MEASURING THE ANTECEDENTS OF BUYER LOYALTY AND THE MODERATING EFFECT OF NETWORK EXTERNALITY ON B2B WEBSITE

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ABSTRACT

This paper explores the process how buyer loyalty is formed on B2B website. The twofold aim is to identify user loyalty dependency of switching cost and user satisfaction, and to verify whether the relationships among the three variables can be moderated by network externality. In particular, a conceptual framework of buyer loyalty is proposed concerning the moderating effect of network externality. The model has been tested on a famous B2B website in China. The results indicate that user satisfaction has direct and indirect impact on user loyalty via switching cost. And network externality will affect the relationships of switching cost and user loyalty, user satisfaction and user loyalty.
Key words: loyalty; network externality; B2B; switching cost

1 INTRODUCTION

B2B website has developed recent years. There are many B2B websites and it is easy for users to find an alternative one when they are unsatisfied with the website. Hence it is uneasy to keep users' loyalty.
Many researchers have studied loyalty in the e-commerce context. Satisfaction and switching cost have been proved the determinants of loyalty [1] [2]. Some scholars argued network externality may be the other factor influences loyalty. In particular, B2B website has the typical feature of network externality. That is, the utilities user perceived increased with the number of users on the B2B website [3]. Some studies pointed that network externality affect loyalty via satisfaction and switching cost [4] [5]. However, is there any other way that network externality affects users' loyalty? Does network externality have moderating effect on the relations of user satisfaction, switching cost and user loyalty?

2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 User Loyalty

Dick and Basu (1994) [6] argued that loyalty can be approached from both behavior and attitude perspectives. Behavior loyalty means the behavior of repeated purchasing and recommending [7] and attitude loyalty refers to preference of products [8].

2.2 Switching Cost

Jones et.al (2002) [9] specified the concept that switching cost refers to the time cost and finance cost. Kaur and Soch (2012) [10] found relational cost is also a part of switching cost. Past studies have shown switching cost is positive associated to loyalty [2] [10]. Yen (2010) [2] identified switching cost has a positive effect on loyalty. So we can bring forth the first hypothesis (H1):
H1: Switching cost has a positive effect on user loyalty.

2.3 User Satisfaction

Satisfaction is user's cognitive statue whether his/her gain is appropriate for the pay [11]. From CSI model, it is easy to find satisfaction directly affects loyalty. Many researchers certified that the relation is still existed on the e-commerce website [1]. So we can bring forth the second hypothesis (H2):
H2: user satisfaction has a positive effect on user loyalty.
Past studies showed user satisfaction is also associated to switching cost [11]. Kaur and Soch (2012) [10] affirmed that user satisfaction has direct and positive influence on switching cost. So we can bring forth the third hypothesis (H3):
H3: user satisfaction has a positive effect on switching cost.

2.4 Network Externality Affects the Relationships among Satisfactory, Switching Cost and Loyalty

Katz and Shapiro (1985) [12] defined "network externality" as "the value or effect that users obtain from a product or service increased with the increase of users, complementary product, or service." Generally, network externality can be divided into two types: direct one and indirect one [4] [5].
The moderating effect network externality on the relationships between user satisfaction, switching cost and user loyalty lacked of relevant empirical study. Zhao and Lu (2012) [13] held the view that network externality can enhance users' perceived interactivity. The feature of network externality makes satisfied users uneasy to switching to other website and repeatedly purchase from the B2B website. Hence, when users perceived higher network externality, the relationships between user satisfaction and user loyalty, user satisfaction and switching cost will be weaker. Besides, network externality will weaken the relationship between switching cost and user loyalty, since network externality can increase the utility user perceived [3], and it will keep users stay on the website. So we can bring forth hypotheses that:
H4a: The higher the network externality, the less likelihood user satisfaction will lead to switching cost
H4b: The higher the network externality, the less likelihood user satisfaction will lead to user loyalty.
H4c: The higher the network externality, the less likelihood switching cost will lead to user loyalty.

3 METHOD

3.1 Structural Model

According to the above analysis, we can bring forth the structural model shown in Figure 1.

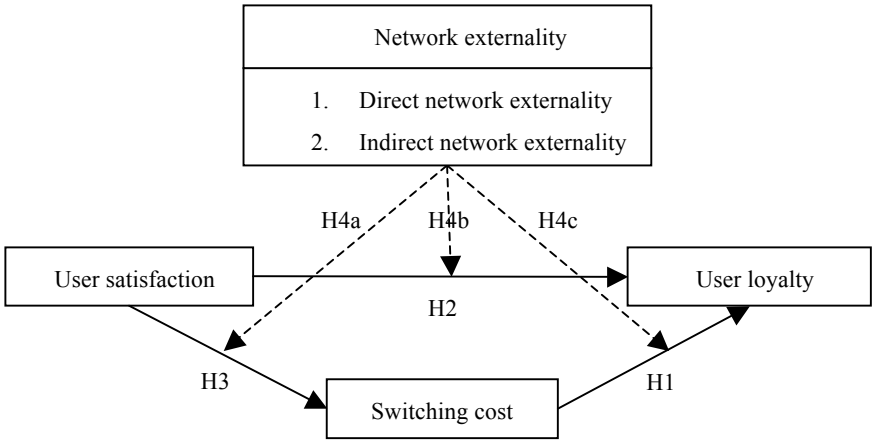

Figure 1 Structural model

3.2 Measures and Subjects

The network externality scale is developed based on Chiu.et al (2013) [4]. The user satisfaction scale is developed by modifying the scale of Yoon et.al (2013) [14].The switching cost scales are from Jones et.al (2002) [10]. The user loyalty measurement adopted the scale of Jaiswal et.al (2010) [15]. All statements of the scales have been modified according to the feature of B2B website.

The sample of the study was from a well-known B2B website in China. The data collection lasted nine days from May 8th to May 16th in 2013. The website randomly distributed 10,000 links and provided $39.5 website voucher incentives to the participants. The questionnaire effective rate is 72.3%.

3.4 Reliability and Validity Test

According to table 1, we can find the values of Cronbach's alpha are 0.823 to 0.928(>0.70), thus we can confirm the scale of the measurement is reliable.

Table 1 Reliability and Convergent Validity Test

Construct	Items	Standardized loading	AVE	Cronbach's αlph
Direct network externality	DN1	0.717	0.6017	0.879
	DN2	0.654		
	DN3	0.788		
	DN4	0.833		
	DN5	0.867		
Indirect network externality	IN1	0.7	0.857	0.823
	IN2	0.776		
	IN3	0.857		
User satisfaction	US1	0.892	0.8125	0.928
	US2	0.91		
	US3	0.902		
User loyalty	UL1	0.852	0.7803	0.908
	UL2	0.884		
	UL3	0.913		
Switching cost	SC1	0.795	0.6508	0.900
	SC2	0.857		
	SC3	0.866		
	SC4	0.711		
	SC5	0.795		

From table 1, all items' factor loading are greater than 0.7 and AVE of all latent variables are greater than 0.5, which indicate that the data has high convergent validity. In general, the verification of discriminant validity requires that each latent variable's AVE must be greater than the squared correlation coefficient between the latent variables. As table 2 shown, all constructs can reach the requirement.

Table 2 Discriminant Validity Test Results

Construct	DN	IN	US	SC	UL
DN	0.880				
IN	-0.021	0.860			
US	-0.067	0.783	0.908		
SC	-0.068	0.6	0.694	0.846	
UL	-0.067	0.744	0.86	0.684	0.923

4 RESULTS AND DISCUSSION

4.1 The Relationships between Satisfactory, Switching Cost and Loyalty

This paper tries to carry out confirmatory factor analysis on the structural model. For the causal relations in the structural model, CMINDF=4.02(<5), GFI=0.96(>0.9), GFI=0.90(=0.9), RMSEA=0.07(<0.08). It showed the structural model fits well.

Table3 The test result of the structural model

Hypothesis	Coefficient	T value	Result
H1 SC→UL	0.06 (0.04)	2.05	Supported
H2 US→UL	0.36 (***)	4.36	Supported
H3 US→SC	0.29 (***)	3.31	Supported

Note: *Significant at 0.05, ** Significant at 0.01, *** Significant at 0.0001

Table 3 showed the model standardized path coefficients and hypothesis test results. As it shown above, all paths are significant ($p<0.05$) and all hypotheses are supported. Therefore, switching cost has a positive effect on user loyalty; user satisfaction has a positive effect on user loyalty; and user satisfaction has a positive effect on switching cost.

4.2 The Moderating Role of Network Externality

To examine the moderating effect of network externality, the study first groups the samples with network externality. The sample was divided into three groups: high (348 samples), middle (283 samples) and low (79 samples).To make sure the diacritical effect on the variable of network externality, we chose the groups of high and low network externality as the research object.

Table 4 The equivalence test of network externality

Model	X^2	CFI	GFI	RMSEA	df	ΔX^2
Structural model	399.49	0.91	0.89	0.06	144	--
Path coefficients equivalent test	431.88	0.90	0.88	0.06	159	32.39
SC→UL	403.67	0.91	0.88	0.06	145	4.18
US→UL	403.89	0.91	0.88	0.06	145	4.4（>3.84）

US→SC	402.53	0.91	0.88	0.06	145	3.04

From table 4, we can figure out the models of the formation mechanism of user loyalty in the high and low network externality groups both have great significance (CFI=0.91>0.9, GFI=0.88 $\approx$ 0.9, RMSEA=0.06<0.08). And we can get ΔX_{15}^2 =32.39 (>24.966, significant) in the path coefficients equivalent test. It indicates that the path coefficient equivalent test did not pass, and the moderating effect of network externality exists. And after equivalent test, we found the path coefficients of SC→UL (ΔX_1^2=4.18>3.84) and US→UL (ΔX_1^2=4.4>3.84) have significantly changed. Thus we can confirm network externality both has moderating effect on the paths of SC→UL (H4c) and US→UL (H4b).

4.3 Discussion

The paper has two important findings. On the one hand, we find user satisfaction is positive linked to user loyalty both independently and in conjunction with switching cost.

Table 5The moderating effects of network externality

Hypothesis	High network externality	Low network externality
SC→UL	0.02	0.22
US→UL	0.41	-0.77

On the other hand, the findings suggest network externality act as a moderator in the relationships of "switching cost →user loyalty" and "user satisfaction→user loyalty". Then we tested the degree of the moderating effect. And the results are as table 5 shown. Thus we can identify that the higher the website network externality, the less likelihood switching cost will lead to user loyalty. That is, with the improvement of network externality, it will reduce users' sensitivity of switching cost. Users will be more concerned about the level of the website network externality rather than switching cost when they decide their attitude and behavior towards the website. While, user satisfaction is proved to have increased influence on user loyalty as network externality improves. The result is against the hypothesis of H4b. And when the network externality of the website is low, the link of user satisfaction and user loyalty is weak and negative (-0.77). It demonstrates satisfied users are not easy to be translated into loyal users when the scale and complementary of the website is not great. It perhaps relates to users' psychology of conformity. And the finding reveals user satisfaction is still an important determinant of user loyalty on the website with high network externality.

5 CONCLUSION AND FURTHER RESEARCH

The study has some theoretical and practical meanings. First, it introduced network externality as moderating variables to discuss the effect network externality on user loyalty. This provides a new research perspective on e-commerce website loyalty. Second, the conclusions can provide some guidance for the B2B website managers. The managers should pay attention to the website's advertisement and provide personalized services and applications to improve user experience, and thus make users stick to the website and transformed satisfied and loyalty users.

Along with the implication of the study, it also contains some shortages and suggestions. We introduced network externality as moderating variables to discuss its impact on user loyalty. Whether are there other

ways that network externality effect user loyalty? The question should be further explored.

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