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Examining the Effect of Switching Costs to Operating System Switching Intention: An Empirical Study

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Abstract

This study adopted the framework from the theory of the switching costs by Burnham et al., (2003) to discuss which customers' switching costs will influence the switching intention of operating system. In the proposed model, financial switching costs, procedural switching costs, psychological and emotional costs directly influence switching intention of windows operation systems.

This study collected 429 users from online questionnaire, conducted confirmatory factor analysis by structural equation modeling to verify the hypothesis with path analysis result. Results of the analysis showed that different types of switching costs have significantly and negative influence on customers' switching intention of operating system such as economic risk costs, evaluation costs, learning costs, customers' comfort and customers' identification. The implications of this study are also discussed.

Keywords: Windows 7, Operating System, Switching Costs, Switching Intention, Structural Equation Modeling

Introduction

Windows operating systems have more than 90% market share in the world (Net Applications, 2010). However, the operating system of Windows Vista had a very bad performance on the market share than Windows XP, because of the software compatibility, require the high level of hardware, and an unfamiliar user interface and so on. As the research of the Net Applications (2010) showed that the most popular operating system was still the Windows XP which had the 62.55% market share. Windows 7 had the 12.68% market share, and was going to surpass the Windows Vista which had 15.25% market share. Although Microsoft had stopped selling the Windows XP in the general market in June, 2008, there was still many comments about criticized and resisted the Windows Vista. However, the phenomenon showed that consumers didn't adopt the new generation product and many users which used Windows Vista degraded to Windows XP.

One of the subjects were usually investigated in recent years was the consumers' switching behavior. It wasn't only damaged the profits of the company, but also decreased the loyalty of the consumers (Rust and Zahorik, 1993). The switching costs played a withdrawal barriers role between the buyer and sellers' partnership (Jackson, 1985). When consumers considered switch the suppliers, he/she will measure the corresponding switching costs. Therefore, this study combined the conceptions of the switching costs and technology readiness to explore how the switching costs affected the consumers' intention of switching operating system. It also intended to examine different technology readiness have moderating effect on the relationship between switching costs and the intention of switching operating system.

Based on the above motivations, this study will explore the effect of the switching costs to the intention of switching operating system. It can state the purpose of the study:

(1) Which switching costs will affect the intendment of switching operating system?

(2) Take personal technology readiness for the moderator, to explore the effectiveness of switching costs to the intention of switching operating system.

(3) According to study consequences, the study through the above topics to explore the relationships between the constructs, in order to give the supplier marketing practice, and the suggestions of system develop.

Research Methods and Hypothesis

Research Model

According to research references, we generalized the research structure based on the Burnham et al. (2003). The research model is shown in figure 1. This research explored mainly the relevance between every difference types of the switching costs and the intention of switching operating system. In addition to combined the technology readiness as moderator to realize the personal characteristic whether it had a significant effectiveness between the different switching costs and the intention of switching operating system.
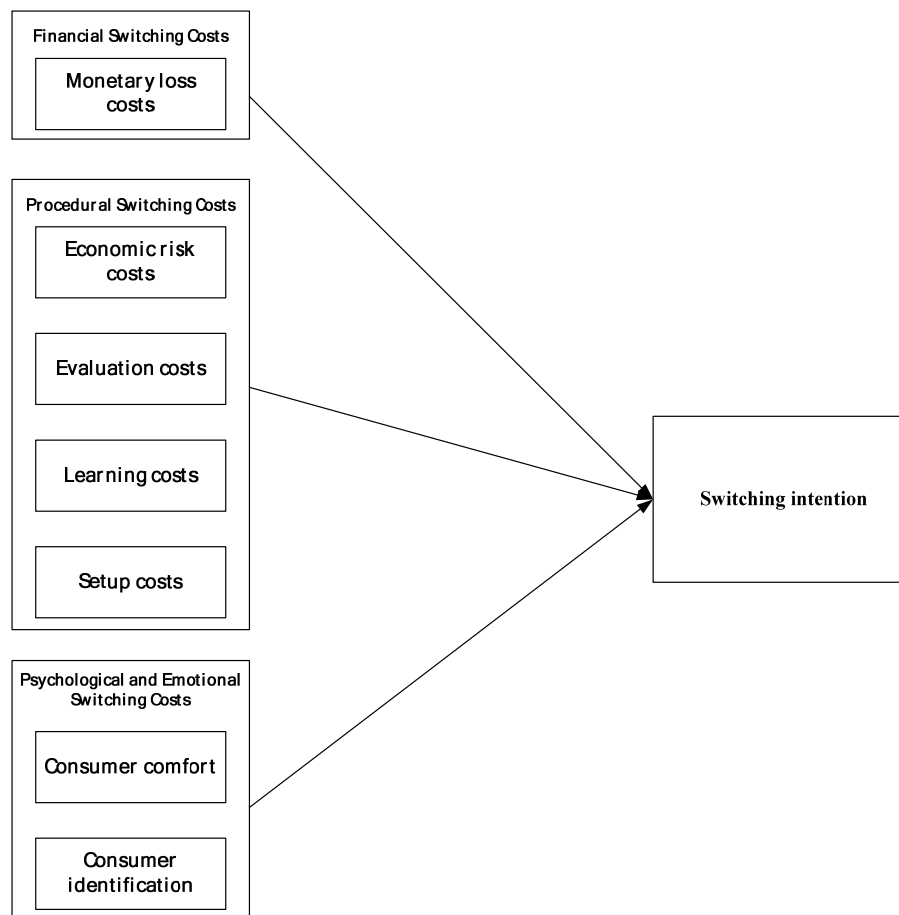
Figure 1- Research Model

Research Hypothesis

Financial Switching Costs

Monetary loss costs were, the one-time financial charge except the products purchased when consumers switch products or service supplier (Heide & Weiss, 1995; Klemperer, 1995). The past researches were inference the higher financial switching costs and then the lower switching costs (Burnham et al., 2003; Caruana, 2004; Hu, 2006). Therefore, this research inference and mention the following hypothesis:

H1: Monetary loss costs of financial switching costs negatively influence the intention of switching operating system.

Procedural Switching Costs

Burnham et al. (2003) defined the procedural switching costs as, the consumers switching products or service suppliers' procedure. For searching, analyzing and assessing the new products or suppliers established the new relationship with it and learning the effective service of usage, consumers had to spend extra time and energy. Burnham et al. (2003) also proved the higher of the consumers' conceptions and effort, the lower intention of

switching. The different types of Microsoft operating systems have many differences, such as user interface, security, system stability and so on. Therefore, this research inference and mention the following hypothesis:

H2a: Economic risk costs of procedural switching costs negatively influence the intention of switching operating system.

H2b: Evaluation costs of procedural switching costs negatively influence the intention of switching operating system.

H2c: Learning costs of procedural switching costs negatively influence the intention of switching operating system.

H2d: Set-up costs of procedural switching costs negatively influence the intention of switching operating system.

Psychological and Emotional Switching Costs

The relational switching costs stated that people created the special emotion and agreement on some particular brands and service providers (Burnham et al., 2003). The purpose of this research is the Microsoft operating system, it wasn't contract with the brands and service providers, so it wasn't

appropriate for this research. However, the psychological and emotional switching costs was extended by the relational switching costs, and it was one of the past researches conceptions (Fornell, 1992; Jones et al., 2000; Burnham et al., 2003; Chen et al., 2008). The psychological and emotional switching costs was emphasized the agreement and dependence between consumers and products or service providers, and the emotional discomfort from the feeling interrupted. When people felt comfortable, they would cognize the smaller risk of environment. It could help the companies and consumers set-up the closer interactive relationship and became the consumers' switching barrier (Bitner, 1995; Gwinner et al., 1998). Therefore, this research inference and mention the following hypothesis:

H3a: Consumer comfort of psychological and emotional switching costs negatively influence the intention of switching operating system.

H3b: Consumer identification of psychological and emotional switching costs negatively influences the intention of switching operating system.

Questionnaire Design

The questionnaire of this research was divided into five parts which including: the usage experience of operating system, technology readiness, switching costs, and personal data. Technology readiness with 18 items was modified from Parasuraman (2000). Switching costs with 22 items were modified from Burnham et al. (2003), Spake et al. (2003), Bhattacharya and Sen (2003), Hu (2006), and Chen et al., 2008. Switching intention with 3 items was modified from Burnham et al. (2003), Chen et al., 2008. Based on the references' data, quoted the international scholars' constructs and scales of technology readiness and switching costs, and then discussed with experts to form this questionnaire, so

Reliability Analysis

The reliability is the degree of reliable, which means the consistency and the stability of a test result. The higher reliability is, the smaller measurement error is. On the contrary, the bigger measuring error is, the lower reliability is. This research adopts Cronbach's

Validity Analysis

Kline (2005) found the modulus of the skewness less than 2, and the kurtosis less than 7 can be considered normality. In this research, the skewness of each constructs were between $0.232 \sim -0.766$, and the kurtosis of each constructs were between $0.661 \sim -0.628$. Therefore, the research variables can be considered normality. The detailed results were

the questionnaire of this research have enough content validity. Every variable of measure constructs are according to the Likert five scale which represented: very disagree, disagree, general, agree and very agree, this five scales of attitude measure scales.

Research Analysis

Descriptive Statistics

Sample Demographics

Among the valid samples, 50.3% were male, 49.7% were female. In the distribution of age, 78.8% of respondents were 21-30 years old. 95.2% had an education background above college degree. In the distribution of occupational, Students and public servants and employees in the information industry accounted for 75.7%. 60.1% of the samples reported monthly incomes under 15,000 NT dollar, and general range above 15,000 to 45,000 accounted for 35.6%.

Operating system Usage Experience

In the usage experience of Microsoft operating systems, 95.3% of the respondents used the Microsoft operating systems more than five years, the results indicated most users were the long-term users. 69% of respondents used Windows XP, 16.3% were Windows 7, and 11.3% were Windows Vista. The results were consistent with the research of Net Applications. There were 68.3% respondents wanted to change their operating system to Windows 7, and Windows XP still had 19.8%. The result is presented most user tended to use the new version operating system. The results were shown in table 1.

α to make the questionnaire reliability analysis to determine the internal consistency. Based on study of Nunnally (1978), Cronbach's α should higher than 0.7. The detailed results were shown in table 2. In this research, the reliability for each construct is above 0.7, showing a good reliability and high internal consistency.
shown in table3.

In this research, we reference the relevant literature to make the questionnaires, each construct of this research had been exacted by the scholars in the past. These scales are not only quoted and used for one time so that we believe that the questionnaire designed by this research has face validity. We also discussed with many experts and modified the questionnaires before investigated, so this

questionnaire has content validity.

There are three indicators to estimate the convergent validity as follows: (1) The fact loading higher than 0.7. (2) The composite reliability higher than 0.7. (3) The average variance extracted higher than 0.5. Table 4 showed all of these fact loading were higher than 0.7 besides the constructs PSC9 (0.545) and ESC4 (0.565) didn't reach the average, so we deleted them. In this research all of the composite reliability were higher than 0.7 and the average variance extracted were higher than 0.5, the results shown this study had well convergent validity.

Based on the suggestion of Fornell and Larcker (1981), the construct's AVE should higher than others, and we can consider it had well discriminant validity. As shown in Table 5, all of the constructs' AVE were higher than others, so we had well discriminant validity in this research.

Goodness-of-Fit Indices for the Measurement model

SEM shows the causal relationships among the latent variables. In addition, it describes the causal effects and the variables that are explained. One of the main purposes of SEM is to test and verify if the model of a theory or a concept provided by the researcher has the empirical meanings. Besides, through different statistical processes and the calculation of goodness-of-fit indices, we can determine the goodness-of-fit between the hypothetical model and the actually observed data. In this research, we adopted twelve indices to examine the goodness-of-fit (Hairs et al., 1998). The result shown in Table 6. All of the indices were within the criteria, showing that we had a good model fit in this research (Hinkin, 1995; Bagozzi and Yi, 1988).

Path Analysis

The result of the research hypothesis and its causal relationship are shown in figure 2 and table 7. We can fine the influence of the money lost costs and the set-up costs didn't significant, and there were five significant paths as follows:
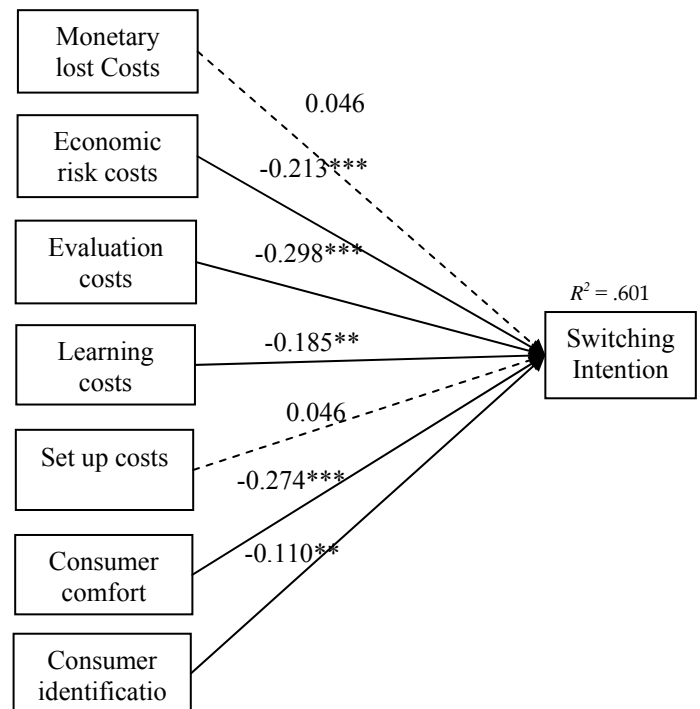

Figure 2- Result of Path Analysis

Moderating Effect

This research adopted the statistical method to examine the moderating effect. We divided the technology readiness into two groups by quartile method, and then used the AMOS software to compare constrained mode with unconstrained mode. By subtracting the chi-square value, if the difference greater than 2.7, we can consider it is significant (Singh, 1995). The result was shown in table 8.

Discussion and Conclusion

According to the research results, we found the switching costs of the economic risk costs, evaluation costs, learning costs, consumer comfort and consumer identification were significantly negative influence on the intention of switching operating system. There are three findings in this research: (1) Switching costs have significantly negative influence on the intention of switching operating system, which are the economic risk costs, evaluation costs, learning costs, consumer comfort and consumer identification, (2) In these switching costs, consumer comfort has most significant influence on the intention of switching operating system, and (3) The monetary lost costs and the set-up costs didn't significant influence on the intention of switching operating system. This result maybe related to the illegally copied increasingly. Furthermore, Microsoft provides fast and convenient process when installing the operating system can reduce the set-up costs in the beginning.

The Moderating Effect of the Technology Readiness

The results of this research showed that the technology readiness have moderating effect on the relationship of the economic risk costs, learning costs, set-up costs and consumer identification to the intention of switching operating system. In the economic risk costs and the set-up costs, the higher technology readiness has strong moderating effect than the lower one. In the learning costs and the consumer identification, the lower technology readiness has strong moderating effect than the higher one.

Financial Switching Costs to the Intention of Operating Switching

In this research, the monetary lost costs didn't significantly affect the intention of switching operating system. The result maybe related to the illegally copied raised. Therefore, the system supplier should ban the illegally copied, and adopt relative measure to prevent the consumers using the copied software.

Procedural Switching Costs to the Intention of Operating Switching

(1)   Economic Risk Costs：

The different consumers' ability of collecting information would make them acquire the information unequally. When the consumers face to the various market method, they will not distinguish form the difference of these products or service. Therefore, the system supplier should emphases on the characteristic and the advantage of the new product. Furthermore, the supplier can through the advertisement to raise the consumers' risk perception to the competitor or the alternate product.

(2)   Evaluation Costs：

Through various value-added services and promotions, and offering the positive response to the negative comment, can reduce the impact of the negative impression. It can also help the enterprise make well image in this way. Furthermore, the supplier can establish the public discussion forum and well customer service to reduce the evaluation costs when customers switching the new operating system.

(3)   Learning Costs：

The operating system suppliers besides design the simple and easy user interface, they can also adopt sales promotion or the free product courses. When the customers reduce their learning costs, they will raise the intention to switching a new version operating system.

(4)   Set-Up Costs：

In this research, the set-up costs didn't significantly affect the intention of switching operating system. Microsoft provides fast and convenient process when installing the operating system can reduce the set-up costs in the beginning. Therefore, the supplier develop a new operating system should avoid the complicated install process in order to reduce the set-up costs.

Psychological and Emotional Switching Costs to the Intention of Operating Switching

(1)   Consumer Comfort：

The supplier should improve the quality of the operating system, such as system security, easy user interface and stable system. If the consumers don't worry about anything when using operating system and feel comfortably, that can reduce the switching costs.

(2)   Consumer Identification：

The identification of the consumers comes from the using experience and the interaction with the supplier, sometimes comes from the public opinion. The supplier besides to build up the well image of the operating system, they can also establish the discussion forum to increase the identification of the consumers, in order to reduce the switching costs.

The Moderating Effect of Technology Readiness

The results showed that the lower technology readiness had moderating effect to the economic risk costs and set-up costs. Cause to this result, the supplier can enhance the characteristic and the advantage of the new operating system; on the other hand the supplier can also design the operating system with easy install process and high compatibility. The results also showed that the higher technology readiness had moderating effect to the learning costs and consumer identification. Cause to this result, the supplier can design simple and easy user interface, furthermore they can provide relative courses and consultation in order to have well interaction with the consumer and attract them to switching new version operating system.

Limitations

(1)   This research adopted the framework form the theory of the switching costs by Burnham et al., (2003). There are other frameworks and theories can be discussed, such as contractual costs, continual costs, take down costs, TAM, TPB, etc.

(2)   This research used Taiwan area's user for research sample, which had cultural

limitations.

(3) Using online questionnaire to collect samples may have some deviations. In this research, the students have a very high proportion in the research samples, therefore the research results can not inference to different situations, such as different kinds of people, conditions, times, etc.

Table 1- Microsoft Operating System Usage Experience

Subject	Group	Number	Percent
How long did you use Microsoft operating system?	< 1 year	3	0.7%
	1-3 years	12	2.8%
	3-5 years	48	11.2%
	5-10 years	194	45.2%
	> 10 years	172	40.1%
Which Microsoft operating system do you use frequently?	Win XP	269	69.0%
	Vista	51	11.9%
	Windows 7	70	16.3%
	Others	39	2.7%
Which Microsoft operating system do you want to switch?	Win XP	85	19.8%
	Vista	29	6.8%
	Windows 7	293	68.3%
	Others	22	5.1%

Table 2- Reliability of the Constructs

Constructs	Items	Cronbach's α
Money Lost Costs	2	0.750
Economic risk Costs	4	0.888
Evaluation Costs	2	0.847
Learning Costs	4	0.781
Set-Up Costs	2	0.766
Consumer Comfort	4	0.801
Consumer Identification	4	0.819
Switching Intention	3	0.849

Table 3- The Skewness and Kurtosis of indicators

Variables	Mean	S.D.	Skewness	Kurtosis
FSC1	3.79	0.73	- 0.45	0.37
FSC2	3.58	0.77	0.23	- 0.16
PSC1	3.96	0.81	- 0.77	0.66
PSC2	3.98	0.85	- 0.77	0.44
PSC3	3.78	0.86	- 0.61	0.17
PSC4	3.65	0.93	- 0.50	- 0.08
PSC5	3.33	0.95	- 0.20	- 0.43
PSC6	3.48	0.98	- 0.37	- 0.51
PSC7	3.33	0.80	- 0.20	- 0.38
PSC8	3.62	0.79	- 0.50	0.07
PSC9	3.54	0.73	-0.46	0.00
PSC10	3.42	0.72	- 0.43	0.13
PSC11	3.32	0.78	- 0.09	- 0.15
PSC12	3.42	0.78	- 0.28	- 0.24
ESC1	3.73	0.75	- 0.36	- 0.04
ESC2	3.48	0.77	- 0.19	- 0.25
ESC3	3.26	0.89	- 0.08	- 0.46

ESC4	3.17	0.95	-0.12	-0.30
ESC5	3.10	0.74	0.10	0.16
ESC6	3.25	0.81	- 0.06	- 0.28
ESC7	2.94	0.74	0.12	- 0.14
ESC8	3.19	0.77	- 0.16	- 0.05
SI1	2.92	0.91	- 0.02	- 0.61
SI2	3.14	0.95	- 0.11	-0.62
SI3	2.48	0.79	0.20	-0.13

Table 4- Convergent Validity

Constructs	Items	Fact loading	C.R.	AVE
Monetary Lost Costs	FSC1 FSC2	0.76 0.79	0.75	0.62
Economic risk Costs	PSC1 PSC2 PSC3 PSC4	0.86 0.86 0.77 0.78	0.89	0.67
Evaluation Costs	PSC5 PSC6	0.86 0.85	0.85	0.74
Learning Costs	PSC7 PSC8 PSC10	0.74 0.74 0.70	0.77	0.53
Set-Up Costs	PSC11 PSC12	0.73 0.85	0.77	0.63
Consumer Comfort	ESC1 ESC2 ESC3	0.73 0.74 0.743	0.78	0.54
Consumer Identification	ESC5 ESC6 ESC7 ESC8	0.72 0.76 0.70 0.73	0.82	0.53
Switching Intention	SI1 SI2 SI3	0.81 0.88 0.76	0.86	0.66

Table 5- Discriminant Validity

Constructs	FSC	PSC1	PSC2	PSC3	PSC4	ESC1	ESC2	SI
FSC	0.776							
PSC1	0.414	0.818						
PSC2	0.044	0.077	0.857					
PSC3	0.121	0.261	0.290	0.728				
PSC4	0.206	0.289	0.237	0.605	0.792			
ESC1	0.157	0.310	0.189	0.483	0.612	0.734		
ESC2	0.187	0.341	0.326	0.366	0.523	0.591	0.729	
SI	- 0.284	-0.505	- 0.143	- 0.373	- 0.565	- 0.636	- 0.589	0.815

Note:

1.The diagonal line is the square root of each constructs' AVE

2.FSC: Monetary Lost Costs；PSC1: Economic risk Costs；PSC2: Evaluation Costs；

　PSC3: Learning Costs；PSC4: Set-Up Costs；ESC1: Consumer Comfort；

　ESC2: Consumer Identification；SI: Switching Intention

Table 6- Goodness-of-Fit Indices for the Measurement Model

Goodness-of-Fit Indices	Recommended value	Result
χ^2/df	$<=3.000$	1.546
GFI	$>=0.900$	0.940
RMR	$<=0.080$	0.023
RMSEA	$<=0.080$	0.036
AGFI	$>=0.900$	0.918
NFI	$>=0.900$	0.935
CFI	$>=0.900$	0.976
RFI	$>=0.900$	0.919
IFI	$>=0.900$	0.976
PNFI	$>=0.500$	0.747
PGFI	$>=0.500$	0.688
PCFI	$>=0.500$	0.779

Table 7- Path Analysis

Hypothesis	Path coefficient	t-value	Result
H1	0.046	0.931	Non support
H2a	-0.213	-3.584***	Support
H2b	-0.298	-4.431***	Support
H2c	-0.185	-2.459**	Support
H2d	0.046	0.709	Non support
H3a	-0.274	-4.595***	Support
H3b	-0.110	-2.051**	Support

Note: *** p < 0.001, ** p < 0.05, * p < 0. 1

Table 8- Moderating Effect Testing Results

Hypothesis	χ^2			TRI_HIGH vs. TRI_LOW	Result
	Unconstrained	Constrained	difference		
H4a	593.6	593.7	0.1	HIGH **=** LOW	Not support
H4b	593.6	596.6	3.0*	HIGH **<** LOW	Support
H4c	593.6	594.0	0.4	HIGH **=** LOW	Not support
H4d	593.6	596.3	2.7*	HIGH $>$ LOW	Support
H4e	593.6	596.3	2.7*	HIGH **<** LOW	Support
H4f	593.6	593.7	0.1	HIGH **=** LOW	Not support
H4g	593.6	596.4	2.8*	HIGH $>$ LOW	Support

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