Antecedents of User Stickiness and Loyalty and Their Effects on Users' Group-Buying Repurchase Intention

Full paper

Lijuan Huang
Xidian University, China
ljhuang@xidian.edu.cn

Lin Jia
Beijing Institute of Technology, China
Jialin3105@hotmail.com

Jiahe Song
Auburn University, USA
Jzs0037@auburn.edu

Abstract

Intense competition among a vast number of group-buying websites leads to higher product homogeneity, which allows customers to switch to alternative websites easily and reduce their website stickiness and loyalty. This study explores the antecedents of user stickiness and loyalty and their effects on consumers' group-buying repurchase intention. Results indicate that systems quality, information quality, service quality, and alternative system quality each has a positive relationship with user loyalty through user stickiness. Meanwhile, information quality directly impacts user loyalty. Thereafter, user stickiness and loyalty each has a positive relationship with consumers' repurchase intention. Theoretical and managerial implications are also discussed.

Keywords

Group-buying, IS success, User stickiness, User loyalty, Repurchase intention.

Introduction

Online group-buying is a new mode of e-commerce in which consumers can gather enough people to make large amount of orders to obtain premium discounts with quite low price (Cheng & Huang, 2013; Shiau & Luo, 2012). With the booming growth of the online group-buying in many countries since 2008, it has become an attractive and popular e-commerce mode which can bring great value for customers (Jing & Xie, 2011). Many researchers have paid their attention to online group-buying after Kauffman and Wang (2002) took the lead in studying group-buying customers' behavior (Cheng & Huang, 2013; Hsu et al., 2014; Shiau & Luo, 2012), and group-buying has become an important e-commerce research topic.

With the fast development of information technology and the quick reduction of cost to develop a group-buying website, a vast number of group-buying websites and companies have been established (Hsu et al., 2014; Shiau & Luo, 2012). Consequently, many issues have appeared due to intense competition among these companies. For instance, more and more identical products or services supplied by the same merchant have shown on the different group-buying websites which leads to higher product homogeneity. This phenomenon allows customers to switch to alternative websites easier, reducing user stickiness and loyalty (Cheng & Huang, 2013). Thus, it is of great importance to research the potential antecedents of user stickiness and loyalty to encourage their repurchase intention.

User stickiness, loyalty, and repurchase intentions are usually used to measure success of e-commerce. D&M IS success model is a well-accepted model to measure IS success and has been proved effectively in various information system settings, as well as the e-commerce setting. However, few research has applied the D&M IS success model to explore factors affecting consumers' group-buying repurchase intention (Hsu et al., 2014). In addition, due to product homogeneity in the online group-buying industry, the customer's behavior and intention may be affected by another competitive website (Li et al., 2006).

Although existing literature on online group-buying have proposed some determinants of consumers' intention to use online group-buying (Cheng & Huang, 2013; Hsu et al., 2014; Shiau & Luo, 2012), the competitors' influence which is can be measured by alternatives system quality is less addressed.

To address these issues, we adopt the the D&M IS success model (DeLone & McLean, 1992, 2003) and try to further our understanding of how information quality, service quality, system quality and alternative system quality influence user stickiness and loyalty that consequently influence repurchase intention. The rest of the paper presents as follows. The theoretical background and research model are presented first. We then develop the hypotheses. Data collection and analysis are presented next. Finally, the research and managerial implications, limitations, and conclusion are presented.

Theoretical Background and Research Model

Delone and McLean (D&M) IS Success Model

The D&M IS success model, proposed by DeLone & McLean (1992), is a well-accepted model to measure IS success. The model was developed based on Shannon and Weaver's (1949) communication research and Mason's (1978) information influence theory. According to this model, IS success is measured using six constructs: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. System quality and information quality will boost consumers' use and user satisfaction, which, in turn, bring forth individual and organizational impact (DeLone & McLean, 1992).

However, some researchers posited that service quality should be included in the D&M IS success model because IT service becomes more and more important in achieving IS success (Jiang et al., 2002; Pitt et al., 1995). Then, DeLone and McLean updated the original model by adding service quality and combining organizational impact and individual impact into one construct named net benefits (DeLone & McLean, 2003). These changes embody the importance of IT service and broaden the application scope of the model. Systems quality, information quality and service quality singularly or conjointly influence use and user satisfaction, which, in turn, lead to net benefits in the updated D&M IS success model (DeLone & McLean, 2003), which has been applied to assess e-commerce success (DeLone & McLean, 2004; Petter et al., 2013). In this study, we will apply the model to measure success of group-buying websites.

In this study, online group-buying system quality means the degree to which the web site is easy to utilize so as to fulfill one's task (DeLone & McLean, 2003; Rai et al., 2002). Meanwhile, alternative system quality is considered because of the fierce competition of different group-buying websites and high quality of alternatives can reduce dependence on present suppliers (Anderson & Narus, 1990; Chen & Hitt, 2002; Li et al., 2006). Alternative system quality refers to the extent to which alternative group-buying websites have the same or even higher quality of products and services that can meet consumers' requirements (Anderson & Narus, 1990; Chen & Hitt, 2002). In addition, information quality is defined as the overall design quality and the comprehensiveness of group-buying website to facilitate effective online transactions (DeLone & McLean, 2003; Zhang et al., 2000). Service quality refers to the ability of group-buying organizations to promote online transaction, purchase and delivery (Parasuraman et al., 2005).

User Stickiness

DeLone and McLean (2003) posited that it was difficult to interpret the multidimensional aspects of use and proposed several measures to assess consumers' use of IS, which are numbers of site visits and numbers of transactions executed. Stickiness refers to the behavior of repeated visit and use of a website in the internet (Xu et al., 2010). Thus, the content of use is coincide with the definition of stickiness, which reflects the capability of a website to attract and retain visitors (Zott et al., 2000) and encourage them to purchase on the website for a long time (Khalifa et al., 2002). In this study, we use user stickiness to represent the variable of use in the D&M IS success model.

User Loyalty

Any measure that can improve time saving, cost savings, incremental additional sales and expanded markets could be regarded as net benefits of e-commerce (DeLone & McLean, 2003). There are plenty measures to assess net benefits of e-commerce and we should select proper measures based on our

research topic. Under group-buying context, user loyalty means that users are not only willing to continue to purchase on a site but also willing to recommend and encourage their friends to purchase on this site (Mathwick, 2002; Oliver, 1999). That is to say, user loyalty develops further from users' continuous purchase of products or services of a company in the future to recommendation this company to their friends and relatives, which could be expand market of the e-companies and increase additional sales. User loyalty is considered a type of net benefit in this study.

Repurchase intention

Another measure of net benefit is repurchase intention in this study. Users' group-buying repurchase intention is their subjective probability and possibility to repeat their purchase on group-buying web sites (Dodds et al., 1991; Gefen, 2000). Online sellers can earn five times more profit from repeat customers than from new customers because repeat customers are less sensitive to price and spend more at online stores (Gupta & Kim, 2007). A high repurchase intention may lead to higher profit for group-buying companies.

Research Model

A theoretical model was proposed based on the D&M IS Success Model to further understanding how to achieve success of group-buying websites (Figure 1). In the model, information quality, service quality, system quality and alternative system quality serve as the predictors of user stickiness and loyalty. User stickiness also has a positive relationship with user loyalty. Then, user stickiness and loyalty are anticipated to have a positive impact on consumers' group-buying repurchase intention.
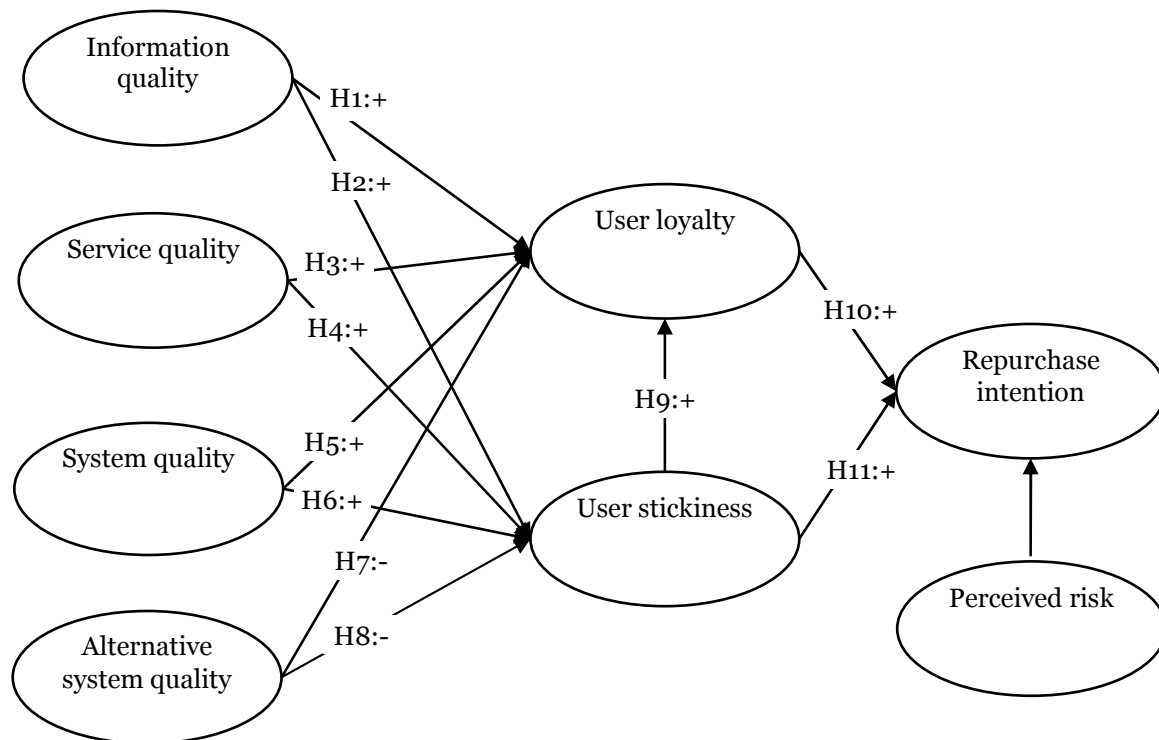
Note: perceived risk serves as the control variable in this study.

Figure 1. Research Model

Hypothesis Development

According to the D&M IS success model, information quality has a positive relationship with user satisfaction (Delone & McLean, 1992, 2003, 2004; Rai, 2002; Seddon, 1997), which is believed to enhance consumers' loyalty (Kim et al., 2009; Yen & Lu, 2008). Rai et al. (2002) applied Seddon's model to the e-

commerce environment, finding out the significant causal relationship between information quality and net profit such as user loyalty. In addition, high quality of website information, such as abundant description of products, well organized texts and photos, highly clear pictures, would increase users' trust on the site, which, in turn, boosts consumers' loyalty (Hong & Cho, 2011). Thus, we propose that

H1. Information quality will have a positive influence on user loyalty.

Koernig (2003) argued that effective webpage information could positively affect consumers' attitude toward using a web site and attract users' further intention to use the services of this site. Information quality could attract users to revisit a website (Lu & Lin, 2002), which greatly reflects consumers' stickiness to the website. Researchers also verified the size and style of pictures which are belong to information quality can impact perception and attract and retain e-commerce users (Nitse et al. 2004; Raney et al., 2003). Consequently well-designed information would promote users' satisfaction and facilitate customers' intention to use and retain the e-commerce system. Thus,

H2. Information quality will have a positive influence on user stickiness.

Lin and Sun (2009) investigated some main shopping websites in Taiwan and found that service quality plays an important role in affecting consumers' satisfaction and loyalty. Kassim and Abdullah (2010) has explored the positive impact of service quality on consumer satisfaction, which is believed to have a positive relationship with trust and user loyalty. Yen and Lu (2008) also empirically found that in online auction context, e-service quality had some effects on loyalty intention. Rao and Rao (2013) also argued that if users were satisfied with the corporate products and services, the loyalty to this company will generate. Thus, we anticipate that

H3. Service quality will have a positive influence on user loyalty.

Due to the online comparison of products features is substantially feasible and costless, Service quality is highly regarded as a powerful instrument in e-commerce. E-service quality has potential and positive dimensions for improving hit rates, customer retention, and stickiness (Santos, 2003). The quality of web design is one dimension of service quality that has been observed to obviously affect users' attitudes (Zhang et al., 2009). Carlson and Cass (2010) also indicated that perceived e-service could enhance intention behaviors such as website revisits, customer stickiness, purchase intention and positive word of mouth. Hypothesis is proposed as following:

H4. Service quality will have a positive influence on user stickiness.

Past literature well support the positive impact of system quality on user satisfaction (e.g., Delone & McLean, 1992, 2003, 2004; Molla & Licker, 2001). Molla and Licker (2001) empirically tested that e-commerce system quality played significant influence on customer e-commerce satisfaction. And user satisfaction is always regarded to advance the generation of user loyalty (Kim et al., 2009; Yen & Lu, 2008). Hence, we propose the following hypothesis:

H5. System quality will have a positive influence on user loyalty.

Running faultlessly is a good start of high user experience of an information system. If an e-commerce system cannot operate fluently, users prefer to drop out and never come back again. Lin (2007) empirically verified that web site infrastructure, which is one aspect of system quality, played a positive role on users' intention to stick the site. DeLone and McLean (2003, 2004) suggested that each of those three qualities has causal relationship with intention to use and user satisfaction, which can finally lead to net benefits for organizations. Indeed, when users first interface the information system, it must present well system quality, such as loading fast, response quickly, convenient guide and so on, to satisfy their visitors and then, to attract users continue to use the system. Thus,

H6. System quality will have a positive influence on user stickiness.

Anderson and Narus (1990) have indicated that high quality of alternatives can reduce the dependence on the suppliers through empirical studies. Then Chen and Hitt (2002) also indicated that high quality of alternatives is more likely to bring users' switching behaviors because of many navigation websites on the background of information system. As we know, there were over 8000 group-buying websites all over China during the flourishing days, which motivated many group-buying navigation websites (e.g.Tuan800.com). Every group-buying site has a rather similar products or service that would be

provided by the same cooperator. Users' switching behavior is easy to take place under this circumstance. In spite of integration in Chinese group-buying industry, it can be clearly seen from present group-buying navigation websites that the homogeneous products and services are very serious in major group-buying sites and it's pretty common that products and services from the same company appear on several group-buying websites. Therefore it's less likely for users to purchase on one group-buying website and it's easy for users to switch websites under the present group-buying marketing environment. That is to say, alternative web site quality would make users less stick to one web site and reduce their loyalty to the web site.

Hypotheses are proposed as follows:

H7. Alternatives system quality will have a negative influence on user stickiness.

H8. Alternatives system quality will have a negative influence on user loyalty.

The notion of loyalty is becoming a more and more important variable in the e-commerce framework due to users' easy switching behavior in the Internet. More and more companies have paid attention to effective web site design and efficiency business strategies to retain visitors because user stickiness is regarded as a general indicator of user loyalty to e-retailers (Lin et al., 2010). Stickiness was able to maximize the time, frequency and depth of users' retention and that stickiness can drive to the generation of user loyalty. Holland and Menzel (2001) held that stickiness was the total quality of the website, which could prompt users to stay in a site rather than converting to other websites, and the increase of stickiness can influence the generation of loyalty. In addition, Kabadayi and Gupta (2005) suggested that users' website loyalty is their desire to return to a website and their willingness to spend a longer time at a website. Hence, user loyalty is a deeper level of users' behavior which could be facilitated by the increase of user stickiness, because the more times you visit a web site, the more sense of identity you relate the site with brand familiarity. Thus, we propose that:

H9. User stickiness will have a positive influence on user loyalty.

Stickiness is also one of the critical measures to e-commerce success and the web users' willingness to stick to a site is a significant indicator of their intention to transact (Lin, 2007). When customers visit an e-commerce web site more frequently, they would be more likely appealed to products displayed on the website. Xu et al. (2010) confirmed the causal relationship between user stickiness and purchase intention. It is important to analyze website visitors' behaviors to test the influence of visiting behaviors on business benefits, such as online transaction (Straub et al., 2002). We pay more attention to make an analysis of user stickiness to repurchase intention here. Hypothesis is proposed as following:

H10. User stickiness will have a positive influence on repurchase intention.

In B2C e-marketplaces, attitudinal loyalty is a crucial predictor of purchase intentions (Hong & Cho, 2011). Guillaume (2008) found that neither customer satisfaction nor attitudinal loyalty predicted customer repurchase behavior. Huang (2008) also found that loyalty resulted in the increased repurchase intentions. So we proposed hypothesis as following:

H11. User loyalty will have a positive influence on repurchase intention.

Methodology

Data Collection

An online survey was used to collect data from current students and alumni of a western Chinese university during Dec. 2013 to Feb. 2014. A total of 362 respondents participated in this survey. Forty seven respondents were excluded from the dataset because of not having adequate experience of group-buying and a high rate of same answers, making the final sample size 315. Table 1 summarizes the demographic characteristic of respondents. As shown in Table 1, 94 percent of respondents have performed group-buying at least six times, indicating that they have plenty experience of group-buying and thus are proper samples for this study. Additionally, according to iResearch (iResearch, 2012) and CNNIC (CNNIC, 2012), college students and office employees are the major consumer groups of Chinese online group-buying website, and consumers with age 18-30 occupy more than 60%. Thus, we address that participants are appropriate for this study.

Measures

Items were drawn from existing scales whenever possible. Information quality was measured with five items adapted from Montoya-Weiss et al. (2003). Service quality was assessed with four items adapted from Parasuraman et al. (2005). System quality was measured with three items adapted from Petter et al. (2013). Three items from Li et al. (2006) were used to measure user stickiness. Five items from Parasuraman et al. (2005) were used to assess user loyalty. Repurchase intention was measured with four items adapted from Lin (2007). Perceived risk was assessed by using five items adapted from Udo et al. (2010) and Lopez and Mollina (2008).

Perceived risk has long been accepted to affect users' behavioral intention toward e-commerce (Gefen et al., 2003; Lopez & Mollina, 2008). In this study, perceived risk is used as the control variable.

A Chinese version of the instrument was developed with help of other researchers and colleagues by following the back translation process. Five managers of group-buying companies were used to test the validity of the Chinese instrument. Prior to the main survey, a pilot test was conducted using a convenience sample of 85 college students and companies employees. Subsequently, some minor changes were made to the questionnaire to match the Chinese context. Each items uses a 5-point Likert scale (1= strongly disagree, 2=disagree, 3=average, 4=agree, 5=strongly agree). The questionnaire can be found in Appendix A.

Char.	Number	Percentage
Gender		
Female	146	46.3%
Male	169	53.7%
Age		
Under 21	85	27.0%
21-25	207	65.7%
26-30	12	3.8%
Above 30	11	3.5%
Education		
Bachelor	253	80.3%
Master	58	18.4%
Doctor	4	1.3%
Frequency of group-buying		
2-5 times	82	26.0%
6-10 times	64	20.3%
11-20 times	46	14.6%
Above 20 times	123	39.0%

Table 1. Demographic Information

Data Analysis and Results

SmartPLS 2.0 (Ringle et al., 2005) was chosen to perform the data analysis because it can maximize the explained variance of dependent variables and does not make normal distribution assumption for the data (Xu et al., 2014). All items with factor loading lower than 0.5 were deleted. As shown in Appendix B, three tests were used to valid that common method bias is not a serious concern in this study.

Measurement Model

The two-stage analytical procedure was adopted (Hair et al., 1998). Measurement model was first assessed and then the structural model was tested. A variety of statistics, including R-square, composite reliability (ρc), average variance extracted (AVE), inter-construct correlations, and cross loadings are shown in Tables 2 and 4. Wertsce et al. (1974) claimed that composite reliability can be more appropriately applied to access the consistency reliability of the constructs because Cronbach's alpha (Cronbach, 1971) would underestimate the reliability in the PLS path model. Thus, composite reliability also can provide evidence of measure reliability. Composite reliability (Chin, 1998) and AVE (Fornell & Larcker, 1981) were used to examine the convergent validity. Composite reliability (ρc) scores are all above 0.8, and all AVEs are larger than 0.5, demonstrating that convergent validity is met (Chin 1998; Fornell & Larcker, 1981). Additionally, as shown in Table 3, all squared roots of AVEs of the variable are larger than the correlation that it shared with other variables in the model, indicating discriminant validity (Chin, 1998; Fornell & Larcker, 1981). Jointly, these results support the validity of the measurement model.

Variable	R-square	α	ρ_c	AVE
Information quality (IQ)	N/A	0.756	0.847	0.580
Service quality (SQ)	N/A	0.698	0.814	0.522
System quality (SysQ)	N/A	0.694	0.830	0.620
Alternative system quality (ASQ)	N/A	0.815	0.876	0.705
User stickiness (ST)	0.626	0.822	0.894	0.738
User loyalty (LO)	0.615	0.831	0.881	0.596
Repurchase intention (RI)	0.717	0.814	0.887	0.663
Perceived risk (PR)	N/A	0.787	0.856	0.666

Table 2. Latent Variable Reliability and Validity Statistics

Variable	AVE	IQ	SQ	SysQ	ASQ	ST	LO	RI	PR
Information quality (IQ)	0.580	**0.762**							
Service quality (SQ)	0.522	0.761	**0.723**						
System quality (SysQ)	0.620	0.708	0.711	**0.787**					
Alternative system quality (ASQ)	0.705	-0.085	-0.083	-0.061	**0.839**				
User stickiness (ST)	0.738	0.738	0.692	0.633	-0.250	**0.859**			
User loyalty (LO)	0.596	0.690	0.656	0.618	-0.196	0.742	**0.772**		
Repurchase intention (RI)	0.663	0.719	0.691	0.703	-0.122	0.811	0.757	**0.814**	
Perceived risk (PR)	0.666	0.065	0.024	0.093	0.360	-0.008	0.059	0.094	**0.816**

Note. Bold diagonals are square roots of AVEs

Table 3. AVE and Correlation Matrix

Constructs		IQ	SQ	SysQ	ASQ	ST	LO	RI	PR
Information quality (IQ)	IQ1	**0.792**	0.594	0.556	-0.017	0.596	0.504	0.579	0.055
	IQ2	**0.730**	0.589	0.501	-0.066	0.512	0.545	0.545	0.020
	IQ3	**0.730**	0.541	0.488	-0.083	0.542	0.533	0.530	0.077
	IQ4	**0.793**	0.595	0.608	-0.093	0.594	0.520	0.535	0.046
Service quality (SQ)	SQ1	0.553	**0.754**	0.502	-0.120	0.516	0.535	0.503	-0.011
	SQ2	0.635	**0.740**	0.568	-0.109	0.582	0.524	0.604	0.074
	SQ3	0.494	**0.677**	0.496	0.010	0.429	0.382	0.429	0.006
	SQ4	0.501	**0.717**	0.485	0.008	0.453	0.429	0.437	-0.009
System quality (SysQ)	SysQ1	0.535	0.545	**0.793**	-0.039	0.497	0.477	0.544	0.121
	SysQ2	0.572	0.613	**0.798**	-0.107	0.538	0.508	0.559	-0.025
	SysQ3	0.565	0.517	**0.770**	0.009	0.457	0.474	0.558	0.132
Alternative system quality (ASQ)	ASQ1	0.026	0.002	0.108	**0.706**	-0.070	-0.062	0.059	0.247
	ASQ2	-0.134	-0.123	-0.109	**0.899**	-0.240	-0.184	-0.141	0.315
	ASQ3	-0.046	-0.046	-0.047	**0.899**	-0.243	-0.191	-0.123	0.335
User stickiness (ST)	ST1	0.642	0.598	0.547	-0.194	**0.870**	0.651	0.732	0.009
	ST2	0.649	0.595	0.558	-0.255	**0.866**	0.640	0.680	-0.053
	ST3	0.610	0.591	0.527	-0.196	**0.842**	0.623	0.679	0.025
User loyalty (LO)	LO1	0.470	0.443	0.439	-0.138	0.469	**0.750**	0.541	0.031
	LO2	0.540	0.461	0.417	-0.181	0.579	**0.747**	0.551	0.046
	LO3	0.540	0.534	0.507	-0.080	0.576	**0.803**	0.592	0.071
	LO4	0.586	0.569	0.535	-0.231	0.676	**0.790**	0.644	0.044
	LO5	0.515	0.510	0.476	-0.112	0.542	**0.769**	0.584	0.034
Transaction intention (TI)	TI1	0.678	0.640	0.601	-0.080	0.710	0.597	**0.824**	0.021
	TI2	0.589	0.606	0.605	-0.117	0.719	0.616	**0.854**	0.047
	TI3	0.600	0.539	0.601	-0.121	0.693	0.617	**0.842**	0.131
	TI4	0.467	0.461	0.476	-0.075	0.507	0.637	**0.731**	0.106
Perceived risk (PR)	PR1	0.052	-0.021	0.050	0.284	-0.039	0.010	0.037	**0.756**
	PR2	0.045	-0.037	0.063	0.282	-0.011	0.051	0.046	**0.739**

	PR3	0.062	0.059	0.096	0.328	0.006	0.064	0.109	**0.940**

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Table 4. Loading and Cross-loading of Measures

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Structural Model

The path coefficients and explained variances of the structural model are shown in Figure 2. The PLS model uses R-square to assess the predictive power of research model. The analyzed model explains 62.6 percent of the variance of user stickiness, 61.5 percent of the variance of user loyalty, and 71.7 percent of the variance of repurchase intention. All R^2 values exceed the acceptable threshold of 10 percent as suggested by Falk and Miller (1992), indicating substantive explanatory power of the model.

The results indicate that the four hypotheses regarding relationships between information quality and user stickiness (b=0.437, p<0.001), between service quality and user stickiness (b=0.246, p<0.001), between system quality and user stickiness (b=0.138, p<0.05), and between alternative system quality and user stickiness (b=-0.184, p<0.001) are supported (H2, H4, H6, and H8). Information quality has a positive relationship with customer loyalty (b=0.190, p<0.05). However, none of service quality, systems quality, and alternative system quality has a significant relationship with user loyalty. Thus, H1 is supported while not H3, H5, and H7. User stickiness has a positive relationship with user loyalty (H9: b=0.424, p<0.001), supporting H9. User loyalty (b=0.334, p<0.001) and user stickiness (b=0.564, p<0.001) each has a positive relationship with users' repurchase intention, supporting H10 and H11.
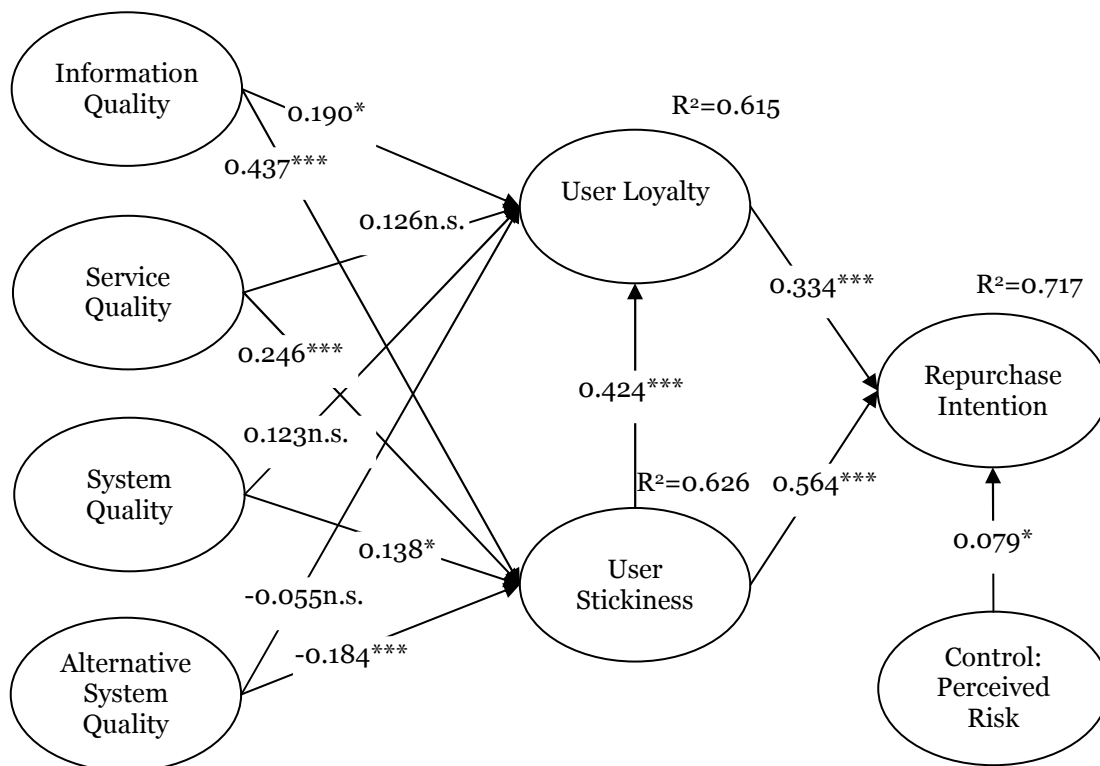
Note: * significant at P<0.05; ** significant at P<0.01; ***significant at P<0.001; n.s.=not significant.

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Figure 2. Structural Model

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Post Hoc Analysis

There are three hypotheses that are not supported (H3, H5, and H7), leading to an opportunity for further exploration. We adopted the process of Baron and Kenny (1986) to test whether there exist mediation effect. Sobel tests are used to assess whether the potential mediation effect is significant. According to the results, user stickiness fully mediates the relationship between service quality and user loyalty (Sobel statistic=3.283, p<0.01), between system quality and user loyalty (Sobel statistic=2.327, p<0.05), and between alternative system quality and user loyalty (Sobel statistic=-3.496, p<0.001).

Discussion

Key Findings

Overall, we found support for eight of eleven proposed hypotheses. The results of our research extend our understanding of antecedents of user stickiness and loyalty and their impacts on users' repurchase intention.

First, we identified four predictors of user stickiness, information quality, system quality, service quality and alternative system quality. Information quality, system quality, and service quality each has a positive relationship with user stickiness while alternative system quality has a negative relationship with user stickiness. This is supported by the D&M IS success model, which posited that system quality, information quality, and service quality will have a positive impact on use (DeLone & McLean, 1992, 2003).

Second, we found that system quality, alternative system quality, and service quality has an indirect impact on user loyalty through user stickiness. However, information quality both directly and indirectly influenced user loyalty. Similar conclusions can be found in Koernig (2003) and Lu and Lin (2002). As many researchers' revealed, there were always several factors impacting loyalty indirectly via a certain mediated factors such as trust (e.g., Gefen, 2000; Hong & Cho, 2011) and satisfaction (e.g., Kassim & Abdullah, 2010; Yen & Lu, 2008). In this paper, we found that user stickiness can be a new mediated factor in exploring the relationship with loyalty and revealed that enhancing user stickiness by improving service quality, system quality and alternatives system quality to increase user loyalty, which in turn could promote repurchase intention.

Third, we found that user stickiness has a positive impact on user loyalty. In addition, user stickiness and loyalty each has a positive relationship with consumers' repurchase intention while perceived risk has a negative influence on the repurchase intention. These relationships are well supported by past literature (e.g., Guillaume, 2008; Huang, 2008; Hong & Cho, 2011; Lin, 2007; Xu et al., 2010). For example, Holland and Menzel (2001) posited that stickiness is a deep level of use behavior and will increase consumers' brand loyalty and satisfaction and individuation, which in turn contributes to their repeat purchase behavior (Srinivasan et al., 2002). And due to the absence of face-to-face interaction and the intangibility of products, customer perceived risk is regarded as main obstacle for them to attend online shopping (Belanche et al., 2012), which leads to impact on repurchase intention (Gefen et al., 2003).

Limitations

There are several limitations that need to be discussed. First, the exclusive use of Chinese respondents may restrict the generalization of the findings in this study. However, our respondents have enough group-buying experiences and are proper respondents of this study. Future research is needed to explore the effect of culture in affecting consumers' repurchase decision making. Second, we just include alternative system quality in this study while neglecting alternative service quality and alternative information quality. Future research should be performed to explore the impact of competitors' performance on a specific group-buying website.

Implications for Research

Our study provides several implications and contributions for research. First, although many researches have utilized D&M IS success model in various context (e.g., Molla & Licker, 2001; Rai et al., 2002; Udo et al, 2010), few study has adopted the D&M model IS success model to online group-buying (Hsu et al.,

2014). One of the contributions of this study is that we extend the D&M model to online group-buying context early.

Second, while previous studies have confirmed website qualities and use behavior on repurchase intention based on D&M model (e.g., Hsu et al., 2014; Lin, 2007), they are incomplete. In this study, we also explore the effect of competitors in affecting the success of a certain group-buying company by including alternatives system quality in the research model.

Third, we use user stickiness to represent the variable of use in the D&M IS success model and use user loyalty and repurchase intention to assess net benefits of group-buying websites. Results demonstrate that system quality, alternative system quality, service quality, and information quality serves as antecedents of user stickiness, which also mediates the relationship between the four quality measures with user loyalty.

Finally, as mentioned above, we identify a new mediating variable – user stickiness which mediates the relationship on user loyalty, while prior researches have taken trust (e.g., Gefen, 2000; Hong & Cho, 2011) and satisfaction (e.g., Kassim & Abdullah, 2010; Yen & Lu, 2008) into account frequently. This finding could provide another mediator to conduct researches on customer loyalty.

Implications for Practice

The findings of this study have several managerial implications for online group-buying organizations. This study provides managers of group-buying websites with suggestions on how to retain their consumers and encourage consumers to repurchase. Results indicate that managers should improve their information quality, system quality and service quality to improve their consumers' stickiness and then which can drive to promote their users' loyalty.

For system quality, the online group-buying organizations not only need to improve their system infrastructure (Cheng & Huang, 2013) to guarantee their system run faultlessly and load fast, but also need to do more auxiliary improvement to increase stickiness and loyalty, such as personalization recommendation which can attract more users and keep them on the web site for longer, and create customer loyalty (Hagel & Armstrong, 1997). There once appeared more than five thousand group-buying websites in China (tuan800.com, 2015). However, only those who have paid much attention to system quality survived. Meituan.com is on top of the list. Meituan.com invests a lot of resources to improve its system quality.

For information quality, the online group-buying organizations should enrich and verify information exhibited on the site (Liang et al., 2014). A totally precise and reliable information will be effective to earn users' trust and then attract them to retain (Koernig, 2003; Liao et al., 2006). In practice, if users first time to attend to an online group-buying, they always worry about the product quality due to the striking low discount. The superior sites will display particular text and picture information of products and cooperation partners in detail to reduce customers' uncertainty, describe whole services information to protect consumers' interests. For example, Meituan.com provides detailed information of their special services such as "Refund guaranteed" and "Satisfaction guaranteed" at a notable place of the website.

For service quality, the online group-buying organizations should advance their delivery speed and online response service (Cheng & Huang, 2013; Hsu et al., 2014), especially enhance their after-sale service quality as keeping their refund commitment which is the most serious controversy in actual market, to retain customers and develop much more interactive activities, like online and offline communities, incentives schemes to attract them to revisit the site (Bohlmann et al., 2006; Jing & Xie, 2011). The online group-buying companies in China have improved their service quality. For example, advanced appointment is no more required before consumers go to stores and use the purchased coupon, which improves consumers' service experience and user stickiness (Kim et al., 2009).

Furthermore, the significant influence of alternative system quality on user stickiness indicates that group-buying organizations should pay attention to their competitors' system and try to obtain and keep an advantage in system quality compared with their competitors' websites. Managers of group-buying organizations should consider competitors as important stakeholders when they design, implement, maintain, and improve their own group-buying websites.

Conclusion

This research explores the antecedents of user stickiness and loyalty toward group-buying websites and their effects on consumers' repurchase intention. Based on the D&M IS success model, we proposed a model suggesting that information quality, service quality, systems quality, and alternative system quality each has a positive relationship with user stickiness and loyalty, which in turn affects consumers' group-buying repurchase intention. Results indicate that information quality, service quality, systems quality, and alternative system quality each has a positive relationship with user loyalty through user stickiness. Meanwhile, information quality has a direct impact on user loyalty. Thereafter, user stickiness and loyalty each has a positive relationship with consumers' repurchase intention. This study provides managers with suggestions on how to retain consumers by improving their information quality, systems quality, and service quality. This research also deepens our understanding of how to use the D&M IS success model to guide our research on the success of group-buying websites.

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APPENDIX A. Questionnaire

Constructs	Items	Source
System Quality (SysQ)	1. It is easy to navigate on this site 2. The site makes it easy to find what I need 3. The site launches and runs right away	Udo et al., 2010; Parasuraman et al., 2005
Information Quality (IQ)	1. The website has an ideal amount of images/graphics 2. The contents of this website are useful for my purpose 3. I am kept ell informed of the developments at this website* 4. The information about the products for my needs/interests is sufficient to make a purchase decision 5. The information about the products/services is adequate	Montoya-Weiss et al., 2003
Service Quality (SQ)	1. The vendor gives prompt service to customers 2. It enables me to complete a transaction quickly 3. The site delivers orders when promised 4. It is truthful about its offerings	Parasuraman et al., 2005
Alternative system quality （ASQ）	1. An alternative website is appealing 2. An alternative website is better than this website 3. To my knowledge, another website is closed to ideal 4. An alternative website is attractive to me* 5. My needs could easily be fulfilled by an alternative website*	Li et al., 2006
User Stickiness （ST）	1. I plan to keep using this website in the future 2. I intend to continue using this website in the future 3. I expect my use of this website to continue in the future	Li et al., 2006
User Loyalty （LO）	1. I will say positive things about this site to other people 2. I will recommend this site to someone who seeks my advice 3. I will encourage friends and others to do business with this site 4. I consider this site to be my first choice for future transactions 5. I will do more business with this group-buying site in the coming months	Parasuraman et al., 2005
Perceived Risk （PR）	1. I worry about credit card information being stolen* 2. I worry about the product quality on the internet 3. I worry about the service I ordered on the site being poor* 4. I worry about safe transaction online 5. I worry about how my personal information might be used when I buy online	Lopez and Mollina, 2008 Udo et al., 2010
Repurchase Intention (RI)	1. I am very likely to make a purchase from this website 2. I would use my credit card to purchase from the website 3. I intend to repurchase products or service I needed on the website 4. So far, I have planned to purchase on the website again	Lin, 2007

Note. *item deleted

APPENDIX B. *Common Method Bias*

There is a potential of common method bias since all data was collected through a self-report survey (Podsakoff et al., 2003). We use three methods to test the common method bias. First, the Harmon's single factor test was performed. The result yielded 6 factors with eigenvalues greater than 1.0, which accounted for 72 percent of the total variance. The first factor captured only 42 percent of the variance in the data, indicating that no common factor accounts for more than 50% of the covariance in the variables (Podsakoff et al., 2003).

Second, we compared correlation among constructs and found no constructs with correlations below the threshold of 0.9 (Pavlou et al., 2007).

Third, the unmeasured latent method construct (ULMC) technique (Liang et al., 2007) was performed. The results indicate that the average explained substantive variance of the indicators is 0.719, while the average method-based variance is 0.0031. This leads to a ratio of 232:1 between substantive variance and method variance. In addition, the results revealed that 26 method factor loadings (out of 29) were not significant at a 95 percent confidence level. All results indicate that common method bias is unlikely to be a serious concern for this study.