constraint. An objective of the present study, therefore, is to identify the dedication and constraint factors that are operative specifically in the context of online services.

- Second, although perceived usefulness and satisfaction have been shown to influence online consumer behavior, little is known about whether the same variables determine both dedication and constraint. This study is intended to carefully examine whether the dedication and constraint factors have different types of antecedents.

- Finally, to the best of our knowledge, no studies have taken into account both dedication and constraint factors in order to explain post-adoption behaviors in the context of online services. This study examines the potentially

differential effects of dedication and constraint on various post-adoption behavioral outcomes.

In essence, our proposed model offers a theoretical account of how the dedication- and constraint-based mechanisms differ in their antecedent, intervening,[2] and outcome variables. The findings of this study are expected to shed light on how the two contrasting forces simultaneously, yet differentially, shape the nature of post-adoption phenomena in the context of online B2C services.

The organization of this paper is as follows: The next section reviews relevant literature in the information systems and marketing areas. Subsequently, the third section develops a causal model of online consumer behavior and proposes relevant research hypotheses. The research methodology is described in the fourth section. We specifically chose to examine actual customers of online portals to collect data. The online portal industry is one of the most rapidly growing sectors of the online B2C economy (Burns 2005; Nielson-NetRatings 2005); hence, it seems timely and relevant to assess the validity of the theoretical framework in an online portal context. The fifth section presents the results of data analyses and research hypotheses. This paper concludes with a discussion of research findings, the limitations of this study, and the opportunities for further research.

Literature Review

Following the tradition of adoption research, post-adoption research often emphasized individuals' cognitions as the determinants of post-adoption behaviors (Jasperson et al. 2005). In particular, the new stream of research shows that, as with IT adoption, post-adoption behaviors are mainly driven by the perceived fit between the IT application and the user's needs, which are the perceived benefits (Bhattacherjee 2001; Lin et al. 2005; Van der Heijden 2003). Considering that post-adoption behaviors can be framed within the larger context of individuals' reactions to an IT application, the efficacy of traditional IS models in predicting post-adoption behaviors is unsurprising. However, according to Jasperson et al., rational task–technology fit models fall short of explaining post-adoption behaviors because the traditional models ignore a user's history of interacting with the IT application.

[2]Intervening variables represent partial mediators between antecedents and outcomes. The intervening variables mediate, to some extent, the effects of antecedents on outcomes. However, the intervening variables are not full mediators, and thus, the antecedents would have overriding effects on the outcomes over and above the intervening variables.

Let's take an example of an online service that offers IT-enabled personalization capability to customers (e.g., My Yahoo!, My MSN, My AOL, iGoogle). Initially, online users may perceive the availability of personalization as a potential benefit. Yet, it takes time to learn to build a personal profile, and such a profile is not easily transferable to another website. Thus, the use of a personalization feature could result in service-specific investments that later create "lock-in" (Gilmore and Pine 2002, Pine et al. 1995). Moreover, although many customers actively take advantage of the personalization feature and develop ongoing relationships with the online service provider, "not every customer would want to invest the time that such a relationship would require" (Pine et al. 1995, p. 106). Thus, for a better understanding of post-adoption behaviors, more attention should be paid to such service-specific investments as personal profiles and the extent of learning that vary widely over time with a user's history of using a specific IT application.

The foregoing discussion indicates that online consumers may choose to continue to use the same service because either the service is deemed to offer value (i.e., perceived benefits) or they simply feel locked in (i.e., service-specific investments). It implies that at least two contrasting forces are in play in determining the customer–firm relationship and shaping post-adoption behaviors. Likewise, a number of studies in other disciplines have shown that these two motivational factors characterize a variety of relationships (Bendapudi and Berry 1997; Dunham et al. 1994; Stanley and Markman 1992). Social exchange theory provides a theoretical framework for the analysis of long-term relationships driven by these two different factors. According to social exchange theory, people are believed to engage in ongoing relationships "either because they genuinely want to or because they believe that they have no option" (Wulf and Odekerken-Schröder 2001, p. 86). Specifically, within this conceptual framework, two different types of commitments, namely, dedication and constraint, characterize relationship maintenance (Bendapudi and Berry 1997); whereas dedication-based relationship maintenance is based on attitudinal commitment resulting from "genuine appreciation for the relationship" (p. 20), constraint-based relationship maintenance centers on locked-in "economic, social, or psychological" investments (p. 18). This theory has been shown to be useful in analyzing long-term relationships such as personal relationships (Stanley and Markman 1992), employee–firm relationships (Dunham et al. 1994), and customer–firm relationships (Bendapudi and Berry 1997). Clarification of the complex nature of online customer behavior requires an understanding of the subtle connotations that the customer–firm relationship may entail. Accordingly, social exchange theory, along with its notions of dedication and constraint, is likely to offer a theoretical basis for ex-

plaining online consumer behavior with regard to enduring B2C relationships.

In the consumer behavior literature, a customer's dedication to a service is often examined through loyalty. Loyalty refers to the individual's deeply held affective commitment toward the service (Beatty and Kahle 1988; Oliver 1999). This type of dedication commitment occurs in anticipation of long-term benefits from maintaining an ongoing relationship with the partner. In general, people expect that a provider who cannot deliver value at present will continue to perform inadequately in the future. Thus, the formation of loyalty is initially based on individuals' current perceptions of the benefits of using the service (i.e., perceived benefits). However, unlike perceived benefits, which focus on the transactional value of the service or the difference between prior expectations and actual performance, loyalty is relatively stable against short-term changes in service performance and other situational influences. Consequently, it is such a dedication commitment that eventually leads to behavioral outcomes oriented toward long-term benefits for both parties involved (Lam et al. 2004; Oliver 1999; Yang and Peterson 2004). Loyalty is widely known as an essential component for the survival of a firm in an offline setting (Jones and Sasser 1995). Yet, loyalty is regarded as an even more prominent factor in the survival of online businesses because recommendations and support from loyal customers can be spread faster across the Internet than in face-to-face media (Reichheld and Schefter 2000). An increasing body of research consistently shows that loyalty, or dedication commitment, is an important predictor of customer behavior in online service settings (Gefen 2002; Park and Kim 2006; Srinivasan et al. 2002; Thatcher and George 2004).

Switching costs refer to the extent to which a customer feels dependent on a service because of economic, social, or psychological investments that would become useless in other services (Burnham et al. 2003; Jones et al. 2002). As mentioned earlier, many online services (e.g., e-mail, portal services) are currently offered to customers in a highly personalized form. However, personal data (e.g., e-mail messages, customized settings) that are accumulated as a result of one's ongoing use of the service cannot be easily transferred to other websites. In such a case, where the overall costs of switching to another service are relatively high, the customer may need to stick with the current service not because of dedication but because of constraints. Switching costs are known to represent such a constraint-based commitment, which ultimately leads to behavioral outcomes that are performed reluctantly just to avoid the termination of a relationship with the incumbent provider (Bendapudi and Berry 1997; Jones et al. 2000; Lam et al. 2004). Indeed, much research empirically shows that switching costs regulate consumers' post-adoption reactions to online services (Chen and Hitt 2002; Gefen 2002; Thatcher and George 2004). Thus, the concept of switching costs, which represents a constraint commitment, is considered a key to understanding relationship maintenance in online B2C settings.

In summary, the IS literature suggests that post-adoption behaviors are driven not only by perceived benefits but also by service-specific investments. In addition, the marketing literature indicates that dedication and constraint commitments determine the nature of relationship maintenance. Note that whereas perceived benefits appear to be the driving force of dedication (Oliver 1999), service-specific investments are considered the major source of constraint (Lin et al. 2005; Von Campenhausen and Lübben 2002). Thus, the IS and marketing perspectives seem to complement each other nicely to offer a better explanation of post-adoption phenomena.

Dual Model of Post-Adoption Phenomena

Figure 1 depicts a dual model that this study proposes for examination of post-adoption phenomena in the context of online services. As shown in Figure 1, the major theme of this dual model is that the dedication- and constraint-based mechanisms are quite differentiable in their antecedent, intervening, and outcome variables. This section provides a theoretical rationale for the two mechanisms and proposes research hypotheses.

Dedication-Based Mechanism

The dedication-based mechanism centers on the concept of loyalty, which represents dedication commitment. According to the dual model proposed in this study, perceived benefits serve as the basis for the formation of loyalty. The rationale behind this proposition is that (1) a customer considers the current value of the service (i.e., perceived benefits) as a cue from which to infer the future value of the service, and (2) the consumer is likely to favor a long-term relationship with the provider in anticipation of future value. Through this process the consumer becomes loyal to a provider that currently offers some benefits; that is, perceived benefits, which correspond to current value, will have positive effects on loyalty, which is one's attitudinal attachment to the provider. Similarly, Oliver's (1999) attitude-based framework offers a theoretical explanation of the causal link between perceived benefits and loyalty. A basic premise of this reasoning is that consumers

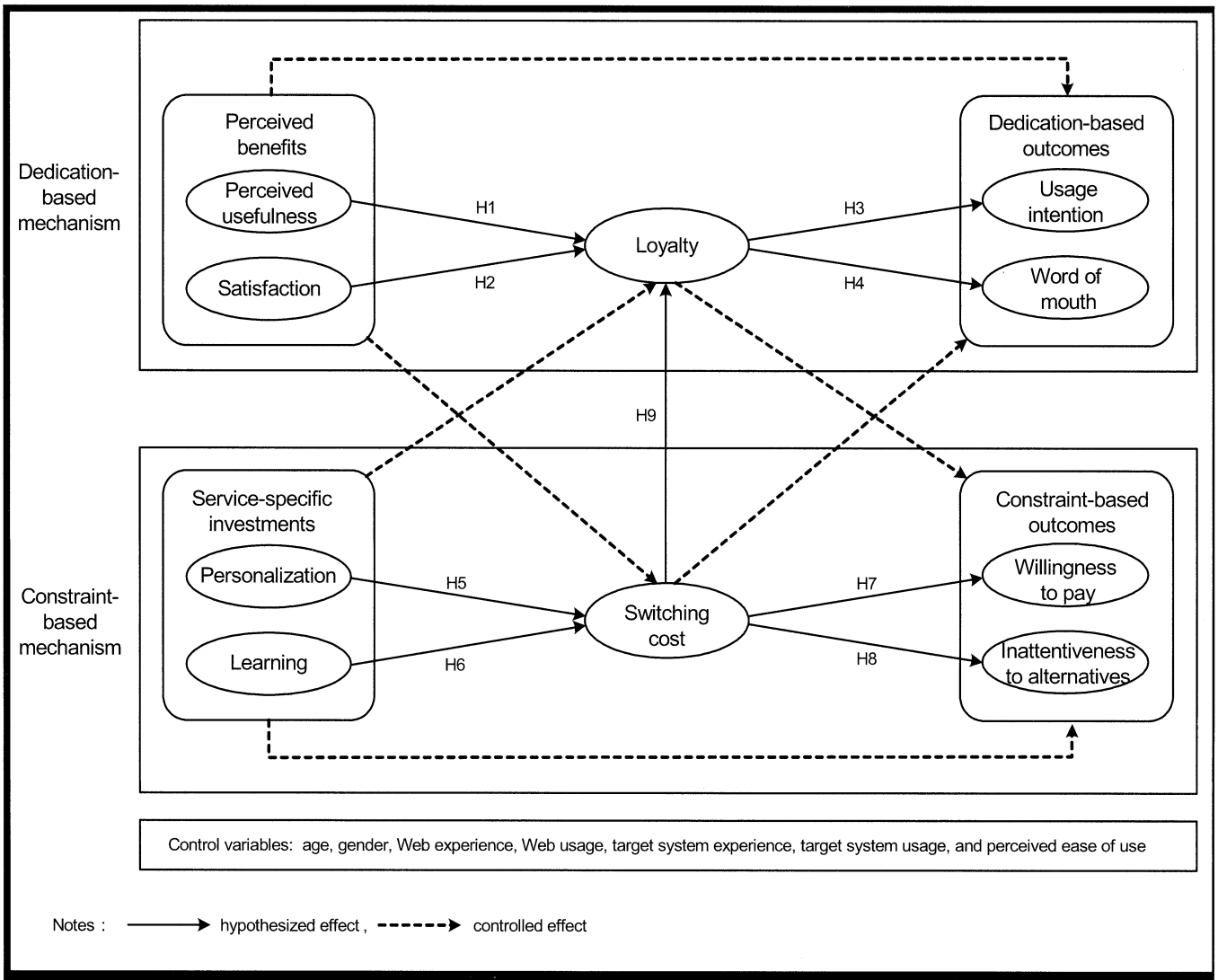


Figure 1. Dual Model of Post-Adoption Phenomena

will not have positive feelings toward a service provider, *vis-à-vis* other alternative providers, without having had some rewarding experiences.

Thus, within Oliver's conceptual framework, loyalty—which indicates a favorable attitude toward maintaining a long-term relationship with the provider—results from cognitive perceptions about the current value of using the service. Because of this process, perceived benefits are expected to positively influence loyalty.

It is generally known in IS research that two factors succinctly capture the perceived benefits of using an IT application (Bhattacherjee 2001; DeLone and McLean 1992; Rai et al. 2002). These two factors, also called *net benefits,* are (1) perceived usefulness, defined here as perceptions about enhanced effectiveness achieved through the use of a service, and (2) satisfaction, which refers to favorable feelings toward a service in question (Seddon 1997). A large number of studies suggest that these two factors determine loyalty (Lam et al. 2004; Oliver 1999).[3] For example, Kim et al. (2002) showed

[3]In the context of online services, such technical features as download time, search functionality, and content are expected to directly influence individuals' perceptions about the benefits of using a service in question (Koufaris 2002; Palmer 2002). However, those technical features are not included in the proposed model, because perceived usefulness and user satisfaction are assumed to fully mediate the effects of technical factors on post-adoption behaviors (Bhattacherjee 2001; Seddon 1997). For example,

in a study of four online business domains (i.e., virtual mall, stock brokerage, search portal, and online game) that customer satisfaction is positively associated with loyalty. Similarly, Yang and Peterson (2004) found that perceived value, which resembles perceived usefulness, had positive effects on loyalty in the context of online banking. Park and Kim (2006) also demonstrated, based on the data collected from online customers, that satisfaction and perceived value explained more than one third of the variance in website commitment. Taken together, these findings imply that in an online information service environment, perceived usefulness and satisfaction will influence loyalty (Oliver 1999).[4] Therefore, we propose the following hypotheses:

H1: *The perceived usefulness of an online service will be positively related to a customer's loyalty to the service.*

H2: *A customer's satisfaction with an online service will be positively related to the customer's loyalty to the service.*

Our dual model in Figure 1 proposes that loyalty, which is an affective-level variable, will affect behavioral intentions such as usage intention and word-of-mouth. Usage intention refers to the degree to which a customer thinks he or she will rely upon the service. According to Bendapudi and Berry (1997), repeated use is a dedication-based, as opposed to constraint-based, behavioral outcome. Repeated use tends to raise the investments specific to the customer–firm relationship, and thus it will eventually lead to a stronger tie between the customer and the firm. Accordingly, a loyal customer who is dedicated to establishing a long-term relationship with the firm (i.e., high on loyalty) is willing to visit the website more frequently, makes greater relationship-specific investments, and establishes a stronger relational bond with the firm. In contrast, a customer in a constrained situation who views the relationship as binding or forced (i.e., high on switching costs) will be reluctant to visit the website more than necessary because repeated use will raise relationship-specific investments and thereby make it more difficult to terminate the undesirable relationship. Thus, we predict that loyalty, but not switching costs, will have a positive relationship with usage intention. A number of studies show that loyalty is actually an important predictor of usage intention in the B2C service context. For example, Reichheld (2003) found, based on data collected from 4,000 consumers, that loyalty effectively predicted repeat purchases. Similarly, Jones and Sasser (1995) maintained that loyalty would be a good predictor of actual repurchasing behavior. In addition, in the context of online services, "e-loyalty," or one's loyalty to the online provider, is known to cause repeat behavior (Reichheld and Schefter 2000; Srinivasan et al. 2002). Thus, it is reasonable to expect that loyal online customers tend to be repeat users because they believe their ongoing interactions with the online provider will be beneficial in the long run, even if this is not the case at the moment.

Word-of-mouth refers to a customer's intention to recommend the service to others (Reichheld 2003). Along with usage intention, word-of-mouth is considered one of the most important dedication-based outcomes (Gefen 2002; Homburg and Giering 2001; Srinivasan et al. 2002). As mentioned earlier, loyalty is a customer's dedication to achieving mutual benefits with a preferred vendor. Such a dedication leads to behavioral outcomes oriented toward supporting and strengthening the relational bond with the incumbent provider (Reichheld 2003). In particular, Bendapudi and Berry posit that advocacy behavior (e.g., providing referrals to others) is one of the most distinctive dedication-based outcomes. The rationale behind this proposition is that the very act of referring a friend puts the actor's social image at risk, and thus word-of-mouth would not occur without the person's faithful dedication, or loyalty (Reichheld 2003). Consistent with these arguments, much research demonstrates that the greater the degree of dedication a customer has to an online service, the more likely he or she is to say positive things about the service to others (Gefen 2002; Reichheld 2003; Srinivasan et al. 2002). Overall, we expect that loyal customers are willing to use the service (i.e., usage intention) repeatedly or say positive things about the service (i.e., word-of-mouth) based on a rational faith that the service will continue to offer an excellent value. Thus, we propose the following hypotheses:

H3: *A customer's loyalty to the service will be positively related to usage intention.*

H4: *A customer's loyalty to the service will be positively related to word-of-mouth.*

Bhattacherjee found in the context of online banking that behavioral intention is a function of perceived usefulness and satisfaction. Similarly, Rai et al. showed that the use of a student information system is determined by perceived usefulness and satisfaction. The two factors of net benefits have also been shown to be significant in the context of online services (Lin et al. 2005; Van der Heijden 2003).

[4]Of course, this prediction does not necessarily indicate that satisfied customers will always be loyal customers. Rather, it suggests that loyalty (i.e., dedication commitment) will rarely be acquired without satisfaction (Oliver 1999). Although satisfaction and loyalty are strongly related, the two concepts are distinct; in essence, satisfaction is a necessary condition for loyalty, but loyalty requires more than "mere satisfaction" (Jones and Sasser 1995; Luarn and Lin 2003).

Constraint-Based Mechanism

Switching costs, conceptualized as an affective-level variable in this paper, arise because of one's perceptions about the investments devoted to a certain partner that are not easily transferable to other partners (Gefen 2002; Heide and Weiss 1995; Jones et al. 2000; Lam et al. 2004,). In general, three types of nontransferable investments are known to differentially contribute to the formation of switching costs (Chen and Hitt 2002; Klemperer 1987; Thatcher and George 2004): (1) transaction costs, which occur when an existing relationship terminates and a new relationship starts; (2) learning costs, which represent the effort required to learn the routines and procedures of a service; (3) artificial switching costs, which are created deliberately by service providers to keep current customers in the relationship (e.g., frequent-flier programs). Switching online services often involves transaction and learning costs because people tend to personalize websites to meet their idiosyncratic needs, and a lot of effort and time is required for them to learn such a personalization feature. Unlike transaction and learning costs, artificial switching costs result entirely from firms' actions such as rewarding customers for repeated use (Klemperer 1987). Given that online services are typically free to the public (e.g., online news, portals), it is not common for firms to offer such rewards. Thus, transaction costs and learning costs are considered especially relevant for examination of consumers' reactions to online services, and artificial switching costs are excluded from this study.[5]

Personalization and learning were earlier conceptualized as service-specific investments that relate to one's history of interacting with an online service over time. Those investments are basically sunk costs, but people tend to expect that a similar amount of time and effort will be required to switch to a new website (Jones et al. 2002). In this sense, personalization is expected to affect transaction costs, whereas the investment incurred in learning to use the incumbent website is associated with learning costs (Chen and Hitt 2002; Klemperer 1987). Specifically, if the provider knows the customer well through the personal profile accumulated in the website, the provider is likely to serve the customer better than competitors will. The customer will recognize that he or she will have to go to the trouble once again to set up the complex personal setting necessary to receive the same level of service from a new provider. Accordingly, the customer—who modified the website to suit their own needs (e.g., colors and/or layout for home page, sports teams for game results, stock quotes, etc.)—tends to consider the costs of switching as rather high. Likewise, the customer's skill in using the incumbent service is not necessarily transferrable to other services. As such, the customer—who took the time and effort to learn the routines, procedures, and features of the service (e.g., how to find information, how to personalize the website, etc.)—is likely to realize that switching costs will be high because learning to use a new service will not be simple. Thus, the learning required to use an online service is believed to positively influence overall switching costs.

Taken together, it seems reasonable to argue that in the context of online services, such service-specific investments as the extent of personalization and the extent of learning will be the basis for the formation of constraint commitment, or switching costs. Thus, we propose that personalization and learning will be the major sources of the formation of switching costs.

> H5: *The extent of personalization performed on an online service will be positively related to switching costs.*

> H6: *The extent of learning required to use an online service will be positively related to switching costs.*

The proposed model in Figure 1 shows that overall switching costs influence willingness to pay. In a model of relationship maintenance, Bendapudi and Berry identified acquiescence as a constraint-based outcome. Acquiescence is defined as "the degree to which a partner accepts or adheres to another's specific requests or policies" (Morgan and Hunt 1994, p. 25). Unlike the advocacy caused by dedication, acquiescence is known as a passive form of relationship maintenance because the primary motive of the customer is to avoid termination of the relationship. Willingness to pay corresponds well to the notion of acquiescence, given that the act of paying extra money for the same service is regarded as the customer's compliance with a new condition set forth by the vendor. As shown in Figure 1, we expect that willingness to pay will be positively influenced by switching costs. Switching costs, by definition, are potential losses that could result from termi-

[5]The nature of artificial switching costs is well-examined in the literature, and we refer readers to the literature for more information on the topic (e.g., Burnham et al. 2003). Our approach of focusing on transaction costs and learning costs is consistent with other studies in which artificial switching costs are excluded from the analysis of switching costs (e.g., Gefen 2002; Yang and Peterson 2004). Nevertheless, it is important to note that transaction costs and learning costs are not an exhaustive list of the determinants of switching costs. In fact, there is a growing interest in the nature of switching costs in the marketing domain, and several studies have begun to examine various antecedents/components of perceived switching costs. Among those factors identified in the marketing literature are monetary loss costs, personal relationship loss costs, sunk costs, setup costs, etc. (Burnham et al. 2003; Jones et al. 2002). However, this present study took a conservative approach in identifying the determinants of switching costs by drawing on the well-recognized economics literature (Klemperer 1987).

nating the existing relationship and establishing a new one. Therefore, as long as a proposed increase in the service fee is less than the costs of switching, the customer is likely to be willing to pay the increased fee. In other words, switching costs are what make a customer reluctantly pay a premium in order to maintain a relationship with the vendor. Consistent with this line of reasoning, the literature maintains that switching costs are strongly related to premium pricing (Chen and Hitt 2002; Klemperer 1987). Thus, we hypothesize that as switching costs increase, online customers are more likely to be willing to pay more to retain a relationship.

Inattentiveness to alternatives is one of the most frequently examined behavioral outcomes in the marketing area (Bendapudi and Berry 1997; Dick and Basu 1994; Srinivasan et al. 2002). This construct, which is another constraint-based outcome proposed in our model, refers to the lack of interest in alternative online services. According to Heide and Weiss (1995), switching costs would "represent a constraint on a buyer's exploration of new vendors" (p. 33). Specifically, in a technology-intensive environment, constraints tend to grow with experience (e.g., personalization of features, e-mail messages). Customers in constrained situations will realize that they have to continue to use the same service and that actively looking for alternatives makes no sense. Through this mechanism, people with higher switching costs will consider defecting to another service less attractive, and they will eventually become less interested in alternatives. Thus, we predict that with an increase in switching costs, one's inattentiveness to alternatives will increase. Several studies indeed show that switching costs tend to reduce the number of alternatives that will be considered (Heide and Weiss 1995), minimize efforts to search for alternatives (Weiss and Heide 1993), and decrease the propensity to search for alternatives (Zauberman 2003). In general, these findings suggest that switching costs will have a positive influence on inattentiveness to alternatives. Taken together, our hypotheses related to constraint-based outcomes are stated as follows:

H7: *Switching costs will be positively related to a customer's willingness to pay for the service.*

H8: *Switching costs will be positively related to a customer's inattentiveness to alternatives.*

Intermechanism Relationships

According to Oliver, loyalty is not merely the outcome of satisfaction; he says that for a fuller understanding of loyalty, investigators need also to consider "nonsatisfaction determinants" (p. 34). This proposition implies that perceived benefits cannot fully explain loyalty; instead, something qualitatively distinct from sheer benefits is required to cement one's dedication to a service provider. Interestingly, some evidence indicates that in addition to perceived benefits, switching costs would influence positively the formation of loyalty—suggesting a spillover effect of the constraint-based mechanism on the dedication-based mechanism (Dick and Basu 1994; Gefen 2002; Thatcher and George 2004). Bendapudi and Berry specifically mentioned self-justification as a psychological process underlying such a spillover effect. In particular, this line of reasoning posits that customers who are locked in tend to convince themselves that they committed the resources because they like the service. It goes on to predict that as long as their provider is not opportunistic, customers will keep reinforcing their "post-commitment rationalization" that the nontransferable investments already incurred actually represent their dedication to the provider. Consistent with this reasoning, Dick and Basu (1994) argue that switching costs will positively influence customer loyalty. Specifically, in the context of online services, Gefen (2002) showed that loyalty was a function of switching costs. In addition, Thatcher and George (2004) maintain that along with net benefits (e.g., satisfaction, affect), switching costs will ultimately influence loyalty. Accordingly, we expect that through the self-justification process, switching costs will have a positive impact on loyalty in the context of online services.

H9: *Switching costs will be positively related to loyalty.*

Controlled Effects

Our dual model is developed based on a premise that the dedication- and constraint-based mechanisms coexist in the minds of consumers of online services but operate in a rather distinct manner. Specifically, the dual model implies that the relationships within the same mechanisms (i.e., intramechanism relationships) will be strong and significant (i.e., H1–H8). Yet, the relationships across the mechanisms (i.e., intramechanism relationships,) are likely to be insignificant or at best weak (except the relationship between switching costs and loyalty, i.e., H9). In order to check whether these predictions hold, the proposed model takes into account not only the hypothesized intramechanism relationships but also the intermechanism relationships that are expected to be insignificant. As shown in Figure 1, we explicitly control for the relationships between perceived benefits and switching costs, between service-specific investments and loyalty, between loyalty and constraint-based outcomes, and between switching costs and dedication-based outcomes. Lack of

intermechanism relationships will add to the validity of our claim that the dedication- and constraint-based mechanisms are distinct and exhibit highly discernible patterns.

The overriding effects that are controlled for in the model are worth mentioning. Bendapudi and Berry argue that dedication commitment would fully mediate the impacts of its antecedents on the outcomes. However, IS research suggests that usage intention, one of the dedication-based outcomes, is directly influenced by perceived usefulness and satisfaction (Bhattacherjee 2001, Rai et al. 2002). Accordingly, as shown in Figure 1, we control for the effects that perceived benefits might have on the dedication-based outcomes over and above loyalty. Similarly, in the constraint-based mechanism, the effects of service-specific investments on constraint-based outcomes beyond switching costs are taken into account.

We also incorporate into the model gender and age as control variables. In the IS literature, the demographic variables are shown to act as moderators (Venkatesh et al. 2003). Thus, the moderating effects of gender and age are controlled for in our model. Similarly, user experience (i.e., target system experience) and past use (i.e., target system usage) are widely known to play important roles as moderators in regulating post-adoption phenomena (Jasperson et al. 2005; Kim et al. 2005; Venkatesh et al. 2000). Thus, the moderating effects of target system experience and target system usage are explicitly taken into account in the model. Finally, we include Web experience, Web usage, and perceived ease-of-use as covariates. These variables are considered most important in the context of online services (Kim et al. 2005; Szajna 1996; Venkatesh et al. 2000), and thus we take into account in the model the direct effects of those variables on post-adoption phenomena. All the control variables included in the model are shown in Figure 1.

Method

Research Setting

Portals were chosen as a specific empirical setting for this study for two main reasons. First, portals are among the most widely used online services (Wagner 2002). Given that our model was specifically developed with online services in mind, portals are considered an appropriate setting in which to test it. Second, portals usually allow their customers to construct personalized pages to tailor the content and services to their specific interests and needs (Smith 2004). This property of portals made it possible for us to examine service-specific investments (i.e., personalization and learning), which have been studied far less in the IS domain than perceived benefits (i.e., usefulness and satisfaction). Taken together, portals appear to offer a desirable empirical environment for testing the efficacy of the model. Consequently, we attempted to test our model with data collected from actual users of portals

Data Collection

We first developed an initial version of the questionnaire in which each subject was asked to think about his or her primary portal service provider and then answer questions about this provider. Then we asked two domain experts to review the questionnaire. Their feedback recommended that we define our meaning of a portal. Accordingly, we added the following definition of a portal at the beginning of the questionnaire: "Portal refers to a website, which offers to users a unified access point to a variety of online resources, including (but not limited to) news, weather, e-mail, and search engines. Among those portal sites are AOL, MSN, and Yahoo!"

Later, we used 73 subjects to conduct a pilot test of the modified version of the questionnaire. They were drawn from the same sample frame used for the main survey that will be described here. The comments of these 73 subjects were used to further refine the clarity of instructions and questions in the questionnaire. Finally, a field study was conducted to collect the data necessary for testing the causal model and the hypotheses. We considered the population of interest to be composed of adult users of online portal services in the United States. Then, the database of a market research firm was used to draw up a nationwide sample frame of panel members 19 years of age or older. The market research firm first selected 2,100 members from a panel pool and sent each member an e-mail invitation to participate in the survey and included a link to a Web-based survey questionnaire.

The online survey ran for 10 days, and follow-up invitations were sent once during this period. As a result, we were able to collect 529 responses, representing a response rate of 25.2 percent.[6] In order to test whether there were statistically significant differences between the respondents and nonrespondents, we obtained the profiles of both respondents and nonrespondents from the market research firm. A chi-square test was run on the gender variable, and a t-test was per-

[6]To ensure that only current portal users are included in the sample, we instructed nonusers to stop the survey at the beginning and close their browsers. Because of this, the actual response rate is believed to be higher than the 25.2 percent reported here.

formed on the age variable. No statistically significant differences were found between the two groups at the 0.05 level. After these tests, nine of the responses were deleted because more than half of the questions were unanswered. This resulted in a total of 510 usable responses, yielding an effective response rate of 24.3 percent. The median age in the final data set was 43, and 54 percent were male. We found that on average, the subjects had used the Web for 7 years, and that they spent 21 hours a week on the Web.

Measures

Scale measures used in this study were borrowed mainly from existing scales that previous research has shown to be reliable and valid. In those cases in which appropriate measures were not available in the literature, we attempted to develop new ones. The specific items included in this study are shown in the Appendix. Unless otherwise noted, the anchors for all items were 1 = strongly disagree to 7 = strongly agree.

First of all, a single-item scale was used to measure each of the control variables (i.e., age, gender, Internet experience, Internet usage, target system experience, and target system usage), except perceived ease-of-use, which was measured by three items borrowed from Agarwal and Karahanna (2000). As a research construct, perceived usefulness was measured by a multi-item scale consisting of three items also borrowed from Agarwal and Karahanna (2000). We used three items to measure satisfaction, and those measures were newly developed based on the definition of the construct and on existing scales from consumer behavior literature (Burnham et al. 2003; Lam et al. 2004; Spreng et al. 1996). The personalization measure consisted of four items; three of them were borrowed from Burnham et al.'s (2003) "modification" scale, and we developed one new item (i.e., "I have chosen features offered by the portal site to suit my style of portal use"). The learning scale included three items, and it was operationalized based on the measures of "learning costs" in Burnham et al. and "post-switching behavioral and cognitive costs" in Jones et al. (2002). We developed the measure of loyalty ourselves by referring to the existing scales developed by Beatty and Kahle (1988), Srinivasan et al. (2002), and Wulf et al. (2001). Because the concept of loyalty has often been confused with its outcomes such as continuance intention and word-of-mouth, we took care to capture only attitudinal (i.e., affection-related) evaluations that differed from behavioral consequences. The loyalty measure consisted of three items. We drew especially upon the items used by Lam et al. (2004) and Gefen (2002) to develop our four items that were used to capture the concept of switching costs.

Usage intention was measured by two items. Special care was taken to measure behavioral intention toward the extent of usage rather than toward the use-nonuse decision (Courneya and McAuley 1993). The first item, "In the next four weeks, how often will you visit this website?" was measured on a seven-point scale anchored with "infrequently" (1) and "frequently" (7). The second item, "I intend to visit this website during the next four weeks within the following frequency" was rated on an eight-point scale with the following categories: 1 = never; 2 = less than once a month; 3 = once a month; 4 = a few times a month; 5 = a few times a week; 6 = about once a day; 7 = two to four times a day; 8 = more than five times a day. Word-of-mouth was measured with three items that were adapted from Srinivasan et al. The scale of willingness to pay was new and was developed with a focus on assessing a person's willingness to pay even a small fee for a service currently available for free. We tried to measure the concept by using three items, each of which is associated with a different payment option: "$0.25 per month," "a one-time-only fee of $6," and "an annual fee of $3." Finally, to measure inattentiveness to alternatives, we used two items adapted from the measures of "alternative/switching experience" in Jones et al. (2002).

Data Analysis and Results

Measurement Model

To assess the psychometric properties of the measures, we performed a confirmatory factor analysis (CFA) using LISREL 8 (Jöreskog and Sörbom 1996). We evaluated model fit through multiple fit criteria, each of which represents a different aspect of the model. In particular, six fit indices examined in this study were the comparative fit index (CFI), the nonnormed fit index (NNFI), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the goodness-of-fit index (GFI), and the adjusted goodness of fit (AGFI). For each index, an acceptable level of fit is indicated as follows: CFI $\geq$ 0.95; NNFI $\geq$ 0.95; RMSEA $\leq$ 0.06; SRMR $\leq$ 0.08; GFI $\geq$ 0.90, and AGFI $\geq$0.80 (Bearden et al. 1993; Gefen et al. 2000; Hu and Bentler 1999).

The measurement model included 11 factors with their 33 corresponding indicators as well as the 6 single-item covariates as listed in the Appendix. For model identification, each of the single-item factors was specified to have a reasonable degree of measurement errors. In particular, the reliability of each item was assumed to be 0.90 in this study, and the measurement model was specified accordingly. We

ran the measurement model, and the results indicated that the model fit the data satisfactorily in terms of all the fit indices considered in this study: $\chi^2(572) = 1152.88, p < 0.001$, CFI = 0.97, NNFI = 0.96, RMSEA = 0.045, SRMR = 0.035, GFI = 0.90, AGFI = 0.86. Table 1 shows, based on our measurement model, the means, standard deviations, Cronbach's alpha, composite reliability, average variance extracted (AVE), and correlations of the measures.

To further ensure the psychometric properties of the measures, we examined the validity and reliability of the scales (Bagozzi and Yi 1988, Fornell and Larcker 1981). First, convergent validity is established if the factor loading of an item is 0.60 or more (Chin et al. 1997). We found from the LISREL output that the lowest loading was 0.74, indicating that the convergent validity of the scale measures was acceptable. Second, discriminant validity is shown if the square root of the AVE of a measure is larger than its correlation coefficients with the other measures (Chin 1998; Fornell and Larcker 1981). We found that each of the scales met the criterion mentioned previously, which suggests that discriminant validity is satisfactory. In addition to convergent and discriminant validity, we also examined the reliability of the scales. Three types of reliability indices examined in this study were Cronbach's alpha, composite reliability, and average variance extracted. Acceptable levels of Cronbach's alpha, composite reliability, and average variance extracted are said to be 0.70, 0.70, and 0.50 or higher, respectively (Bagozzi and Yi 1988; Bearden et al. 1993; Fornell and Larcker 1981). As shown in Table 1, the reliability of the scale measures (i.e., Cronbach's alpha $\geq$ 0.84, composite reliability $\geq$ 0.85, and average variance extracted $\geq$ 0.70) exceeds the recommended values by significant amounts. Thus, with acceptable model fit, validity, and reliability, our measures were considered to be appropriate for subsequent tests of the causal model and the research hypotheses.

Test of Research Model and Hypotheses

We used a structural equation modeling (SEM) technique via LISREL 8 (Jöreskog and Sörbom 1996) to test the proposed model. In the structural model, the four antecedent factors were specified as exogenous variables, whereas the two intervening and four outcome variables were treated as endogenous variables. Meanwhile, Web usage, Web experience, and perceived ease-of-use were specified as potential determinants of the endogenous variables. In addition, gender, age, target system experience, and target system usage were treated as moderators that could potentially change the intramechanism relationships. In this study, interaction effects were estimated using the means of latent variable scores (MLVS) technique (Jöreskog 1998).

The results of data analysis showed that although the NNFI and GFI values were marginal, the proposed model satisfied the recommended criteria for all other fit indices considered in this study, which suggests that the model fit the data reasonably well [$\chi^2(1194) = 1982.83, p < 0.001$, CFI = 0.96, NNFI = 0.94, RMSEA = 0.036, SRMR = 0.030, GFI = 0.89, AGFI = 0.81]. We also found that the proposed model explained a significant amount of variation in the endogenous variables (i.e., on average more than 35 percent). Taken together, our model was deemed to be a reasonable representation of individuals' reactions to a portal website. Figure 2 shows only the significant relationships between the research variables, for the sake of brevity. Meanwhile, Table 2 presents the full results of the SEM analysis, including the structural path estimates and explained variances.

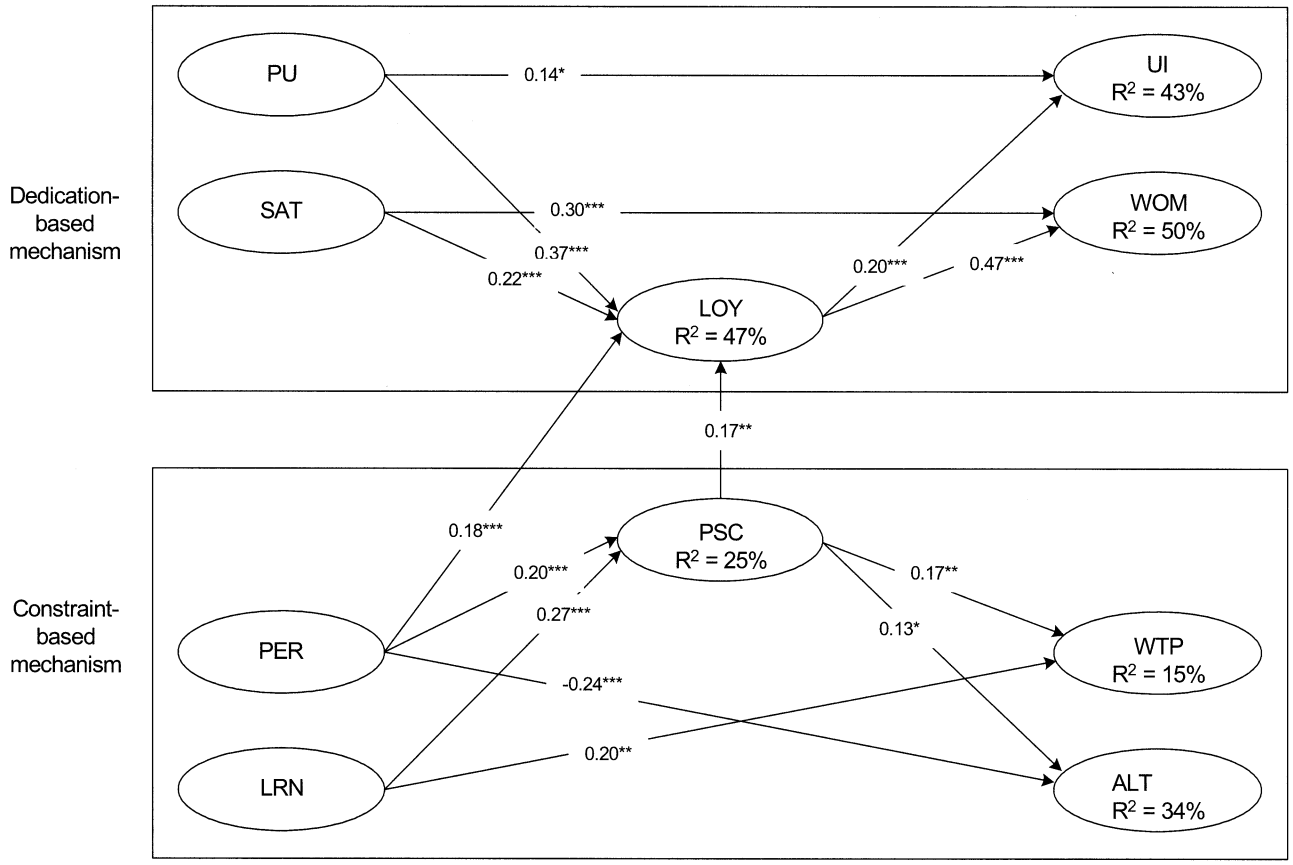
As hypothesized, the relationships proposed to characterize the dedication-based mechanism were all found to be significant. In particular, both perceived usefulness and satisfaction had positive effects on loyalty (H1 and H2 supported). In addition, we found that loyalty significantly affected both usage intention and word-of-mouth (H3 and H4 supported). Our hypotheses related to the constraint-based mechanism also received empirical support. Specifically, the results showed that the effects of personalization and learning on switching costs were statistically significant (H and H6 supported). Besides, switching costs were found to significantly affect such constraint-based outcomes as willingness to pay and inattentiveness to alternatives (H7 and H8 supported). Finally, we found that the effect of switching costs on loyalty was significant, which provides support for the hypothesis that the dedication- and constraint-based mechanisms are connected through the intervening variables (H9 supported). Taken as a whole, all the research hypotheses proposed in this study were empirically supported.

An important premise of the dual model is that because the dedication and constraint-based mechanisms operate quite independently, intramechanism relationships will be fairly weak. To examine these propositions, we explicitly controlled for the "spillover" relationships across the mechanisms. As expected, the results indicated that the intramechanism relationships were generally insignificant. As shown in Table 2, no significant relationships exist between perceived benefits and switching costs. However, the intermechanism relationship between personalization and loyalty was found to be significant, while the learning–loyalty relationship was not significant. Subsequently, we examined the intermechanism relationships between loyalty and the constraint-based outcomes but found no relationships between them. Likewise, we did not find any significant relationships between switching costs and the dedication-based outcomes.

Table 1. Properties of Measurement Scales

						Correlation																
	ME	**SD**	**AL**	**CR**	**AVE**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
1. GEN	1.45	0.50	na	na	na	na																
2. AGE	44.03	14.65	na	na	na	-0.12**	na															
3. IEXP	7.73	3.51	na	na	na	-0.12*	-0.04	na														
4. IUSE	20.93	16.09	na	na	na	-0.10*	-0.08	0.13**	na													
5. TEXP	4.45	3.30	na	na	na	0.07	0.04	0.29***	0.00	na												
6. TUSE	51.27	65.67	na	na	na	-0.05	-0.06	0.06	0.17***	0.05	na											
7. PEOU	5.37	1.31	0.93	0.93	0.82	0.09	-0.06	0.11*	0.05	0.14**	0.14**	0.91										
8. PU	4.75	1.40	0.97	0.97	0.91	0.04	-0.01	0.00	0.05	0.07	0.12**	0.53***	0.95									
9. SAT	5.22	1.35	0.97	0.97	0.91	0.10*	0.02	-0.01	0.01	0.13**	0.09	0.66***	0.63***	0.95								
10. PER	4.26	1.81	0.96	0.96	0.85	-0.03	-0.03	-0.01	0.09	0.06	-0.01	0.25***	0.33***	0.25***	0.92							
11. LRN	2.67	1.35	0.94	0.94	0.84	-0.16***	0.11*	-0.09*	-0.12*	-0.03	-0.05	-0.39***	-0.04	-0.19***	0.14**	0.92						
12. LOY	4.24	1.49	0.93	0.93	0.82	0.10*	-0.05	-0.11*	-0.04	0.07	0.06	0.29***	0.55***	0.49***	0.39***	0.13**	0.91					
13. SC	3.93	1.62	0.90	0.90	0.70	0.09	0.11*	-0.05	-0.16***	-0.03	-0.06	-0.13**	0.10*	0.01	0.22***	0.35***	0.29***	0.84				
14. UI	6.15	1.40	0.85	0.85	0.74	0.03	-0.05	0.18***	0.22***	0.18***	0.34***	0.04***	0.39***	0.33***	0.30***	-0.01	0.35***	0.01	0.86			
15. WOM	4.97	1.43	0.95	0.95	0.85	0.12*	-0.09	-0.07	0.05	-0.03	0.06	0.34***	0.48***	0.53***	0.31***	-0.04	0.63***	0.12	0.30***	0.92		
16. WTP	2.60	1.95	0.94	0.94	0.84	-0.04	0.14**	-0.01	0.06	-0.07	-0.03	0.03	0.10*	0.04	0.18***	0.21***	0.14**	0.25***	0.15**	0.05	0.92	
17. ALT	3.62	1.62	0.84	0.85	0.73	0.01	0.05	-0.12*	-0.15**	-0.04	-0.09	-0.47***	-0.36***	-0.29***	-0.34***	0.12*	-0.21***	0.12*	-0.36***	-0.24***	-0.14**	0.85

Notes:
- ME = mean; SD = standard deviation; AL = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.
- GEN = gender; AGE = age; IEXP = Internet experience; IUSE = Internet usage; TEXTP = target system experience; TUSE = target system usage; PEOU = perceived ease-of-use; PU = perceived usefulness; SAT = satisfaction; PER = personalization; LRN = learning; LOY = loyalty; SC = switching costs; UI = usage intention; WOM = word-of-mouth; WTP = willingness to pay; ALT = inattentiveness to alternatives.
- Value on the diagonal is the square root of AVE.
- *p < 0.05; **p < 0.01; ***p < 0.001 (two-tailed).



Notes:
- PU = perceived usefulness; SAT = customer satisfaction; PER = personalization; LRN = learning; LOY = customer loyalty; PSC = perceived switching costs; UI = usage intention; WOM = word-of-mouth; WTP = willingness to pay; ALT = inattentiveness to alternatives.
- Only significant paths between the research variables are shown.
- *p < 0.05; **p < 0.01; ***p < 0.001 (two-tailed).

Figure 2. Results of Data Analysis (Completely Standardized Solutions)

Overall, seven out of the intermechanism paths were found to be insignificant, and even the only significant path was not substantially strong when compared with the intramechanism relationships. Thus, more credibility can be given to an overarching premise of this study that the dedication- and constraint-based mechanisms are quite distinct and exhibit fairly discernible relationship patterns.

The overriding relationships between the antecedents and the outcomes over and above the intervening variables deserve mention. Consistent with past IS research, we found that perceived usefulness had a positive effect on usage intention. In addition, satisfaction was found to have a direct relationship with word-of-mouth. These results indicate that, although loyalty plays an important role in determining the previously discussed dedication-based outcomes, perceived benefits nevertheless have direct effects on the outcomes beyond loyalty. Similarly, we observed that service-specific investments had overriding effects on the constraint-based outcomes over and above switching costs. In particular, the learning factor had a positive relationship with willingness to pay. An unexpected finding, however, was that personalization had a negative relationship with inattentiveness to alternatives, which implies that the more one personalizes a website, the more he or she looks for other alternatives. We speculate that most of those who frequently modify Web settings are highly skillful, and thus, they are likely to explore other service providers' websites with minimal efforts compared with the effort required by those who are less skillful. In any event, we found that many of the overriding paths be-

Table 2. Results of Structural Equation Modeling Analysis (Completely Standardized Solutions)

		Commitments		Dedication-based outcomes		Constraint-based outcomes	
		LOY	SC	UI	WOM	WTP	ALT
Perceived benefits	PU	0.37***	0.11	0.14*	0.04		
	SAT	0.22***	0.02	-0.06	0.30***		
Service-specific investments	PER	0.18***	0.20***			0.08	-0.24***
	LRN	0.08	0.27***			0.20***	-0.06
Commitments	LOY	0.17***		0.20***	0.47***	0.03	0.04
	SC			0.01	-0.02	0.17**	0.13*
Control variables	GEN	0.05	0.17***	0.04	0.04	-0.01	0.00
	AGE	-0.07	0.09*	0.00	-0.06	0.14**	-0.01
	IEXP	-0.09*	0.03	0.12**	0.00	0.05	-0.12*
	IUSE	-0.01	-0.13**	0.16***	0.06	0.12*	-0.05
	TEXP	0.04	-0.04	0.08	-0.11**	-0.11*	0.07
	TUSE	0.03	0.00	0.25***	-0.01	-0.03	-0.02
	PEOU	-0.06	-0.15*	0.19**	0.00	0.12*	-0.41***
Interactions	GEN * PU	-0.08		-0.05	-0.01		
	GEN * SAT	0.08		-0.09	-0.02		
	GEN * PER		0.01			-0.01	-0.05
	GEN * LRN		-0.05			-0.04	0.01
	GEN * LOY			0.06	-0.04		
	GEN * SC					0.07	0.01
	AGE * PU	-0.03		0.05	0.05		
	AGE * SAT	0.00		0.08	-0.01		
	AGE * PER		-0.06			0.07	-0.14**
	AGE * LRN		-0.12**			0.02	0.04
	AGE * LOY			-0.09	-0.02		
	AGE * SC					0.03	0.08
	TEXP * PU	-0.07		-0.10	-0.04		
	TEXP * SAT	0.03		-0.05	-0.04		
	TEXP * PER		0.05			-0.02	-0.03
	TEXP * LRN		0.08			0.03	0.09
	TEXP * LOY			-0.02	0.07		
	TEXP * SC					-0.11	-0.01
	TUSE * PU	-0.11**		-0.12**	0.01		
	TUSE * SAT	0.02		-0.09*	-0.09*		
	TUSE * PER		-0.08			-0.06	-0.04
	TUSE * LRN		-0.02			0.04	0.03
	TUSE * LOY			-0.02	0.04		
	TUSE * SC					0.00	0.01
SMC (R^2)		47%	25%	43%	50%	15%	34%

Notes:
- GEN = gender; AGE = age; IEXP = Internet experience; IUSE = Internet usage; TEXP = target system experience; TUSE = target system usage; PEOU = perceived ease-of-use; PU = perceived usefulness; SAT = satisfaction; PER = personalization; LRN = learning; LOY = loyalty; SC = switching costs; UI = usage intention; WOM = word-of-mouth; WTP = willngness to pay; ALT = inattentiveness to alternatives
- *p < 0.05; **p < 0.01; ***p < 0.001 (two-tailed).

tween the antecedents and outcomes were significant—an indication that the overriding paths need to be an explicit part of the dual model.

We also examined the effects of 7 control variables on the research variables and found that 17 of 42 paths proved to be significant. Interestingly, each of the control variables had a significant relationship with at least one variable. For example, switching costs were found to be lower among male users than female users. Similarly, switching costs were found to be lower among younger users than older users. Meanwhile, we found that Internet experience had negative effects on loyalty and inattentiveness to alternatives. In addition, target system experience was shown to have negative relationships with word-of-mouth and willingness to pay. These results suggest that maintaining profitable relationships with experienced users would be a challenge to online firms. We suspect that experienced users are typically skillful users and that they tend to be less loyal to the incumbent provider and willing to explore other possibilities. Moreover, consistent with the IS literature (Kim and Malhotra 2005), target system usage was found to have a strong effect on usage intention. This result implies that the use of an online portal tends to easily become habitual, and as a result, past use (i.e., target system usage) becomes the best predictor of subsequent use. Finally, the results showed that Internet usage had a negative effect on switching costs, and perceived ease-of-use was also negatively associated with switching costs and inattentiveness to alternatives. Probably, those high on Internet usage and perceived ease-of-use are competent users, and such competent users are likely to feel less dependent on the incumbent provider and more willing to look for alternatives.

A total of 64 interaction effects were estimated as a way to assess the moderating effects of gender, age, target system experience, and target system usage on post-adoption phenomena. As shown in Table 2, eight of them are shown to be statistically significant. Interestingly, half of the significant interaction effects were related to target system usage. Specifically, we found that the effects of perceived usefulness on loyalty and usage intention decreased with an increase in past use. Similarly, the effects that satisfaction had on usage intention and word-of-mouth decreased as past use increased. Kim et al. (2005) demonstrated that because of the self-perception process, the effect of beliefs on behavioral intention decreased as past use increased. Our results apparently provide further support for the self-perception proposition by Kim et al. (2005). Meanwhile, the age factor was found to negatively moderate the relationship between personalization and inattentiveness to alternatives and the relationship between learning and switching costs. These results imply that in contrast to their younger counterparts, older users' reliance on the service provider would be less influenced by service-specific investments. Overall, we can infer from this study that online consumer behavior at the post-adoption stages is fairly complex and that a number of moderator variables should be taken into account simultaneously for a better understanding of post-adoption phenomena.

Finally, we checked whether common method variance (CMV) threatens the validity of our results. In order to estimate the extent of CMV, we specifically used the bottom 5 percent of the positive correlations among variables (Table 1) (Lindell and Whitney 2001; Malhotra et al. 2006). Our inspection revealed that a conservative estimate of the inflated correlation resulting from CMV was 0.03 (p = ns), suggesting that the biases arising from CMV were not serious in this study. Taken together, our classification scheme for the two different causal mechanisms seems quite useful, and the proposed model appears to serve as a reasonable representation of post-adoption phenomena in the context of online services.

Discussion and Conclusion

The major objective of this study was to examine the dedication- and constraint-based mechanisms that characterize post-adoption phenomena in the context of online services. Our findings based on actual users of online portals are highly consistent with the dual model proposed in this study. Specifically, we found that in the dedication-based mechanism, perceived usefulness and satisfaction influence loyalty, which in turn affects usage intention and word-of-mouth. In the constraint-based mechanism, meanwhile, learning and personalization are found to affect switching costs, which eventually lead to willingness to pay and inattentiveness to alternatives. The two mechanisms exhibit highly discernible patterns in their intramechanism and intermechanism relationships, but they are not completely independent of each other; this is because loyalty and switching costs are interrelated. The findings of this study provide strong support for our dual model, which posits that the dedication- and constraint-based mechanisms simultaneously, yet differentially, determine consumers' reactions to online services at the post-adoption stages. Overall, this research contributes to IS research by offering a conceptual framework that helps to clarify the complex nature of post-adoption phenomena in the context of online services.

Theoretical Implications

The construct of loyalty has often been treated in IS research simply as behavioral outcomes such as usage intention and

word-of-mouth (Gefen 2002; Kim et al. 2002). However, the identification of loyalty with behavioral outcomes is problematic because it ignores the important role of dedication commitment in characterizing a long-term relationship between customers and firms. For example, Gefen (2002) found that switching costs positively affected the factor named "customer loyalty," which was actually operationalized as a combination of usage intention and word-of-mouth. However, our study shows that switching costs have a positive impact on loyalty, but, once loyalty is taken into account, no relationships exist between switching costs and dedication-based outcomes. These findings imply that our dual model, which draws on social exchange theory with emphasis on dedication and constraint commitments, is superior to existing models in clarifying seemingly complex post-adoption phenomena. In the IS discipline, loyalty and switching costs have seldom been examined simultaneously. Moreover, the treatment of the key concepts in past research was not sophisticated and did not reflect the notion of commitments. In this sense, this study contributes to the literature by theoretically highlighting the duality of consumers' commitments and empirically demonstrating that loyalty and switching costs can represent such commitments in the online B2C domain.

Much post-adoption research, like other traditional IS research, takes a simplistic view that perceived benefits such as perceived usefulness and satisfaction serve as the main drivers of individuals' reactions to online services. However, we found that perceived benefits affect the dedication-based mechanism but exert little effect on the constraint-based mechanism. This finding has important implications for IS research because, although a significant amount of work has shown the efficacy of perceived benefits in explaining online consumer behavior (Bhattacherjee 2001; Devaraj et al. 2002), perceived benefits alone are inadequate to explain the complexity of online consumer behavior. Meanwhile, we found that switching costs are mainly driven by prior use of a personalization feature and the time and effort spent in learning such a feature. In IS research, personalization is generally regarded as an IT characteristic that affects website usability and eventually the dedication-based mechanism (Agarwal and Venkatesh 2002). Interestingly, however, our study shows that personalization not only affects dedication (i.e., loyalty) but also constraints (i.e., switching costs). To the best of our knowledge, no studies in either marketing or information systems have shown that service-specific investments exert their effects on both dedication- and constraint-based mechanisms. Taken together, the present study fills a void in the IS literature by revealing the limitations of the simplistic value-oriented approach and shedding light on the powerful effects that personalization and learning have on online consumer behavior.

Although post-adoption behavior has recently received considerable attention, the fact remains that much of the scholarly effort has been limited to IT usage. To address this problem, we attempt to extend an extant view of IT usage to a more integrative theory of behavioral outcomes. Our model incorporates a variety of behavioral outcomes; while some of them are often examined in the IS literature, others are rarely mentioned despite their significance to online providers (e.g., inattentiveness to alternatives). This study contributes to the literature by offering a useful classification scheme for those behavioral outcomes that are salient in the context of online services. More important, it demonstrates that in order to accurately explain those outcomes, *both* dedication and constraint should be taken into account simultaneously. A number of marketing and information systems studies have focused on only one of the two commitments as a predictor of behavioral outcomes (e.g., Burnham et al. 2003; Srinivasan et al. 2002). However, our findings indicate that dedication exerts effects on only dedication-based outcomes, whereas constraints affect constraint-based outcomes. Thus, a narrow focus on one of the two commitments—as was often done in past research—would be seriously problematic in studying diverse behavioral outcomes.

In summary, although an increasing number of IS studies have explored online consumer behavior (e.g., online shopping, online news, Web portals), considerable effort has gone into this stream of research without realization of the importance of the two different mechanisms underlying online consumer behavior. To the best of our knowledge, this study is the first to derive testable hypotheses, based on the idea of a dual model, and empirically test the hypotheses. Thus, we have made an important step toward a better understanding of a dual model that was at best propositional and at a nascent stage (e.g., Bendapudi and Berry 1997). We hope that our findings will guide further research on online consumer behavior and help to accumulate and incorporate empirical findings seamlessly into a coherent body of knowledge.

Managerial Implications

This study shows that service-specific investments affect both dedication and constraint commitments, suggesting the important role such investments play in regulating individuals' post-adoption reactions to online services. An important implication of this finding for online business practices is that online service providers have incentives to promote customers' personalized interactions with the websites because these interactions ultimately will increase customers' nontransferable investments. For example, online service providers need to actively encourage customers to customize their websites in terms of services and contents (e.g., news, e-

mails, weather, photos, briefcases, and blogs) so that the webpage can be tailored to the customers' own interests and needs (Cohen 2006). For instance, Google recently upgraded its personalization homepage and launched iGoogle by adding a large number of personalization features (Claburn 2007). Through such investments of their time and effort, customers become more dependent on the providers (i.e., higher constraint), and at the same time, they become more dedicated to the providers (i.e., higher dedication).

A major implication of the dual model to practitioners is that a clear understanding of the intramechanism and intermechanism relationships is a key to effective customer relationship management. For example, our findings suggest that it is important for firms to try to enhance customer loyalty—through offering a variety of valuable content and services—because customer loyalty will affect both short-term performance by attracting more website traffic (i.e., usage intention) and long-term success by building a better reputation (i.e., word-of-mouth). However, given that switching costs do not relate directly to dedication-based outcomes, a management tactic to inflate switching costs appears to be less effective in boosting customer patronage than the loyalty-oriented approach.

Meanwhile, we found that loyalty did not have any relationships with constraint-based outcomes. That is, enhancing loyalty is probably not a panacea for all managerial problems especially in the online service domain. In contrast, this study shows that switching costs play a significant role in regulating willingness to pay. This finding implies that, unless customers are high on switching costs, they are unlikely to tolerate the levy of even a small fee for a service once available for free. Similarly, we found that inattentiveness to alternatives was affected not by loyalty but by switching costs. It also implies that loyalty will be especially volatile when powerful new competitors enter the market. Thus, to effectively manage and build relational bonds with customers, online service providers should be aware of the importance of a constraint-oriented strategy that can complement the widely known dedication-oriented strategy.

Limitations and Further Research

A potential problem of this study relates to the possibility of ignoring salient factors in our consideration. For example, we do not explicitly incorporate the concept of trust into our model. The rationale for this is that the effect of trust on behavioral outcomes is known to be fully mediated by satisfaction (Hennig-Thurau et al. 2002). It is our assumption that any biases resulting from the omission of trust would be minimal, at least in this particular study. Nevertheless, it is still possible that trust can exert its influence on customer behavior over and above perceived benefits in other contexts. Thus, our findings should be carefully interpreted with this potential problem in mind.

Another limitation of this study is that it focuses on the extent of personalization as a whole without paying much attention to the specific features that are personalized. Although an examination into personalization at a global level is meaningful in its own right, it is also important to examine at a micro level how personalization is used and the outcome of such personalization. We encourage investigators to perform a feature-level analysis to gain better insights into managerial interventions that can affect consumer behavior at the post-adoption stages. Meanwhile, it was somewhat unexpected to find that personalization was negatively associated with inattentiveness to alternatives. Although we offered a possible explanation for this unexpected finding (see the earlier section, "Test of Research Model and Hypotheses"), future research should be undertaken to systematically delineate the nature of personalization and its impacts on online consumer behavior in general.

It is worth also noting that the data in this study were collected from multiple websites rather than from a single website. We took this approach so as to have a wider range of variations in the levels of antecedent variables such as perceived benefits and service-specific investments. In doing so, our assumption was that the effects of different website characteristics on post-adoption phenomena would be, to some extent, captured by perceived benefits and service-specific investments. Despite its seeming reasonableness, this assumption may not be true, and thus the findings of this study should be viewed with this potential caveat in mind.

A major theme of this paper is that post-adoption phenomena are driven by the dedication and constraint mechanisms. Although essential, however, the two mechanisms are insufficient to offer a complete picture of post-adoption behavior. For example, we found from this study that past use had a significant effect on usage intention. This finding is consistent with the post-adoption literature that highlights the force of habit as demonstrated by the relationship between past use and subsequent use (e.g., Jasperson et al. 2005; Kim and Malhotra 2005; Kim et al. 2005). Thus, it is important for further research to investigate (1) the antecedent, intervening, and outcome variables in the habit mechanism and (2) how to incorporate the habit mechanisms into a conceptual framework. In addition, we recommend that investigators incorporate additional antecedents into the dual model for their research. For example, service-specific investments in the

constraint-based mechanism can be expanded by including artificial costs, such as discount coupons, whenever appropriate (Chen and Hitt 2002; Klemperer 1987). Our conceptual framework is flexible enough to accommodate such additional variables and still offer insights into their relationship with other variables. More credibility can be given to our model if the newly added variables behave in a nomological network as the model implies. We hope that in this manner further research can extend the conceptual framework proposed in this study.

Some of the interesting findings from this study are that, all things being equal, experienced and skillful users tend to react quite contrary to firms' interests. As mentioned earlier, personalization had a negative relationship with inattentiveness to alternatives, which implies that the customer who modifies the personal setting to a larger extent is more willing to explore other alternatives. In addition, we found that perceived ease-of-use had negative relationships with switching costs and inattentiveness to alternatives. Our study also shows that heavy Internet users feel less constrained to the incumbent provider than occasional Internet users. These findings seem to consistently indicate that as skills and experience increase, people become less dependent on the incumbent provider, and eventually they attempt to find other alternatives. In fact, Burnham et al. (2003) used a similar rationale to argue that domain expertise would have a negative relationship with switching costs and found empirical support for their hypothesis in the context of credit card and long-distance call services. With the theoretical and empirical evidence shown in Burnham et al.'s study, our findings and the *post hoc* interpretation of such findings are believed to be reasonable. Yet, caution should be exercised against any premature generalization of our findings here. Further research is certainly required for a better understanding of the roles that skills and experience play in regulating switching costs and behavioral outcomes across various contexts.

Finally, according to Stanley and Markman (1992, p. 597), "today's dedication is tomorrow's constraint." Therefore, it will be interesting to examine how dedication and constraint influence each other over time. We believe that the cross-sectional model presented in this study will serve as a basis for a longitudinal model of post-adoption phenomena.

Concluding Remarks

This research attempts to expand the horizons of post-adoption research, which has been largely limited to IT usage, by examining a variety of other post-adoption outcomes that may have more important implications than merge usage in the success of an online service. Our findings indicate that, although seemingly complex, post-adoption phenomena in the context of online services are essentially by-products of two basic mechanisms: the dedication- and constraint-based mechanisms. We believe that the conceptual model shown in this paper is not necessarily limited to online services but largely applicable to other contexts in which an IT application of interest creates customer value as well as locked-in resources (e.g., online financial services, online retailing, computer software, cellular services, and personal digital devices). Certainly, more effort should be directed to further reveal the complex nature of post-adoption phenomena. We hope that the dual model proposed in this study will lay a useful conceptual foundation for future work in this important area.

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About the Authors

Sung S. Kim is an associate professor of operations and information management at the University of Wisconsin–Madison. He holds a B.S. in electronic engineering from Yonsei University, Seoul, Korea; an M.S. in information systems from the University of Wisconsin–Madison; and a Ph.D. from the Georgia Institute of Technology in information technology management with a minor in industrial and systems engineering. His primary research focuses on automaticity in IT use, online consumer behavior, information privacy, and philosophical and methodological issues. His research appears in *Management Science*, *Information Systems Research*, *MIS Quarterly*, *Journal of the Association for Information Systems*, and *Decision Sciences*. He currently serves as an associate editor of *Information Systems Research*.

Jai-Yeol Son is an associate professor of Information Systems at Yonsei University, Seoul, Korea. His research focuses on business-to-business electronic commerce, organizational adoption of IT, and individual acceptance of B2C electronic commerce. His research has appeared in *MIS Quarterly*, *Journal of Management Information Systems*, *Journal of the Association for Information Systems*, *Journal of Organizational Computing and Electronic Commerce*. and *Communications for the Association for Information Systems*. He received Ph.D. in Information Technology Management from the Georgia Institute of Technology.

Appendix

Research Constructs and Measures

Perceived Benefits: Perceived Usefulness (PU)
PU1. Using the portal site enhances my effectiveness.
PU2. Using the portal site enhances my productivity.
PU3. Using the portal site improves my performance.

Perceived Benefits: Customer Satisfaction (SAT)
SAT1. I am content with the services provided by the portal site.
SAT2. I am satisfied with the services provided by the portal site.
SAT3. What I get from using the portal site meets what I expect for this type of service.

Service-Specific Investments: Personalization (PER)
PER1. The portal site is personalized in some way.
PER2. I "set up" the portal site to use it the way I want to.
PER3. I have put effort into adapting the portal site to meet my needs.
PER4. I have chosen features offered by the portal site to suit my style of portal use.

Service-Specific Investments: Learning (LRN)
LRN1. Learning to use the features offered by the portal site took a lot of time and effort.
LRN2. There was a lot involved for me to understand the portal site well.
LRN3. I spent a lot of time and effort to learn how the "system works" at the portal site.

Loyalty (LOY)
LOY1. I consider myself to be highly loyal to the portal site.
LOY2. I feel loyal towards the portal site.
LOY3. It means a lot to me to continue to use the portal site.

Switching Costs (SC)
SC1. Switching to a new portal site would involve some hassle.
SC2. Some problems may occur when I switch to another portal site.
SC3. It is complex for me to change portal sites.
SC4. If I stop using the portal site, I will waste a lot of the effort that I have already made in this portal site.

Usage Intention (UI)
UI1. In the next four weeks, how often will you visit this website? (infrequently-frequently)
UI2. I intend to visit this website during the next four weeks within the following frequency: (Eight categories)

Word-of-Mouth (WOM)
WOM1. I will say positive things about the portal site to other people.
WOM2. I will recommend the portal site to anyone who seeks my advice.
WOM3. I will refer my acquaintances to the portal site.

Willingness to Pay (WTP)
WTP1. I am willing to pay $0.25 per month for this service.
WTP2. I am willing to pay a one-time only fee of $6 for this service.
WTP3. I am willing to pay an annual fee of $3 for this service.

Inattentiveness to Alternatives (ALT)
ALT1. I will try the services offered by the other portal sites. (reversed)
ALT2. I will try occasionally other portal sites. (reversed)

Control Variables
1. Gender: (1 = male; 2 = female)
2. Age: (Years old)
3. Web Experience: "How long have you been using the World Wide Web?" (Years)
4. Web Usage: "On average, how many hours a week do you use the World Wide Web?" (Hours/Week)
5. Target System Experience: "How long have you been using the portal site?" (Years)
6. Target System Usage: "In the course of the past 4 weeks, how many times have you visited the portal site?" (Times)
7. Perceived Ease-Of-Use (PEOU)
   PEOU1. Interacting with this website does not require a lot of mental effort.
   PEOU2. I find it easy to get the website to do what I want it to do.
   PEOU3. I find the website easy to use.