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The Impact of Switching Costs on Intention to Stay with MS-Windows

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Abstract

The role of switching costs in customer retention has been posited, but has not been subjected to rigorous empirical testing. Therefore, our main focus is on the factors that influence whether consumers will have intention to switch or stay with an incumbent technology (e.g., MS-Windows). Based on consumer survey with MS-Windows users, we find empirical support for the link between the existence of compatible software, consumer's expertise in MS-Windows and intention to stay with MS-Windows. Specifically, switching costs are found to be positively associated with the existence of compatible software. Further, the lack of expertise in MS-Windows on the part of consumers tends to increase the likelihood that they will rely on current MS-Windows, rather than switch to other alternative operating systems.

Keywords : MS-Windows, Switching Costs, Structural Model

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1. Introduction

Reduced regulation, increased price competition, and diminished consumer loyalty have propelled customer retention and customer relationship management (CRM) to the forefront of management concerns. As competition intensifies and the costs of attracting new customers increase, companies are increasingly focusing their strategic efforts on retaining customers [Jones et al., 2002]. Obviously, a key component in any customer retention program is satisfaction. However, satisfaction need not be the only strategy [Fornell, 1992]. Barriers to customer defection, such as the development of strong interpersonal relationships or the imposition of switching costs, represent additional retention strategies. 'Switching costs' are the psychological, physical, and economic costs that consumers face in switching between technologies [Jackson, 1985]. Despite their potential importance in the retention process, the role of switching costs has received relatively little attention in the fields of marketing, management, and economics [Jones et al., 2002 ; Burnham et al., 2003].

Therefore, our main focus is on the factors that influence whether consumers will switch to alternative technologies or stay with an incumbent technology (e.g., MS-Windows). We focus on three categories of factors : 1) the existence of compatible software 2) the pace of upgrade in MS-Windows, and 3) the consumer's expertise in MS-Windows.

Specifically, we attempt to demonstrate the importance of switching costs in the success that corporate technology advancement strategies (such as the promotion of a variety of compatible software and the pace of upgrade) have had in securing commitment to a particular type of technology. We argue, however, that the success of these seemingly disparate strategies actually depends to a significant degree on the same underlying factor, i.e., switching costs. Further, uncertainty caused by the consumer's lack of expertise also can play a major role in the decision to stay with incumbent technology. In the process, we hope to provide an integrative framework for understanding at least some of the mechanisms by which technology advancement strategies and the consumer's technology expertise of the consumer affect intention to stay with incumbent technology.

2. Conceptual Model and Research Hypotheses

2.1 Existence of Compatible Software

Many of the products are used not in isolation but integrated with one or more complementary products. The value of products and services depends on the number or variety of compatible complementary goods or services [Katz and Shapiro, 1985]. For instance, CD players are used with CDs, video game consoles with video games, and computer operating systems with software programs. All of these have one thing in common, namely coexistence : they need each other. Consumers are more likely to purchase items that are either compatible with their existing equipment or likely to be compatible with future products in the same category. When consumers purchase products in the form of components that must be put together, technological compatibility between components becomes a factor in the evaluation of the end product [Kotabe et al., 1996].

Alternatively, compatibility of technology is associated with the cost to the consumer of switching technologies. Complementary goods provide system benefits : the added value to users of the full system. The incremental benefits provided by the whole can be greater than the sum of the benefits of the individual components. System benefits usually increase switching costs [Jackson, 1985 ; Shapiro and Varian, 1999]. Therefore, system benefits and the increased cost of switching between whole systems are effective in keeping consumers committed to the technologies they are currently using.

Getting a multicomponent system to work properly almost always requires more than just placing the individual components next to each other. To use the products effectively, consumers must define interfaces, make connections, establish compatibility and invest in other system components as well, and this investment can exceed the investment in the product itself. A study conducted by the Gartner Group Inc. states "The initial purchase price of a corporate personal computer accounts for only 10 percent of its lifetime cost. The rest : troubleshooting, administration, software, and training." [Gross and Coy, 1995]

To the extent that the existing-version adopter continues to derive a satisfactory consumption value from the entire system and to the extent that the consumer's systemwide investment (in complementary products, interfaces and learning) is neither transferable to the new version nor recoverable from the disposal of the existing version, the consumer will be even more reluctant to switch [Dhebar, 1996]. Switching costs in the networked multicomponent system are likely to be larger than stand-alone products, especially when each component in multicomponent system has a different useful lifetime. Therefore,

Hypothesis 1 : The existence of compatible software will be positively associated with switching costs.

2.2 Pace of Upgrade in MS-Windows

The pace of upgrade is defined as the rate at which the focal technology and its features are changing [Weiss and Heide, 1993]. In recent times, the time interval between successive generations of high technology products has been very short. An extreme example of this is the computer software industry, where firms introduce a series of upgrades at a rapid pace. A prominent case in this sector is Microsoft Corporation, which introduces upgrades for its operating system Windows approximately once every two years.

In a general sense, the perception of a rapid pace of upgrade creates uncertainty and gives rise to an information processing problem in potential buyers. Specifically, under rapidly changing technological conditions, acquired information is time sensitive and tends to have a shorter shelf life. That is, to the extent that the technology's features or underlying technology is improving quickly, information about a product received today may be relatively less valuable tomorrow. For a consumer, one implication of the rapid pace in upgrade may be a perception that new information may rapidly become outdated anyway. This perception acts as an incentive to consumers to curtail decision processes and to act on acquired information [Weiss and Heide, 1993].

As suggested by Sutton, Eisenhardt, and Jucker [1986], rapid upgrades in technology make it difficult for buyers to evaluate acquired information in terms of the significance of new technology offerings. This, in turn, gives consumers an incentive to stay with the incumbent technology, even after having collected information about new ones. This prediction is also supported by studies showing that rapid upgrade represents uncertainty because of the time sensitivity of information [Bourgeois and Eisenhardt, 1988]. Under such conditions, information gathered at a particular point in time may not remain relevant for lon g : thus making a decision to buy a new and relatively unknown technology introduces the risk of obsolescence. Consumers are reluctant to switch not because they do not value the improvement, but because early in the life of the existing version, the benefits from switching are not commensurate with the costs of switching [Dhebar, 1996]. Hence,

Hypothesis 2 : The pace of upgrade in MS-Windows will be positively associated with switching costs.

2.3 Expertise in MS-Windows

Alba and Hutchinson [1987] define consumer expertise as "the ability to perform product-related tasks" and to delineate characteristic differences between expert and novice consumers. As compared to novices, experts are better able to recognize the complexities in a problem and to process information analytically. In a decision to purchase, experts recognize important product attributes, operate from better-established decision criteria, and thus are more capable of making decisions independently. Novice consumers, on the other hand, lack knowledge base or well-formulated decision criteria.

Prior research has examined search efficiency as one of the predictors of consumer search levels [e.g., Brucks, 1985 ; Goldman and Johansson, 1978 ; Ratchford and Srinivasan, 1993]. Search efficiency is defined as the degree to which a consumer is able to identify, assess, and exploit the appropriate market sources for the optimal search strategy [Goldman and Johansson, 1978]. Two important factors influencing search efficiency include a consumer's knowledge and/or experience about the market and exposure to relevant information during the search process [Ratchford and Srinivasan, 1993]. A greater degree of market knowledge and exposure to relevant information will enable the consumer to examine only the appropriate relevant sources of search (and ignore the irrelevant sources), thereby enhancing the efficiency of the search. Search efficiency also makes it easier for the consumer to acquire and process new information [Brucks, 1985].

Therefore, experts will need to expend less effort in learning new technologies, enabling them to adapt new ones more efficiently. As they need less effort to search for information and to assess alternatives, the costs of switching will decline. Thus compared to novices, expert consumers find it much easier to search for information, evaluate it, and learn an alternative technology. Broad experience with an alternative provider is also likely to reduce perceptions of uniqueness of an existing provider, leading to weaker relational bonds with the provider [Burnham et al., 2003]. With this regard, expert consumers will be less reluctant than novices to adopt an alternative technology. Therefore,

Hypothesis 3 : Expertise in MS-Windows will be negatively associated with switching costs.

2.4 Switching Costs and Intention to Stay with MS-Windows

Switching costs refer to costs expressed as the time, efforts and financial risk involved in switching from a particular type of technology. Pre-switching search and evaluation costs represent consumer perceptions of the time and effort involved in seeking out information about available alternatives and in evaluating their viability prior to switching [Zeithaml, 1981]. Learning also occurs after switching, as consumers adjust to a new alternative. Consumer perceptions of the time and effort needed to acquire and adapt to these new procedures and routines are referred to as post-switching behavioral and cognitive costs. Cost-benefit models of behavior suggest that consumers engage in activities if the perceived benefits outweigh the perceived costs. All else being equal, the higher perceived costs of switching should reduce the likelihood that consumers will switch service providers [Jones et al. 2002]. Switching costs may be a significant impediment to the adoption of a new technology, acting as a barrier to new entrants by making consumers favor incumbent technologies [Porter, 1980].

High technology markets are characterized by a high level of uncertainty. Rapidly changing technologies and the absence of relevant information are the main sources of this uncertainty [Heide and Weiss, 1995]. This means that the costs and risks involved in switching from a technology will influence the choice behavior of consumers. Therefore, switching costs create dependence and inertia ; new technology keeps getting more costly for new consumers, at least in terms of the time required to master it. Consumers' anticipation of high switching costs gives rise to their interests in maintaining a continuous relationship and commitment to incumbent technologies [Dwyer et al., 1987].

Consumers in high technology markets tend to want their product usage skills, which they have developed on one technology/brand of a product class, to be transferable across all technologies/brands. Thus, consumers who develop nontransferable product-specific skills may be unwilling to learn how to use a new product [Alba and Hutchinson, 1987]. The effect grows with time, and consumers are forced to stay with incumbent technologies as the costs of switching continue to increase [Kotabe et al., 1996]. Further, commitment has been conceptualized in terms of a temporal dimension, focusing on the fact that commitment becomes meaningful only when it develops consistency over time. As a result of continuity, consumer turnover may be reduced and a relationship can be maintained [Ganesan, 1995].

Hypothesis 4 : The switching costs will encourage intention to stay with MS-Windows.

3. Research Design

3.1 Product

For this study, we chose MS-Windows operating system as a key product. First of all, MS-Windows operating system is a well-known and crucial product for computer users. Second, in the network market, MS-Windows operating system requires compatibility with other applications software. Third, an operating system can be upgraded, and indeed MS regularly offers upgraded versions. Finally, changing from one operating system to another imposes switching costs.

3.2 Questionnaire Development and Data Collection

A questionnaire on consumer's perception concerning personal computer operating system was developed for collecting data. The specific questionnaire development procedures follow. First, six academic experts (three in computer-related academics and three in business-related academics) helped to finalize the preliminary questionnaire. Twelve computer company managers then assessed the initial questionnaire. Each judge was asked 1) to evaluate the adequacy of the items according to the definitions provided, 2) to eliminate items that were poorly phrased or captured, and 3) to add items that might represent each latent variable but had not been included in the initial list. After this exercise, some of the initial items that had consistently been rated poorly by the judges were deleted, while a few new items were added.

Pretest questionnaires containing these items were then administered to 33 MS-Windows users. They were asked to indicate if any of the items were confusing, difficult to respond to, or not applicable to them. Their responses suggested that some of the items had to be reworded or reverse-coded.

The finalized questionnaire was mailed to 730 MS-Windows users in metropolitan areas in Korea. After sampling, we checked whether the selected computer users had been included in the pretest sample and replaced eight such users with others. Each individual respondent was contacted in advance by phone to request his/her cooperation ; in order to increase the response rate, follow-up calls were made and the participants were reassured that all responses would be kept confidential and that only the aggregate results would be presented. Of the 730 questionnaires distributed, 413 were finally returned with usable data, providing for a 56.6 percent response rate. Of the 413 respondents, 344 (83.3%) indicated that they had used a computer for at least three years. The demographic characteristics of respondents are shown in <Table 1>, <Table 2> shows the construct-level correlation matrix and descriptive statistics.

Measures for the variables were either developed specifically for this study or adapted from prior ones. In cases in which the measure was developed for this study, the domain of the relevant construct was first specified and the items subsequently developed on the basis of the conceptual definition. The items were then modified on the basis of field interviews, reviews of literature, and discussions with industry observers. The measures were subsequently pre-tested and modified again, if necessary. In cases in which the scale was adapted from prior studies, the wording of the original items was changed so as to make sense to respondents in the present context : as then the material was then used in a pretest. In addition, we refined the measure scales throughout the purification procedures. <Table 3> shows the items used in this study.

〈Table 1〉 Characteristics of Respondents

Age Group	No. of Respondents	Occupation	No. of Respondents
< 20 yrs	20(4.8%)	Student (Univ. Level)	34(8.2%)
20~24	31(7.5%)	Office Worker	73(17.6%)
25~29	37(9.0%)	Teacher	65(15.7%)
30~34	77(18.6%)	Self-employed Person	102(24.7%)
35~39	80(19.4%)	Others	139(33.7%)
40~44	116(28.1%)		
> 45 yrs	52(12.6%)		

〈Table 2〉 Scale Means, Standard Deviations, and Correlations

	Mean	S.D.	COMP	PACE	EXP	SWC	INT
COMP	5.70	.90	1.00				
PACE	5.82	.75	.27	1.00			
EXP	3.58	1.40	.30	-.04	1.00		
SWC	5.07	1.26	.14	.07	-.11	1.00	
INT	5.81	.85	.36	.23	.12	.28	1.00

Note) COMP = Existence of Compatible Software ; PACE = Pace of Upgrade in MS-Windows ; EXP = Expertise in MS-Windows ; SWC = Switching Costs ; INT = Intention to Stay with MS-Windows.

〈Table 3〉 Items and Internal Consistency

If you are a current user of MS-Windows, please answer the questions below.

Intention to Stay (Coeff = .68 ; Comp Reliability = .70 ; Var Extracted = .44)

- I will keep using MS-Windows.
- If possible, I wont use MS-Windows in the future. (Reverse Coded)
- In case both of Microsoft and other firms will produce new products, I will use the new MS-Windows.

Switching Costs (Coeff = .65 ; Comp Reliability = .69 ; Var Extracted = .45)

- It will take time and effort to become comfortable with other O/S systems.
- I will have to buy new software/computer to use other O/S systems.
- It is complicated for me to use other O/S systems.

Compatible Software (Coeff = .86 ; Comp Reliability = .86 ; Var Extracted = .61)

- Various applications software such as spreadsheets, graphics and word processing can currently be used on MS-Windows.
- There are various hardware peripherals such as soundcards that are compatible with MS-Windows.
- Various applications software such as spreadsheets, graphics and word processing will be used on the new MS-Windows, which will be on the market in the future.
- Various hardware peripherals such as soundcards and other components are compatible with the new MS-Windows, which will be on the market in the future.

Pace of Upgrade (Coeff = .59 ; Comp Reliability = .62 ; Var Extracted = .37)

A three-item, seven-point scale, anchored by No changes taking place and Frequent changes taking place.

- Nature of computer technology overall.
- Nature of computer operating systems.
- Nature of computer application software.

Expertise (Coeff = .86 ; Comp Reliability = .87 ; Var Extracted = .63)

- I know many functions of MS-Windows.
- I can work quickly on MS-Windows.
- I can solve computer problems on my own without any service from manufacturers.
- I usually advise people on computer-related problems.

4. Results

4.1 Measurement Model Results

Consistent with the two-step approach advocated by Anderson and Gerbing [1988], we estimated a measurement model prior to examining the structural model relationships. We used LISREL 8.14 [Jöreskog and Sörbom, 1998] with covariances as the input to estimate the model. The goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the comparative fit index (CFI) values were .93, .90, and .93, respectively, which means that the measurement model fits the data well. The parsimony normed fit index (PNFI) value was .72 (minimum acceptance is .60) and the root mean square error of approximation (RMSEA) was .059. Taken collectively, these indices suggest a good model fit, even though the chi-square index is significant (χ^2 (109) = 270.26 ; $p < .01$).

Heide and Weiss [1995] previously recommended examining the scales of a study for unidimensionality, composite reliability, and convergent and discriminant validity. Following their direction, we first computed the inter-item correlations and corrected item-to-total correlations for each item, taking one scale at a time. We explored the unidimensionality of each purified scale with principal axis factoring, using an eigenvalue of 1.0 and factor loadings of .25 as the cut-off point. In every case, only one factor was extracted.

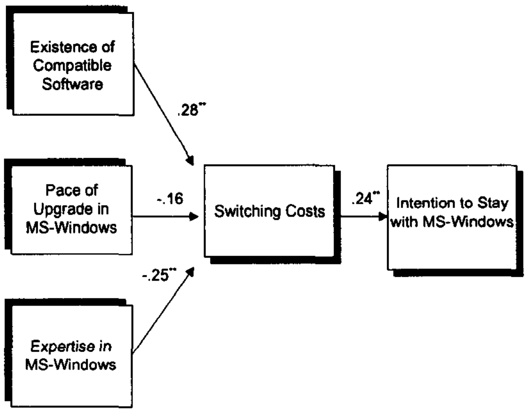
Composite reliability and coefficient alpha provide evidence of internal consistency. Composite reliability is a LISREL-generated estimate of internal consistency analogous to coefficient alpha [Fornell and Larcker, 1981]. As <Table 3> shows, these two estimates ranged from .59 to .86.

To investigate the convergent validity of the scales, we performed a confirmatory factor analysis using Maximum Likelihood (ML) estimation in LISREL 8.14. We have found that all factor loadings from latent constructs to their corresponding measurement items are statistically significant (i.e., $t > 2.0$; minimum t-value of the factor loadings is 6.18).

Discriminant validity is obtained when all pairwise latent-trait correlations of constructs are significantly different from one [Anderson and Gerbing, 1988]. In this study, discriminant validity was obtained as none of the confidence intervals encompassed 1.0. If the square of the parameter estimate between the two constructs is less than the average variance extracted estimates of the two constructs, then discriminant validity is supported [Fornell and Larcker, 1981]. This criterion was met across all possible pairs of constructs.

4.2 Structural Equation Model Results

The first hypothesis posits that the existence of compatible software is associated with the costs of switching from MS-Windows (H1). According to <Figure 1>, the positive relationship between compatible software and switching costs proves to be robust based on the corresponding coefficients ($\beta = .28$; $p < .01$).



주) ** $p < .01$.
Model of Fit : $\chi^2(112) = 325.51$, GFI = .91, AGFI = .89, CFI = .91, PNFI = .72, RMSEA = .068.

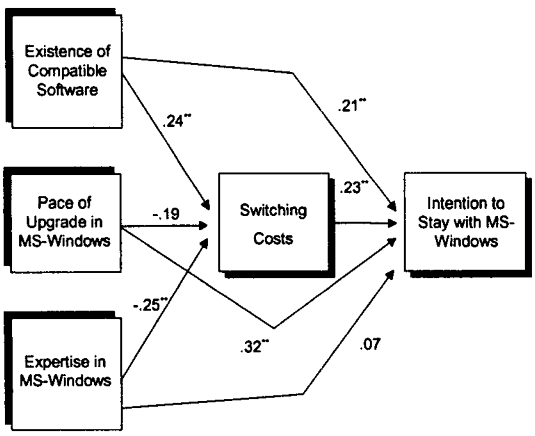
〈Figure 1〉 Structural Equation Model Results of the Theoretical Model

The existence of a variety of compatible software that use existing MS-Windows will encourage consumers to maintain their preference for MS-Windows due to the costs of switching. Especially in the operating system market, the existence of a variety of compatible applications secures continued acceptance by consumers.

H2 is concerned with the impact of the pace of upgrade on intention to stay with MS-Windows via switching costs. Specifically, we posit that the pace of upgrade will be associated with the costs of switching. Even though the paths show a positive impact, the relationship is not significant (β = -.16 ; *n.s.*).

H3 posits that a consumer's expertise in MS-Windows has a negative impact on switching costs. The hypothesis is supported based on corresponding coefficients (β = -.25 ; $p <$ .01) : if consumers are novices on MS-Windows, they tend to rely more on existing MS-Windows because of the costs of switching.

Last, we have attempted to establish the association between switching costs and its consequence, i.e., intention to stay with MS-Windows. The hypothesis posits that switching costs encourage consumers to stay with MS-Windows (H4). As we have noted in <Figure 1>, switching costs secure intention to stay with MS-Windows (β = .24 ; p < .01).



Nate) ** $p <$ .01.
Model of Fit : 2(109) = 270.26, GFI = .93, AGFI = .90, CFI = .93, PNFI = .72, RMSEA = .059.

〈Figure 2〉 Structural Equation Model Results of the Saturated Model

We also analyze direct relationships between antecedent variables of switching costs and intention to stay with MS-Windows. The results are shown in <Figure 2>. According to <Figure 2>, positive relationship is manifested between existence compatible software and intention to stay with MS- Windows (β = .21 ; $p <$ .01). And, it also reveals that pace of upgrade is positively associated with intention to stay with MS-Windows (β = .32 ; $p <$ .01). Even though we add direct relationship paths between antecedent variables of switching costs and intention to stay, there are no significant differences in structural parameters between the focal theoretical model and the saturated structural model.

5. Discussions and Conclusion

When consumers have built up large technology-specific switching costs, they tend to stay with incumbent technologies and put less effort into their searches and decision processes. As switching costs act as an entry barrier against new entrants to the market [Porter, 1980], and these invisible barriers are voluntarily established by consumers, incumbent technologies can easily maintain (or increase) their market shares. The presence of high switching costs therefore tends to buffer consumers from information about competing technologies and to show continuous stay with incumbent technologies. As such, ex-ante homogeneous products become ex-post heterogeneous. From the theoretical perspective, customer switching costs confer market power on firms. Thus, firms may face a trade-off between charging low prices to attract customers and locking them in, and high prices to extract high profit from its already locked-in customers.

Unfortunately for new entrants into technology markets, the results of this study support the conclusion that where a dominant technology emerges, switching costs may make its position unassailable unless there is a fundamental shift in the technology paradigm. The costs to the consumer of switching from one standard to another can be considerable, not only in terms of having to purchase of new software, but also in terms of the difficulty of properly exploiting the new package. Thus, for example, a consumer who switches to a technically superior but unpopular spreadsheet that has a different command set and macro programming language will find it harder, and therefore more costly, to get complementary products. This is because producers of complementary products are likely to concentrate on the more lucrative standard market.

The results of this study have implications for the technology advancement strategies both of new entrants to a market and of incumbents. Compatibility is associated with the costs involved in switching away from incumbent technologies, because of an abundant or varied supply of complementary goods. Firms may influence perceptions of replaceability and the costs of switching not only by producing compatible technology but also by developing specific relationship routines and procedures and "technology-specific learning" [Heide and Weiss, 1995]. Therefore, these mechanisms are worth studying in some detail, since they may have very different implications for the strategic behavior of firms involved in the industry. A strategy of advancing compatible technology may be successful in pursuing existing consumers to remain stay with a technology.

As the economy becomes more interconnected, issues of compatibility become more important in industries such as computers, telecommunications and consumer electronics. The last decade has witnessed a shift from a focus on the value created by a single firm and product to an examination of the value created by networks of firms whose assets are commingled with those of external entities. Thus, managers seeking to expand the strategic reach of a company should quickly address the networks associated with the product. For example, the diffusion of high-definition television has largely depended on the complements network, allowing the television to not only broadcast programming as is commonly cited, but also other forms of digital input, such as those from DVD players [Heller 2001]. The creation of complementary resources (for instance, the greater availability of films in a VHS than in a Beta format) played a crucial role in boosting JVC's VHS system, which in the end almost completely displaced Sony's Betamax.

In our hypotheses, we assumed that the pace of upgrade might be positively associated with switching costs. This is because the investments of consumers become obsolete under conditions of rapid upgrade. With technology-specific training, learning tends to grow with time, as consumers become more and more familiar with the existing technology. However, there may also be an effect of declining switching costs. With rapid sequential introductions of a product, consumers tends to get the impression that the improvements are marginal over time and that utility of improved versions will be quickly depreciated by sequential technological progress [Jackson, 1985 ; Shapiro and Varian, 1999]. In the current study, MS-Windows had already been upgraded many times (Windows 1.x, Windows 2.x, Windows 3.x, Windows 95, Windows 98, and Windows 2000). In this regard, no significant relationship between the pace of upgrade and switching costs can be observed.

Interestingly, the results we obtained for technology expertise should serve as a causality tale about the costs of switching in terms of highlighting the conditions under which a consumer's intention to stay is likely to be high. Specifically, it is important for producers of incumbent technologies to be aware that the more expert a consumer has in technology the more likely he/she will be switch to a new technology, rather than rely on an existing one. Our findings can be used in guiding the marketing efforts of manufacturers. For example, as evidenced by the result, potential manufacturers of new technology should target expert consumers, because these consumers are more likely to switch to new technologies if they provide better functions.

This article suffers from the limitations of all cross-sectional design studies that attempt to observe an inherently dynamic phenomenon, such as continuous usage of incumbent technology. One way of overcoming this limitation is by conducting a longitudinal study, in which consumer decision processes can be followed over time. Longitudinal studies will extend our ability to manage the dynamic, contextual effects of consumer switching costs.

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