5-2012

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Surej P. John
Assumption University of Thailand, pjohn@au.edu

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Surej P John
Assumption University of Thailand
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Abstract

From time to time, large numbers of researchers investigate the success factors of B2C e-commerce systems. However majority of those were conceptual studies. Though some empirically validated studies were published on B2C e-commerce systems, very few focused on Asian consumers. The study aims to fill this gap by studying ecommerce success factors among Asian online consumers. Another important objective of this study is to include factors such as perceived security, privacy, trust and perceived cost of transactions into the existing ecommerce success models.

Based on the IS success model proposed by DeLone and McLean and its further respecification and validation attempts made by other researchers later, a revised conceptual model is formulated. The model is tested and validated using the data collected from 240 Asian online consumers living in Thailand.

The research generated 8 inter related dimensions of e-commerce system success which are information quality, system quality, service quality, trust, perceived sacrifice, perceived value, online customer satisfaction and repurchase intention. Results show that the user satisfaction and perceived value are the two important factors influencing the individuals to repurchase products and services from online portals. Online customer satisfaction is influenced by trust, perceived value, service quality, information quality and system quality. On the other hand, three quality dimensions as well as the perceived sacrifice construct influence perceived value. This study also proved that user's trust in the system is influenced by system quality and service quality of the e-commerce system.

Key words

DeLone and McLean model, E-commerce success model, repurchase intention, online consumer satisfaction

1. Introduction

Asian markets are found to be very lucrative and promising for most of the global firms in this period of time due to their rapid transition to business economies (Shao et al., 1999). Asian countries such as China, India, Taiwan, and South Korea are growing at a faster rate than any other Asian countries (Arnott et al., 2007; Kim et al., 2006; Schramm, 2006). Consumer's purchasing behavior and characteristics are different while comparing on the basis of the eastern and western cultural perspectives. Previous literatures give many evidences of these existing differences.

Kacen & Lee (2002) found that attitude- behavior relationship is weaker in collectivist cultures than in individualist cultures. Kacen & Lee, (2002, pp. 168) suggested *"collectivists are less driven than individualists to act on their trait buying impulsiveness by making an impulse purchase."* Meng (Meng & Nasco, 2009) confirmed significant differences in consumer's price sensitivity, price consciousness and sales proneness while comparing Chinese and US consumers. Considering the significant differences between consumer's buying characteristics across eastern and western cultures, it would be interesting not only for academicians but also for the industrialists and practitioners to know more about the critical success factors of B2C e-Commerce among Asian online consumers. Therefore this study would be justifiable even though similar studies have been conducted under different cultural perspectives.

After ten years of their initial proposal of IS success model (DeLone & McLean, 1992) for measuring the complex interdependent variables in IS research, DeLone and McLean (DeLone & McLean, 2003) proposed a revised model of the Information Systems Success framework in 2003 especially for measuring the success of e-commerce systems. The updated model of IS success framework proposed by DeLone and McLean included seven interrelated dimensions such as information quality, system quality, service quality, intention to use/use, user satisfaction, and net benefits. Though numerous researchers investigate the success B2C e-commerce systems based on D&M framework, majority of those were conceptual studies. Though some empirically validated studies (Atsu et al., 2010; Ghandour et al., 2010; Hosnavi & Ramezan, 2010; Mun et al., 2010; Sambasivan et al., 2010; Brown, 2008) were published on B2C e-commerce systems, very few focused on Asian consumers. The study aims to fill this gap by studying ecommerce success factors among Asian online consumers.

The main purpose of this study is to re-specify and validate an eight dimensional conceptual model for measuring the e-commerce success in Asian region. The eight dimensions are system quality, service quality, trust, information quality, perceived sacrifice, perceived value, online customer satisfaction and repurchase intention. The model is based on the framework of updated DeLone and McLean model (2003). The detailed objectives of this research paper are as follows:

a. Reexamine the relationships between various dimensions of DeLone and McLean model for assessing the e-commerce system's success in Asian region.
b. Develop a revised model by including trust, perceived sacrifice, and perceived value into the updated DeLone and McLean model of IS success.
c. Empirically validate and test the conceptual model based on the data collected from 240 Asian online consumers.

2. Research model and hypotheses

Based on the comprehensive evaluation of the previous literatures (Belanger et al., 2002; Brown, 2008; Chen & Dubinsky, 2003; DeLone & McLean, 2003, 2004; Fang et al., 2011; Flavián & Guinalíu, 2006; Ha & Janda, 2008; Kassim & Abdullah, 2010; Molla & Licker, 2001; Pavlou & Fygenson, 2006; Petter et al., 2009; Rai et al., 2002; Seddon, 1997; Suh & Han, 2003; Y.-S. Wang, 2008 etc.), related to Information systems success and more specifically e-Commerce success models, this research paper proposes a more current and updated multidimensional and interrelated IS success model suitable for measuring e-commerce success. The model consists of eight interrelated constructs, which are system quality, service quality, trust,

information quality, perceived sacrifice, perceived value, online customer satisfaction and repurchase intention. The proposed research model (Fig. 1) is given below.
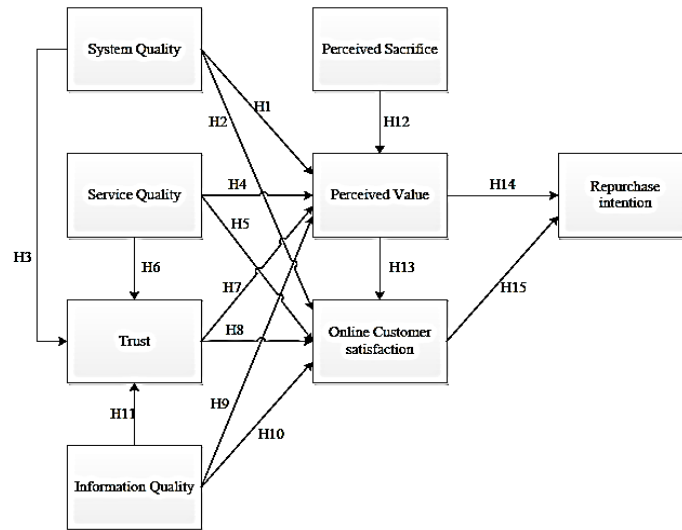

Figure 1: Proposed B2C E-commerce success model

Each of the eight dimensions of IS success model as well as the hypotheses related to these constructs are described below.

2.1. System Quality

System quality in an e-Commerce context refers to usability, reliability, adaptability, and fast response time of the system (DeLone & McLean, 2003). Seddon (Seddon, 1997 pp.246) suggested that system quality is mainly concerned with ease of use, presence or absence of 'bugs' in the system and consistency of the user interface.

Most of the previous literature measured system quality using perceived ease of use found positive relationship with the operationalization of the system use in a variety of systems at individual levels of analysis (Petter, Willam, & McLean, 2009; Wang, 2008; Rai et al., 2002). Halawi & McCarthy (2007) confirmed positive relationship of system quality with user's satisfaction and intention to use of the system. Brown (2008) found positive relationship between system quality and trust in an e-commerce system. Based on the above, this study tests the following propositions

H1: *System quality will positively influence perceived value of users in an e-commerce context*
H2: *System quality will positively influence online customer's satisfaction in an e-commerce context*
H3: *System quality will positively influence the online customer's trust in the e-commerce system.*

2.2. Service Quality

Service quality construct, in an e-commerce context can be defined as consumer's overall judgment of the excellence and quality of e-service offerings in the virtual market place (Kassim & Abdullah, 2010). Service quality is evaluated by a consumer might depend on many factors such as their perceived value, their trust in the service providers, and ultimately their satisfaction from the purchase and the quality of

service offerings they received. Recently Brown (2008) identified the positive relationship of service quality and user satisfaction. Wang, (2008) found significant positive relationship between service quality and perceived value and also service quality and user satisfaction. This study proposes following hypothesis for testing with regard to service quality construct.

H4: *Service quality will positively influence perceived value of users in an e-commerce context*
H5: *Service quality will positively influence online customer's satisfaction in an e-commerce context.*
H6*: Service quality will positively influence the online customer's trust in the system in an e-commerce context*

2.3. Trust
Following the words of Pavlou, (P. Pavlou, 2003, pp.74) Trust in an e-commerce context can be defined as the belief that let the online consumers to willingly become vulnerable to online merchandisers after having their characteristics into consideration. Trust is an important construct in many transactional relationships and covers many stages and dimensions such as benevolence, honesty, integrity, competence, security, privacy etc. (McKnight, Choudhury, & Kacmar, 2002).
From 2001 onwards (Molla & Licker, 2001; Gefen *et al.*, 2003; Brown, 2008) many researchers included trust factor in the e-commerce success models. Molla (2001) suggested that not only the quality of the website and content information, but security and privacy factors are also important in influencing e-commerce use and ultimately their satisfaction.
According to Gefen *et al.* (2003), user's trust in a system has several benefits including greater perceived usefullness and thereby greater intention to use the sytem. Brown (2008) confirmed that percevied usefulness and user satisfaction are positively related with their trust in the system and service provider. Following hypotheses are proposed to test with regard to trust.

H7: *Trust will positively influence perceived value of users in an e-commerce context*
H8: *Trust will positively influence online customer's satisfaction in an e-commerce context*

2.4. Information Quality
Information quality is an essential dimension among the factors that lead to user satisfaction in a B2C e-commerce context. The term information quality refers the characteristics of the information system such as relevance of the data, understandability of the information, accuracy, completeness, conciseness of the information presented etc. Most of the previous literature (Maditinos & Theodoridis, 2010; Halawi & McCarthy, 2007; Chiu et al., 2007; Leclercq, 2007; Rai et al., 2002; Fang, C.-M. Chiu, & E. T. G. Wang., 2011) identified a positive relationship between information quality and user satisfaction.
Lim, Lee, Hur, & Koh (2009) proved that quality of information has a significant influence of customers trust. Information quality also positively influences perceived value of e-commerce systems among online users (Wang, 2008). Based on the above, following hypotheses are proposed with regard to information quality.

H9: *Information quality will positively influence perceived value of users in an e-commerce context*

H10: *Information quality will positively influence online customer's satisfaction in an e-commerce context*

H11: *Information quality will positively influence the online customer's trust in the system in an e-commerce context*

2.5. Perceived sacrifice

K. B. Monroe (1991) & Zeithaml (1988) agreed that perceived value should be determined from perceived quality and perceived sacrifice. Wang and Yi-Shun (2008) noted that, "*Perceived sacrifice or perceived price in the respeicified model is an important issue in need of theoretical reasoning and systematical empirical approach*". Perceived sacrifice refers to all the cost that a customer has incur in order to acquire the product. Perceived sacrifice (Monroe, 1991; Ravald & Grönroos, 1996; Zeithaml, 1988) includes factors such as purchase price, post purchase price, acquisition costs, startup costs, transportation costs, insurance costs while transportation, transportation costs, risks of failures or poor performances etc. Monroe (1991) defined perceived value as the ratio between perceived benefits and perceived sacrifice. Wang (2008) suggested in his research that while measuring perceived value in information systems success, perceived sacrifice also need to be measured to give richness to the systematic empirical research model of IS success. Zeithaml (1988) suggested that economically rational customers see price as the most important financial cost component and most important component of perceived sacrifice. Based on the above literature, this study tests the following hypothesis

H12: *Perceived sacrifice will negatively influence perceived value of users in an e-commerce context.*

2.6. Perceived value

According to Zeithaml (1988, p.13), "*value is I what I get for what I paid*". This defenition of perceived value is consistent with Monroe (1991). Monroe (1991) defined perceived value as the ratio between perceived benefits and perceived sacrifice in a transaction. Many of the previous literature (Wang, 2008; Lin & Wang, 2006; Caruana & Fenech, 2005; Lam, et al., 2004) found positive relationship between perceived value and customer satisfaction. Yang & Peterson (2004) found that customer loyalty is highly depending on customer perceived value and customer satisfaction. He pointed out that to enhance customer loyalty in business; marketers should improve their products/service value and their customer satisfaction levels. Recently it is (Ha & Janda, 2008; Eakuru & Mat, 2008; Yang & Peterson, 2004) found that perceived value is directly influencing customer satisfaction because of their perception of utility they might receive while buying the product and it is also found (Ha & Janda, 2008) that perceived value is indirectly influencing the customer's intention to reuse the online shopping sites. Based on the above literature, this study tests the following hypotheses

H13: *Perceived value will positively influence customer satisfaction in an e-commerce context*

H14: *Perceived value will positively influence intention to reuse in an e-commerce context*

2.7. Online Customer satisfaction

Online customer satisfaction is considered to be the second most important success factor after Use/Intention to use while measuring the success of e-commerce systems. Online customer satisfaction refers to the evaluation of a customer's feelings towards various aspects of an e-commerce systems especially informational, transactional, service and support given by a firm to market and sell its products and services (Molla & Licker, 2001). Many researchers mentioned above have identified that user satisfaction has been indirectly affected by factors such as information quality, system quality, service quality and customer's trust in the websites. The strong positive relationship between customer's satisfaction and their intention to use or repurchase has been empirically proved by many previous researchers (Ha & Janda, 2008; Eakuru & Mat, 2008; Wang, 2008; Brown, 2008; Lin & Wang, 2006; Carpenter & Fairhurst, 2005; Lam et al., 2004; Anderson & Sullivan, 1993). Based on the above findings, this study tests the following hypothesis

H15: *Online customer satisfaction will positively influence customer's intention to reuse the system for repurchase in an e-commerce context.*

2.8. Repurchase intention

Repurchase intention can be defined as the positive attitude of a customer towards a B2C e-commerce system, which may result, repeat use/purchase and ultimately lead to customer loyalty (Wang, 2008). Repurchase intention in a B2C e-commerce system can be considered conceptually similar to loyalty in the marketing literature. Anderson (Anderson & Srinivasan, 2003) defined e-loyalty as "customer's favorable attitude toward an electronic business resulting in repeat buying behavior". Thus repurchase intention ultimately reflects the success of a B2C e-commerce system, which is in line with the net benefits proposed by DeLone and McLean (2003). The intention to reuse is similar to continuance intention proposed by Brown (2008). DeLone and McLean (2003) in their revised IS success model suggested that sometimes Intention to Use can be considered as a substitute for use in their model in order to simplify the multidimensional aspects of IS success.

3. Research Methods

3.1 Instrument design

Instruments used to create the questionnaire are shown below as Table I. All the items were selected from the previous empirically validated literature for ensuring the content validity and modified slightly to fit the e-commerce context. Likert scale ranging from 1-5 (strongly disagree to strongly agree) was used for all questions.

3.2 Data collection

Since this research is focused on identifying the significant factors that influence Asian consumer's intention to reuse online shopping portals, data were collected from online Asian consumers living in Bangkok metropolitan. Thais, Chinese and Indians are the three largest Asian communities living in Bangkok city. Due to the convenience in collecting the data in the limited time, quota sampling was used to obtain the desired responses (80 each) from Thais, Indians, and Chinese online

consumers living in Bangkok metropolitan, Thailand. Respondents were asked to identify their most familiar e-commerce website and the questionnaire requested the respondents to assess the website attributes and ultimately their online satisfaction.

No	Measure	No. of items	Source
1	System Quality	4	Doll & Torkzadeh, 1988 Rai et al., 2002 Rivard et al., 1997
2	Service Quality	4	Tang & Wang, 2003
3	Information Quality	5	Rai *et al*., 2002
4	Trust	4	T. Pikkarainen, et al., 2004 Yousafzai, et al., 2009
5	Perceived Sacrifice	3	Chu & Lu, 2007
6	Perceived value	3	W. B. Dodds, et al., 1991
7	Online customer satisfaction	3	Rai *et al*., 2002 Ha & Janda, 2008
8	Repurchase intention	3	Chu & Lu, 2007 Wang, 2008

Table I: Instruments used to measure B2C e-Commerce success

4. Analysis and Results

4.1 Measurement model

Reliability analysis of the multi-item scales resulted favorable results. The Cronbach's Alpha values were calculated for each construct. All alpha values were higher than 0.8 indicate high overall internal consistency among the items under each of the construct. Exploratory factor analysis was conducted using verimax rotation with a minimum Eigenvalue of 1 used as cutoff value for extraction. Only those items with factor loadings greater than 0.5 were kept for further analysis. A measurement model is developed (Fig. 2) to verify that 29 measurement variables reflect the eight unobserved variables in a reliable manner. The overall fit of the measurement model, adequacy of the factor loadings, explained variances of the measurement model were determined by the Confirmatory factor analysis (CFA) using AMOS version 18. The results of the CFA (χ^2 = 519.189, df= 349, p=0.00, NFI=0.893, RFI=0.876, IFI=0.962, TLI=0.956, CFI=0.962) showed the measurement model a good fit to the data collected. The average variance extracted (AVE) was computed for all the measures and the values varied from 0.66 to a maximum of 0.90, thus suggesting adequate convergent validity. After comparing the AVE for any two constructs with the square of the correlation estimate between those constructs, it is found that variance extracted is always greater than the squared correlation estimate, thus suggesting adequate discriminant validity. Overall the measurement model exhibited sufficient reliability, convergent validity and discriminant validity.
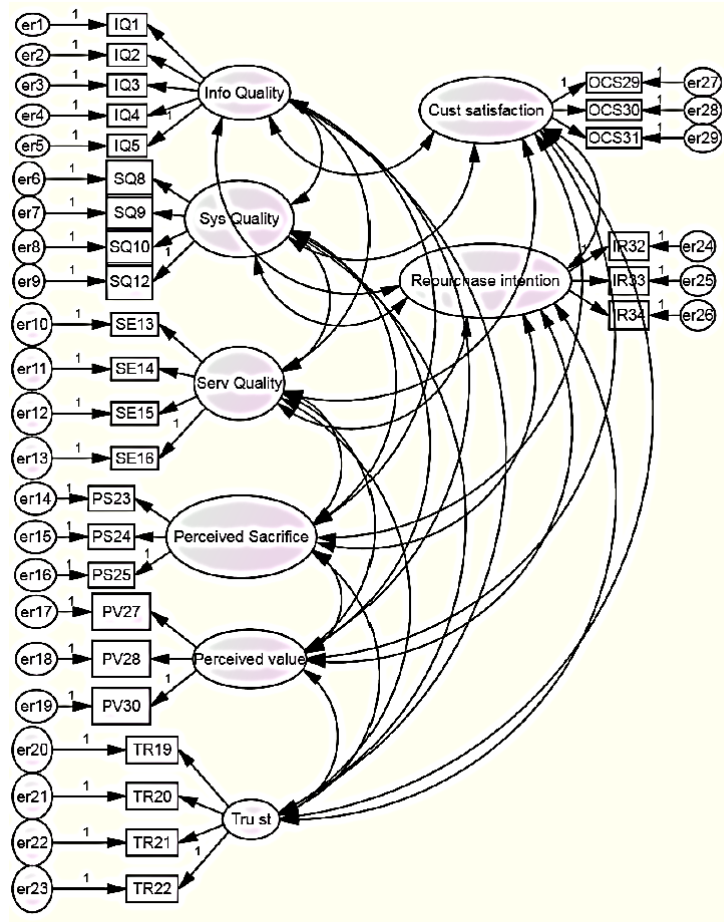
Figure 2: Measurement Model

4.2 Structural model

Further analysis utilized the structural equation modeling (SEM) techniques via AMOS 18 program. Once the fit of the measurement model has been confirmed, the fit of the structural path were evaluated. The SEM helped to identify the efficacy of the model and proposed hypothesis. Results showed a fairly good fit (χ^2 = 39.849, df= 8, p=0.00, NFI=0.0.947, RFI=0.816, IFI=0.958, CFI=0.956) of the structural model. Overall the structural equation parameter estimates provide empirical support for fourteen of the fifteen hypotheses proposed (See Table II for details).

As expected, online customer satisfaction and perceived value were found to be the most important predictors of Intention to reuse of an e-commerce system. However online customer satisfaction exerts a better positive influence on repurchase intention of the online users. Results also indicate that perceived sacrifice is negatively related to perceived value. Perceived value positively influences customer satisfaction. Further results show that system quality, service quality, information quality and trust are the predictors of perceived value and online customer satisfaction. Trust in turn is influenced by system quality and service quality. Figure 3 indicates the respecified e-commerce success model for an individual level.

Hypothesis	Dependent variable	Independent variable	Path coefficient	P (<0.05)	Hypothesis supported
H1	Perceived Value	System Quality	0.161	0.003	YES
H2	Customer satisfaction	System Quality	0.175	0.000	YES
H3	Trust	System Quality	0.287	0.000	YES
H4	Perceived Value	Service Quality	0.223	0.000	YES
H5	Customer satisfaction	Service Quality	0.189	0.000	YES
H6	Trust	Service Quality	0.432	0.000	YES
H7	Perceived Value	Trust	0.12	0.015	YES
H8	Customer satisfaction	Trust	0.129	0.004	YES
H9	Perceived Value	Information Quality	0.132	0.013	YES
H10	Customer satisfaction	Information Quality	0.157	0.001	YES
H11	Trust	Information Quality	0.028	0.689	NO
H12	Perceived Value	Perceived Sacrifice	-0.112	0.002	YES
H13	Customer satisfaction	Perceived Value	0.236	0.000	YES
H14	Repurchase intention	Perceived Value	0.255	0.000	YES
H15	Repurchase intention	Customer satisfaction	0.64	0.000	YES

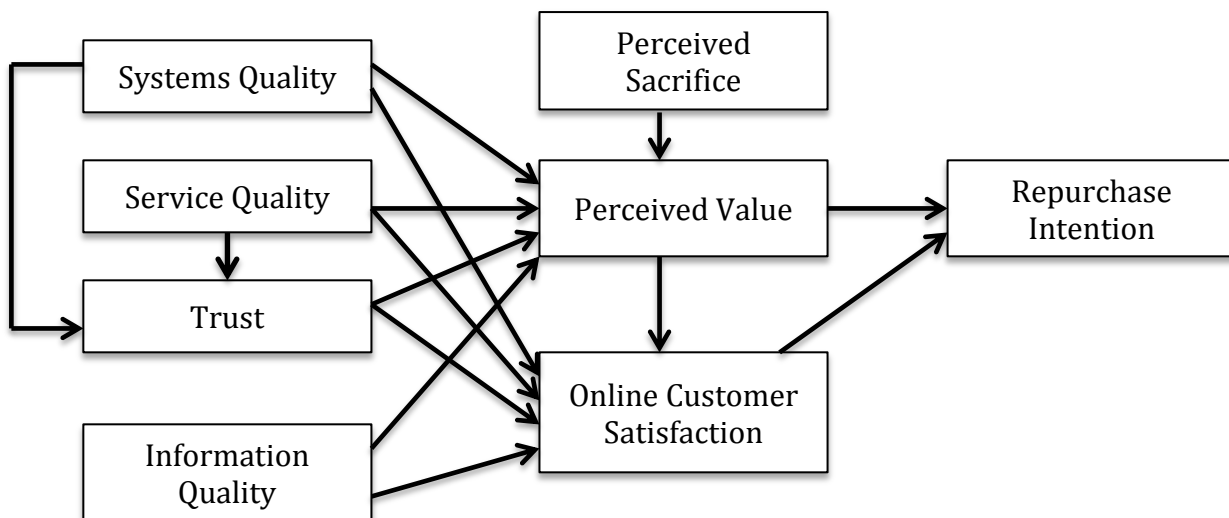**Table II.** Structural Equation Modeling results

Figure 3. Respecified E-Commerce success model

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5. Implications

Results of this study provide empirical evidences to the relationship between online consumers repurchase intention and its key antecedents. An important contribution of this research is to provide empirical evidence pertaining to the roles of perceived sacrifice and trust in influencing perceived value and customer satisfaction among Asian consumers. As Zeithaml & Dodds (Dodds et al., 1991; Zeithaml, 1988) proposed, this study proved that perceived sacrifice is significantly influencing perceived value.

Similarly the study proved that trust among the customers towards an e-commerce system would positively influence their perceived value and ultimately online consumer satisfaction. Therefore the inclusion of trust and perceived sacrifice into the traditional IS success model (DeLone & McLean, 2003) significantly alters the nature of relationships between success factors of an e-commerce success system.

This study also validates and provide empirical evidence pertaining to the relationship between three quality dimensions proposed by DeLone and McLean (DeLone & McLean, 2003), and repurchase intention. Service quality is found to be the most important quality dimension that influences repurchase intention through perceived value and consumer satisfaction. This study proved that service quality is influencing the consumer's trust more than information quality or systems quality. Therefore, the e-commerce managers should give more importance to the development of customer loyalty by increasing the quality of services offered.

6. Limitations
This study has a few limitations, which can be addressed and avoided in the future researches.
Firstly, Factor Analysis results showed that repurchase intention and online customer satisfaction were loaded on the same factor. This may be due to the strong interrelations between customer satisfaction and loyalty. However to ensure better discriminant validity, the repurchase intention instrument may be revised in the future, given that customer satisfaction instrument has been validated in a wide variety of ways in the future.
Secondly, this study measured the perceived sacrifice construct only in terms of perceived price of the product. However other perceived sacrifice components such as transportation costs, start-up costs, maintenance costs, risk of getting cheated due to online purchase etc. are also to be measured and verified in the future researches.
Finally, this study and its findings depend on the data collected from only Asian online consumers. Therefore the generalization of the results is limited to Asian consumer groups. Hence it is important to validate the proposed model with different user communities' mainly from individualist culture countries and with different contexts.

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