Understanding group-buying websites continuance

An extension of expectation confirmation model

Hong Zhang
School of Management, Wuhan University of Science and Technology, Wuhan, China
Yaobin Lu
School of Management, Huazhong University of Science and Technology, Wuhan, China
Sumeet Gupta
Indian Institute of Management, Raipur, India, and
Ping Gao
School of Environment and Development, Institute for Development Policy and Management, University of Manchester, Manchester, UK

Received 10 May 2014
Revised 29 May 2014
9 July 2014
19 August 2014
9 October 2014
Accepted 28 November 2014

Abstract

Purpose – Sustainable success of group-buying web sites implies that consumers not only accept them initially but also use them continuously. Most group-buying web sites, however, are unable to achieve such sustainable success. Drawing on expectation-confirmation model (ECM), the purpose of this paper is to examine the factors that influence group-buying web sites continuance.

Design/methodology/approach – In total, 605 valid responses were collected via a survey of a leading group-buying web site in China. Structural equation modeling was used to test the research model. This study also compared the three competing models of continued use behavior, namely, ECM, the research model and the integrated model.

Findings – The results show that perceived web site quality, perceived price advantage and confirmation are important determinants of consumer satisfaction, while perceived web site quality, perceived reputation, satisfaction and perceived critical mass significantly influence consumers' continuance intention. The research model accounts for more variance in satisfaction and continuance intention than ECM and is the best-fitting model among the competing models.

Originality/value – Drawing on ECM, this research proposes a model by incorporating three online group-buying characteristics (perceived price advantage, perceived reputation and perceived web site quality) and two social influence factors (subjective norm and perceived critical mass). Specially, this study uses these three online group-buying characteristics to represent perceived usefulness in ECM. These constructs are found to influence consumer satisfaction and continuance intention. This study extends ECM and provides a better explanation of consumers' post-purchase behavior in the online group-buying context.

Keywords China, Continuance intention, Satisfaction, Social influence, Expectation-confirmation model, Online group buying

Paper type Research paper

The work described in this paper was supported by the grants from the National Natural Science Foundation of China (Nos. 71332001 and 71201062).

Internet Research
Vol. 25 No. 5, 2015
pp. 767-793

1066-2243
DOI 10.1108/IntR-05-2014-0127

Corrigendum

It has been brought to our attention that the affiliation for Sumeet Gupta is incorrect in "Understanding group-buying websites continuance: an extension of expectation confirmation model", which was published in Internet Research *Vol. 25 No. 5. This occurred due to an author error. The authors sincerely apologise for this. The correct affiliation for Sumeet Gupta is Indian Institute of Management, Raipur, India. The author affiliation has now been corrected in the electronic version of the article.*

1. Introduction

The diffusion of social media has led to the rise of online group buying, a business model of collective online purchase (Liang *et al.*, 2011). Consumers of group-buying web sites get attractive discounts on bulk purchases. Online group buying has become popular, especially in collectivist cultures like that of China (Jing and Xie, 2011). It emerged in China in early 2010 with the launch of "Manzuo" – the first group-buying web site, and has kept a fast pace of growth since then. The number of Chinese online group-buying users has reached 83.27 million in 2012, accounting for 34.4 percent of the entire online market (with 242 million shoppers) (CNNIC, 2013).

On the global scale, the competition in this fast-growing market tends to be fierce. Most group-buying web sites are unable to retain customers and achieve sustainable development. Particularly in China the switching rate among consumers is quite high because of the entry of a large number of players offering group-buying services (CNNIC, 2013). The intense competition from group-buying web sites and other online and offline channels combined with poor consumer satisfaction and retention rate had led to the strategic restructuring of the industry. A large number of group-buying web sites have appeared and disappeared, leaving behind only a few group-buying web sites, such as Lashou and Meituan, which have been able to sustain the test of time (Zhou *et al.*, 2013). Therefore, managers of group-buying web sites are very eager to find strategies to improve consumers' satisfaction and in turn their continuance intention to sustain in the market. This paper addresses one research question of practical interest:

RQ1. What influences consumers' satisfaction and their intention to continue using a group-buying web site?

The research question also has good academic value, given the fact that a very few studies have examined consumers' satisfaction and continuance behavior in the context of online group-buying.

Drawing on the above-mentioned practical and theoretical needs, this study: first, attempts to develop an integrated model to provide a better understanding of the driving forces of consumers' continuance intention; and second, systematically examines this research model. With respect to the first purpose, expectation-confirmation model (ECM) of information systems (IS) continuance serves as an overarching framework to explain consumers' satisfaction and their continuance intention. Based on previous studies on online group buying, this study inductively identifies salient factors that influence consumer attitude and behavior in the first stage. The first stage suggests that online group-buying characteristics and social influence should be taken into consideration in order to examine the dynamics that govern consumers' continuance intention. Therefore, in the second stage, a research model that integrates ECM with the concept of online group-buying characteristics and social influence is developed based on the expected utility theory and social influence theory.

In terms of contribution, first this paper extends the literature on consumer behavior in online group-buying settings by examining online group-buying consumers' continuance intention from an integrated perspective of online group-buying characteristics and social influence. Second, this paper extends ECM and differs from most ECM-based research in significant ways. The extant research has extended ECM in two primary ways to provide greater understanding and explanatory power of consumer continuance behavior in its application. This first approach involves introducing factors from related models, such as habit (Limayem and Cheung, 2008) and affective factors (Lee and Kwon, 2011). A second approach involves introducing alternative post-adoption beliefs to the model, such as perceived enjoyment (Thong *et al.*, 2006) and perceived ease of use (Hong *et al.*, 2006). Despite this extensive research activity, these studies in the ECM research stream have overlooked the role of object-based beliefs and attitudes (Lin *et al.*, 2012). Our study identifies three object-based beliefs reflecting online group-buying characteristics, namely, perceived price advantage, perceived reputation and perceived web site quality, and uses them to represent the post-adoption expectations (i.e. perceived usefulness) in ECM. These constructs are justified by statistical tests to impact consumer satisfaction and continuance intention and are therefore useful for examining post-purchase behavior in online group buying. In addition, this study integrates two social influence factors to examine the effect of social influence in determining consumers' continuance intention, which contributes to the theoretical understanding of the social specificity of online group buying. Drawing on ECM, this study offers a validated model of continuance intention in online group-buying settings. This study thus serves as a precursor for studying continuance behavior in online group buying based on ECM.

The rest of the paper is organized as follows. The following section presents a review of relevant research. Based on ECM, the third section proposes a conceptual model of online group-buying continuance behavior. The process of the empirical study is discussed in the fourth section. The analysis results are documented in the fifth section. The sixth section discusses the results, and summarizes the theoretical and practical implications. The final section presents limitations and future research directions.

2. Literature review

2.1 Online group buying

Research on online group buying can be classified into three major themes. The first one is about its strategic functions, such as the dynamic pricing mechanism (Anand and Aron, 2003; Chen *et al.*, 2010). The second theme emphasizes the leverage that cooperation among buyers can create for successful online group buying, and focusses on the potential benefits and risks of such cooperation on both buyers and suppliers (Chen *et al.*, 2009; Chen and Roma, 2011). The third theme, which has gained increased interest among the scholars, focusses on online consumer behavior.

Table I summarizes prior studies on consumers' online group-buying behavior and shows salient factors that influence consumer attitude and behavior, their definitions and implications. As shown in Table I, previous studies reveal several key determinants in the consumer decision process in the online group-buying context, including price (Fan *et al.*, 2010; Kauffman *et al.*, 2010a; Liao *et al.*, 2012; Zhang *et al.*, 2013), network externality (Kauffman *et al.*, 2010b; Liu and Sutanto, 2012), conformity

Salient factor	Study	Definition	Implication
Perceived price fairness	Kauffman *et al.* (2010a)	Consumers' perceived sense of how fair, acceptable and reasonable the online group-buying price is	The price perception (price fairness, acceptance, reasonableness, price satisfaction, etc.) is important in the consumer decision process
Price satisfaction	Kauffman *et al.* (2010a)	The extent to which the current online group-buying price makes the consumer feel satisfied, delighted and happy	
Price performance expectations	Fan *et al.* (2010)	Consumers' perception that the online group-buying price is more reasonable and satisfying	
Price	Liao *et al.* (2012)	The extent to which the online group-buying price is low	
Price discount	Zhang *et al.* (2013)	A discounted rate that a restaurant offers on a food package in a group-buying promotion	
Network externality	Kauffman *et al.* (2010b)	The number of existing bids	There exists the network externality effect /herd effect and normative influence in online group buying
	Liu and Sutanto (2012)	The number of existing bids	
Conformity	Chen and Wu (2010)	Due to both the normative and informative influence in group buying, the individual follows the public's thinking or behavior	
Perceived usefulness	Fan *et al.* (2010)	Consumers' perception that using a specific online group-buying platform will increase their shopping performance	Improving shopping performance is one of the main reasons that consumers choose online group buying or continuously use a specific online group-buying platform
	Tsai *et al.* (2011)	The degree to which an individual believes that using a group-buying web site will enhance his or her behavioral intention	
Online reputation systems	Kauffman *et al.* (2010b)	The extent to which textual comments are positive or negative	Reputation of a web site can increase consumers' trust in the web site, in turn their behavior intention
Popularity of a restaurant	Zhang *et al.* (2013)	The welcome level of a restaurant	
Reputation of web site	Hsu *et al.* (2014)	Customers' belief that a web site is honest and concerned about its customers	

Table I.
Prior studies on consumer behavior in the online group-buying context

(*continued*)

Salient factor	Study	Definition	Implication
Web site quality	Tsai *et al.* (2011)	The quality of web-based information systems and services provided by a web site, including system quality, information quality and service quality	Enhancing web site quality is critical for a success group-buying web site
System quality attitude	Cheng and Huang (2013)	User feelings regarding web site usability, availability, reliability, adaptability and response time	
Perceived quality of web site	Hsu *et al.* (2014)	A customer's perception of system quality, information quality and service quality of a group-buying web site	
Trust	Shiau and Luo (2012)	A consumer's belief in an online group buying vendor's honesty toward the consumer	Consumer trust is a strong predictor of intention to engage in online group buying
	Tsai *et al.* (2011)	The trust between users and the online group-buying communities	

Table I.

(Chen and Wu, 2010), perceived usefulness (Fan *et al.*, 2010; Tsai *et al.*, 2011), reputation (Hsu *et al.*, 2014; Kauffman *et al.*, 2010b; Zhang *et al.*, 2013), web site quality (Cheng and Huang, 2013; Hsu *et al.*, 2014; Tsai *et al.*, 2011) and trust (Shiau and Luo, 2012; Tsai *et al.*, 2011). These studies suggest that price, perceived usefulness, reputation and web site quality are key determinants of consumer attitude and behavior from the perspective of online group-buying attributes, and social influence (resulting from network externality and normative influence) plays a salient role in determining consumer behavior.

2.2 Social influence

Given the importance of social influence in online group buying (Kauffman *et al.*, 2010b; Tai *et al.*, 2012), we pay particular attention to its impact on consumers' continuance intention to use a group-buying web site. Previous studies have used two constructs, namely, subjective norm and critical mass, to capture the essence of social influence in various contexts, such as computer-based communication technologies (Van Slyke *et al.*, 2007), online games (Chang *et al.*, 2013) and Web 2.0 services (Chen *et al.*, 2012). Therefore, we examine social influence using these two constructs in this study.

Subjective norm is dominantly conceptualized as social influence (Wang *et al.*, 2013). It refers to an individual's perception that his/her referent others think he/she should engage in a behavior, which typically reflects the normative influence derived from a cohesive social reference group, namely, compliance-based social influence (Venkatesh *et al.*, 2003). Since previous studies on online group buying also suggest that there exists the normative influence in online group buying, we include subjective norm in our research model.

Critical mass as a form of social influence is considered in this study for two reasons. First, critical mass has important implications for predicting user behavior (Wattal *et al.*, 2010). It refers to the point at which a minimum number of users have adopted an innovation so that there is an acceleration in adoption of the innovation (Van Slyke *et al.*, 2007). Perceived critical mass represents the degree to which a user perceives that this point has been reached (Lou *et al.*, 2000). This means that once the scale of users reaches a critical mass, more number of users are motivated to join the network (Lin and Lu, 2011). Second, critical mass represents the effect of network externality which influences online group-buying behavior (Kauffman *et al.*, 2010b; Liu and Sutanto, 2012). The critical mass theory suggests that as more and more consumers adopt an innovation, the innovation is perceived as increasingly beneficial to both previous and potential adopters (Van Slyke *et al.*, 2007). This is related to the concept of network externality, which refers to the value that a consumer derived from using a good or service increases with the number of other consumers using the same good or service (Tseng and Teng, 2014). In summary, both critical mass and network externality share a common view: the value of a technology increases with the number of its users.

Since the actual critical mass is difficult to determine, we use perceived critical mass to examine the effect of critical mass on consumer behavior. Following Lou *et al.* (2000), perceived critical mass is defined here as consumers' perception that a group-buying web site is widely used in their social networks.

2.3 ECM of IS continuance

Rooted in the expectancy-confirmation paradigm, Bhattacherjee (2001b) developed and empirically tested an ECM of IS continuance. The model predicts users' IS continuance intention with three antecedent constructs, namely, user satisfaction with IS use, user confirmation of expectations following actual IS use and perceived usefulness of IS representing post-adoption expectations. ECM has been extended to understand consumer behavior in different continuance contexts. For example, Thong *et al.* (2006) expanded post-adoption expectations in ECM by integrating perceived enjoyment and perceived ease of use with perceived usefulness. They reported significant effects of perceived enjoyment and perceived ease of use on satisfaction and continued IS use intention. Lee and Kwon (2011) included two affective factors (familiarity and intimacy) into ECM to predict continuance intention toward web-based services and found that perceived usefulness, satisfaction, familiarity and intimacy together explain 80.9 percent of the variance in intention. Similarly, Lin *et al.* (2012) integrated value-based adoption model and ECM model and used perceived value to replace perceived usefulness in ECM to predict the intention to continue using the internet protocol television service. The results show that perceived value, a function of perceived sacrifices and perceived benefits, is a strong predictor of satisfaction and continuance intention.

These studies demonstrate that a proper expansion of ECM may generate a model with better explanatory power than ECM itself. This study inductively identifies three beliefs about the group-buying web site, manifested as online group-buying attributes, and discovers the social specificity of online group buying based on previous studies on online group buying. Therefore, we integrate online group-buying characteristics and social influence with ECM to develop a research model for examining group-buying web sites continuance intention.

First, based on the expected utility theory, we focus on three crucial online group-buying features, namely, perceived price advantage, perceived reputation and perceived web site quality, and use them to represent perceived usefulness in our model. The

rationales are that first, the expected utility theory is developed for explaining consumer behavior from a value maximization perspective. In this study, utility is determined on the basis of the consumer's perceptions of the equivalent value of using a group-buying web site. It focusses on not only the monetary aspects of value (such as price), but also the non-monetary aspects (such as risk) (Kim *et al.*, 2012). Web site reputation and web site quality are important non-monetary aspects (risk reduction and equivalent value enhancement) of using a specific group-buying web site; second, previous studies on online group buying suggest that price is a crucial determinant in online group buying, whereas web site reputation and web site quality represent the characteristics of group-buying web sites and third, since perceived usefulness can only reflect the overall behavioral belief of perceived benefits (Lin *et al.*, 2012), object-based beliefs/perceptions need to be taken into consideration in the online group-buying context (Jingjun *et al.*, 2013). Therefore, we argue that perceived price advantage, perceived reputation and perceived web site quality may represent perceived usefulness to better reflect the very nature of online group buying, and thus exclude perceived usefulness in our model.

Second, considering that subjective norm and perceived critical mass are important determinants of consumer behavior in the context of online group buying (Kauffman *et al.*, 2010b; Liu and Sutanto, 2012) and, respectively represent the normative influence from peers and the network externality effect, we include them in our research model and investigate how they influence the continuance intention toward the use of group-buying web sites.

3. Research model and hypotheses

The research model developed by integrating ECM with three constructs reflecting online group-buying characteristics and two social influence constructs is presented in Figure 1.

3.1 Hypotheses related to ECM

ECM hypothesizes that a user's level of confirmation of actual IS use is the key determinant of user perceptions and satisfaction, and satisfaction significantly influences his or her IS continuance intention (Bhattacherjee, 2001b). Since ECM is an already verified model in e-commerce, the hypotheses in ECM should also hold in this study (Lee and Kwon, 2011; Limayem and Cheung, 2008). Consumers' confirmation implies that they have achieved expected benefits through purchase experience, which positively influences their satisfaction (Bhattacherjee, 2001a). Thus, it is reasonable to believe that consumers' confirmation will influence their satisfaction with a group-buying web site:

H1a. Confirmation positively influences consumer satisfaction.

Consumer satisfaction reflects the summary psychological state after purchase and consumption experience (Bhattacherjee and Premkumar, 2004). This study focusses on consumer feeling about actual group-buying experience provided by a group-buying web site and defines satisfaction as an evaluation of prior use of the web site. ECM posits that users' satisfaction with IS use positively affects their continuance intention. In the literature, a customer's satisfaction level is the determinant in his decision to re-purchase products or to patronize services (Lee and Kwon, 2011; Limayem and Cheung, 2008). Therefore, we hypothesize:

H1b. Consumer satisfaction positively influences continuance intention of group-buying web sites.

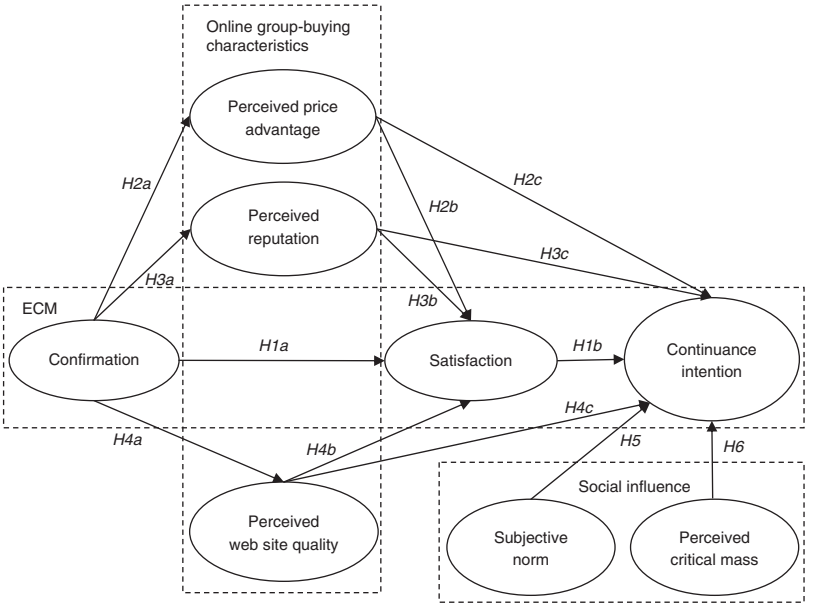


Figure 1.
The research model

3.2 Hypotheses related to online group-buying characteristics

3.2.1 Perceived price advantage. Perceived price advantage is a reflection of the value consumers obtain from group-buying web sites use. Based on the value-based adoption model, if consumers' actual experience of products exceeds their performance expectation, the price advantage would be perceived as satisfying because the consumers' perceived benefits exceed their perceived sacrifices (Lin *et al.*, 2012). Thus, confirmation of online group buying, which refers to a cognitive belief representing the extent to which consumers' expectations are met, is expected to have a positive influence on perceived price advantage:

H2a. Confirmation positively influences perceived price advantage.

Adapted from Fan *et al.* (2010), we define perceived price advantage as consumers' perception of the advantage of the online group-buying price. The expected utility theory suggests that consumers who exhibit rational decision-making behavior select the alternative that maximizes their utility. Since perceived price advantage refers to the perception of price advantage relative to the reference price, good perception of price advantage represents the shopping utility (Kim *et al.*, 2012). Based on the assumption of rational choice, we argue that perceived price advantage will positively influence consumer attitude and behavior.

Previous studies have examined the role of perceived price on satisfaction (Jiang and Rosenbloom, 2005; Martín-Consuegra *et al.*, 2007). Using BizRate data, Jiang and Rosenbloom (2005) verified that price perception determines consumer satisfaction. Martín-Consuegra *et al.* (2007) found that perceived price fairness affects consumer satisfaction in the service industry. Given the nature of online group buying where consumers enjoy receiving significant discounts on premium products, perceived price advantage may play an increased role in determining satisfaction. Therefore,

consumers are more likely to be satisfied with their experience if they perceive that the price advantage on an online group-buying platform is greater:

H2b. Perceived price advantage positively influences consumer satisfaction.

Online group buying is a business model whereby consumers come together to demand greater discounts on bulk purchases (Liang *et al.*, 2011). In other words, consumers use online group buying primarily for saving money through discounts on bulk purchases (Shiau and Luo, 2012). Thus, consumers' perception of price advantage constitutes a driver of their continuance behavior in online group-buying settings. Extant studies provide theoretical basis for this argument. For example, Reibstein (2002) concluded that product price is critical in attracting consumers to a retailer's web site. Liao *et al.* (2012) found that low price is the main reason that consumers choose the same group-buying web site. Therefore, we hypothesize that:

H2c. Perceived price advantage positively influences continuance intention of group-buying web sites.

3.2.2 Perceived reputation. The self-perception theory posits that customers adjust their evaluation of a group-buying web site as they acquire new reputation-relevant information about the web site (Park and Lee, 2009). Thus, consumers may continually update their reputation perceptions of a group-buying web site with their interaction experience. The consumers' perceived reputation will be high as a result of the confirmation experience of realizing expected benefits, such as timely delivery, accurate billing and excellent service. On the other hand, if the outcome does not meet their expectation, the perception will be adjusted negatively. Hence, we hypothesize:

H3a. Confirmation positively influences perceived reputation.

Following Chandra *et al.* (2010), we define perceived reputation as the extent to which consumers believe in the group-buying web site's competency, honesty and benevolence. Reputed group-buying web sites are more readily accepted by consumers (Park and Lee, 2009). A favorable reputation is generally built on a significant investment, great effort, as well as consistently good service. Thus, a group-buying web site aiming to maintain a good reputation in consumers' cognitive memory would not act opportunistically, as such action would tarnish its credibility and reputation (Pan *et al.*, 2013). Hence, it is reasonable to believe that the group-buying web site with a favorable reputation provides consumers with an experience that increases their satisfaction:

H3b. Perceived reputation positively influences consumer satisfaction.

Consumers' perceived reputation of a group-buying web site influences their intention to use it continuously. First, studies on online group buying have documented the considerable value consumers place on a web site's reputation (Cheng and Huang, 2013; Kauffman *et al.*, 2010b). A group-buying web site with good reputation conveys an image of justice and honesty to consumers. Consumers expect that the web site will fulfill what it promises and are therefore encouraged to continue using it. Second, reputation has a positive effect on trust (Chandra *et al.*, 2010; Kim *et al.*, 2004) and e-WOM effect (Park and Lee, 2009), which are key determinants of online group-buying behavior (Cheng and Huang, 2013). Therefore, we hypothesize:

H3c. Perceived reputation positively influences continuance intention of group-buying web sites.

3.2.3 Perceived web site quality. Delone and Mclean (2004) maintain that web site quality includes system quality, information quality and service quality. These three measures of quality have been widely used in research studying web site quality (Ahn *et al.*, 2007; Cheng and Huang, 2013; Teo *et al.*, 2008). System quality refers to the degree to which users assess the web site's features such as usability, availability, reliability and response time. Information quality indicates the degree to which the content of the web site is relevant, personalized, accurate and complete. Service quality refers to the degree to which users evaluate the overall support and services provided by the web site. In this study, we measure perceived web site quality based on system quality and service quality for the following reasons. First, the group-buying web sites contain significant user-generated content (such as customer reviews) apart from the marketer-generated content. Second, group-buying web sites rely on social networking sites like Renren and Sina Weibo (just like Facebook and Twitter in USA) to disseminate the deal information within online social networks (Liang *et al.*, 2011). Thus, the responsibility of web site operators is limited to system quality and service quality as information quality depends on members' contribution. Following Liang *et al.* (2011), we suggest that the quality of a group-buying web site is determined by both system functions and service.

Perceived web site quality in our study refers to consumers' evaluation of the web site's features and excellence, reflecting the extent to which the web site meets consumers' needs (Liang *et al.*, 2011). It represents the overall experience on a web site, including information search, product evaluation, decision making, ordering, customer service and delivery (Wolfinbarger and Gilly, 2003). Because confirmation inherently captures the entire consumption experience, it is reasonable to assume that confirmation of purchase experience will tend to elevate perceived web site quality, and disconfirmation will reduce such perception. Therefore, we hypothesize:

H4a. Confirmation positively influences perceived web site quality.

Delone and Mclean (2004) applied IS success model to measure e-commerce success with system quality, information quality, service quality, user satisfaction, system use and net benefits, in which system quality and service quality lead to users' satisfaction, and in turn their use intention. Good system quality and service quality allow consumers to use the platform to solve their problems efficiently, and can provide consumers a satisfactory consumption experience by responding to their needs quickly (Delone and Mclean, 2004). Some studies have confirmed the positive effect of system quality and service quality on consumer satisfaction. For example, Wang (2008) and Kim *et al.* (2004) indicated that both system quality and service quality significantly influence consumer satisfaction in e-commerce. Therefore, we hypothesize:

H4b. Perceived web site quality positively influences consumer satisfaction.

Based on the IS success model, if consumers perceive that functions and services of a group-buying web site can meet their expectation, they are likely to choose it as their preferred web site, which in turn will lead to their continued use (Cheng and Huang, 2013). A recent study by Tsai *et al.* (2011) asserted the important role of web site quality for the success of a group-buying web site. Liang *et al.* (2011) also found that web site

quality influences consumers' intention to continue using a social commerce platform. Therefore, we hypothesize:

H4c. Perceived web site quality positively influences continuance intention of group-buying web sites.

3.3 Effects of social influence

3.3.1 Subjective norm. Social influence as a direct determinant of behavioral intention is represented as subjective norm in Theory of Reasoned Action, Technology Acceptance Model 2 and Theory of Planned Behavior (TPB) (Venkatesh *et al.*, 2003). Due to its profound impact on user behavior, subjective norm has been examined in various studies from diverse areas, such as technology acceptance (Cheung *et al.*, 2011), service continuance behavior (Chen *et al.*, 2012) and online shopping (Limayem *et al.*, 2000). Subjective norm is defined here as consumers' perception that important referents (colleagues, classmates or friends) think that they should use a particular group-buying web site. An individual is often motivated to comply with the views of his or her supervisors, and/or peers in order to meet their expectations or earn their favor (Venkatesh *et al.*, 2003). In the context of online group buying, when faced with a number of alternatives, consumers are more likely to use the web site if they believe that their colleagues, classmates or friends think that they should use a particular web site. Therefore, we hypothesize:

H5. Subjective norm positively influences continuance intention of group-buying web sites.

3.3.2 Perceived critical mass. The critical mass theory highlights that as the number of users reaches a critical mass, the innovation is perceived as increasingly beneficial to both previous and potential users. The IS literature also points out that critical mass is the key to the success of any technology (Van Slyke *et al.*, 2007). This is because critical mass within consumers' reference groups can exert influence by serving as a behavioral role model based on their own experience and assessment (Wattal *et al.*, 2010). Wattal *et al.* (2010) examined the role of network externality on the use of blogs in an organization and reported that blogs use within an individual's social network is associated with an increase in one's own use. Lou *et al.* (2000) suggested that perceptions of critical mass are important determinants of sustained use. Chang *et al.* (2013) confirmed that users' perceived critical mass has a positive effect on their continuance intention to play online games. For an individual consumer, the acceptance of a web site by a large number of members in his social networks is a signal of its advantages and motivation to use (Wei and Lu, 2014). Hence, we hypothesize:

H6. Perceived critical mass positively influences continuance intention of group-buying web sites.

4. Research methodology

4.1 Instrument

To ensure content validity, the items used to measure the constructs were adapted from the extant literature. Because existing measurements are not enough to measure perceived price advantage in the online group-buying context, we developed the measures following Churchill's (1979) standard procedures. A five-item scale was developed to measure perceived price advantage in which two items were adapted from

Voss *et al.* (1998) and the remaining three items were self-developed. Perceived reputation was measured using four items adapted from Ganesan (1994) and Kim *et al.* (2004). Perceived web site quality was measured by two components: system quality and service quality. The measurement items for system quality were adapted from Liang *et al.* (2011), and the measurement items for service quality were adapted from Jiang *et al.* (2002). Satisfaction was measured using three items adapted from Bhattacherjee and Premkumar (2004). Measurement items for confirmation were adapted from Bhattacherjee (2001b). Items for subjective norm were adapted from Hsu and Lu (2004). Perceived critical mass was measured by three items adapted from Hsu and Lu (2004) and Lou *et al.* (2000). Items for continuance intention were adapted from Bhattacherjee (2001b). Finally, measurement items for perceived usefulness were adapted from Davis (1989). All items were measured on a seven-point Likert scale in which 1 = "not agree at all," 4 = "neutral" and 7 = "absolutely agree."

Back translation method was followed to translate the questionnaire in Chinese. The measurement items were first translated by one researcher into Chinese, and then back to English by another researcher independently. It was ensured that there were no discrepancies. A pre-test of the designed questionnaire was conducted with 20 doctoral students in the IS research area. Based on their feedback the questionnaire was modified to improve the legibility of the survey instrument. The final questionnaire is presented in the Appendix.

4.2 Data collection

Lashou, a popular group-buying web site in China, was chosen for the study. Launched in March 2010, it took the first position by virtue of its first-mover advantages in the market in 2010, with a market share of 16 percent. As of May 2011, its daily user volume is 5.866 million, the monthly number of orders is three million, and the monthly number of group-buying activities is 5,199 (IResearch, 2011). Its deals involve food, clothing, skin care products, tickets and a variety of services. Lashou has not only witnessed greater number of suppliers and customers but also rapid expansion into second and third-tier cities that are located near first-tier cities. Its popularity enabled it to offer insights into the best practices in this area and serve as an appropriate context for investigating continuance behavior. The data collection were conducted using an online survey. A survey hyperlink was placed on a few online group-buying forums. The respondents were first screened and only those who used Lashou were allowed to proceed with the survey. Each participant who completed the questionnaire was offered an entrance into a lucky draw. In total, 650 responses were received in four weeks. Finally, 605 responses were used for subsequent analyses after 45 incomplete and invalid responses were dropped.

Table II summarizes the demographic information of the survey respondents. Responses were balanced in terms of gender distribution, with 46.4 percent males and 53.6 percent females. Further, 63.8 percent of the respondents were young people (20-29), 89 percent had undergone college level education and 66.8 percent were employed. Among those surveyed, 40.7 percent purchased from this group-buying web site for one to five times, 32.6 percent purchased between six and ten times and only 26.7 percent purchased more than ten times.

5. Data analysis and results

Following the two-step approach recommended by Anderson and Gerbing (1988), we first examined the measurement model to verify the reliability and validity of the

Demographics	Category	Frequency	%
Gender	Male	281	46.4
	Female	324	53.6
Age	~19	10	1.6
	20-29	386	63.8
	30-39	173	28.6
	40~	36	6.0
Education level	High school or below	67	11.0
	College	150	24.8
	Graduate school or above	388	64.2
Employment	Student	198	32.7
	Working	404	66.8
	Unemployed	3	0.5
Times purchased from this group-buying web site	1-5	246	40.7
	6-10	197	32.6
	11-20	86	14.2
	21~	76	12.5

Note: $n = 605$

Table II.
The demographics of survey respondents

instrument by using a confirmatory factor analysis (CFA) approach. Then, we assessed the structural model and tested our research hypotheses. The AMOS program (version 17.0) was used to estimate both the measurement and structural models.

5.1 Measurement model

A ten-factor measurement model was set up to assess the reliability and validity of the instrument under the CFA approach. Each item was restricted so as to load only on its prespecified factor while the factors themselves were allowed to correlate freely. The results of CFA test are shown in Tables III and IV.

As shown in Table III, the Cronbach's α and composite reliability value of each construct ranged from 0.871 to 0.976 (above the suggested threshold of 0.7), thus exhibiting a satisfactory level of reliability. For construct validity, both convergent validity and discriminant validity were examined. Convergent validity was tested by examining the average variance extracted (AVE) and indicator loadings. All AVE values were higher than the recommended minimum of 0.5 (Fornell and Larcker, 1981). The standard loadings of all items were above the desired threshold of 0.7 and significant at 0.001. This showed a good convergent validity. The discriminant validity can be ascertained, if the square root of the AVE of each construct is greater than its correlation coefficients with other constructs (Fornell and Larcker, 1981). As shown in Table IV, the square roots of the AVEs were larger than the inter-construct correlations depicted in the off-diagonal entries, suggesting acceptable discriminant validity.

In addition, we conducted a multicollinearity test to examine the correlations between independent variables. Variance Inflation Factor (VIF) value above 10 indicates multicollinearity problem. As shown in Table V, VIF values for the variables in this study were all below 10, indicating the absence of multicollinearity.

5.2 Structural model

The AMOS path coefficients are shown in Figure 2. Confirmation had a positive influence on satisfaction and satisfaction significantly influenced continuance

Construct	Item	Standard loading[a]	AVE	CR	Cronbach's α
Perceived price advantage	PPA1	0.871	0.714	0.925	0.934
	PPA2	0.717			
	PPA3	0.948			
	PPA4	0.845			
	PPA5	0.827			
Perceived reputation	PR1	0.871	0.805	0.943	0.919
	PR2	0.883			
	PR3	0.933			
	PR4	0.901			
System quality	STQ1	0.811	0.611	0.904	0.871
	STQ 2	0.796			
	STQ 3	0.718			
	STQ 4	0.807			
	STQ 5	0.826			
	STQ 6	0.724			
Service quality	SVQ1	0.900	0.812	0.945	0.923
	SVQ 2	0.912			
	SVQ 3	0.880			
	SVQ 4	0.911			
Perceived usefulness	PU1	0.894	0.801	0.942	0.917
	PU2	0.930			
	PU3	0.909			
	PU4	0.845			
Confirmation	CN1	0.936	0.860	0.949	0.919
	CN2	0.925			
	CN3	0.921			
Satisfaction	SA1	0.962	0.931	0.976	0.963
	SA2	0.970			
	SA3	0.962			
Subjective norm	SN1	0.878	0.802	0.924	0.878
	SN2	0.914			
	SN3	0.895			
Perceived critical mass	CM1	0.922	0.828	0.935	0.898
	CM2	0.870			
	CM3	0.936			
Continuance intention	CI1	0.927	0.850	0.944	0.911
	CI2	0.944			
	CI3	0.895			

Note: [a]All standard loadings are significant at $p < 0.001$

Table III.
Results of confirmatory factor analysis

intention. Thus *H1a* and *H1b* were supported. In terms of online group-buying characteristics, confirmation had a positive influence on perceived price advantage, perceived reputation and perceived web site quality, thus supporting *H2a*, *H3a* and *H4a*. The positive effects of perceived price advantage on satisfaction, and perceived reputation on continuance intention were both found to be significant, thus supporting *H2b* and *H3c*. Perceived price advantage, however, did not have an effect on continuance intention, and perceived reputation did not have a significant influence on satisfaction. Thus *H2c* and *H3b* were not supported. Further, we found that perceived web site quality had positive effects on satisfaction and continuance intention, supporting *H4b* and *H4c*. In terms of social influence, perceived critical mass significantly influenced continuance intention, thus supporting *H6*. Subjective norm,

	PPA	PR	STQ	SVQ	PU	CN	SA	SN	CM	CI
PPA	*0.845*									
PR	0.490***	*0.897*								
STQ	0.569***	0.644***	*0.782*							
SVQ	0.498***	0.494***	0.498***	*0.901*						
PU	0.564***	0.531***	0.577***	0.572***	*0.895*					
CN	0.634***	0.458***	0.553***	0.519***	0.527***	*0.927*				
SA	0.621***	0.437***	0.518***	0.514***	0.518***	0.649***	*0.965*			
SN	0.369***	0.313***	0.271***	0.382***	0.409***	0.363***	0.417***	*0.896*		
CM	0.376***	0.358***	0.378***	0.324***	0.422***	0.486***	0.380***	0.509***	*0.910*	
CI	0.529***	0.512***	0.525***	0.464***	0.512***	0.547***	0.609***	0.348***	0.486***	*0.922*

Notes: PPA, perceived price advantage; PR, perceived reputation; STQ, system quality; SVQ, service quality; PU, perceived usefulness; CN, confirmation; SA, satisfaction; SN, subjective norm; CM, perceived critical mass; CI, continuance intention. ***$p < 0.001$

Table IV.
Results of discriminant validity testing

Model	Unstandardized coefficient *B*	SE	Standardized coefficient *β*	*t*-value	Significance	Multicollinearity statistics VIF
1 (cont.)[a]	0.934	0.195		4.781	0.000	
PPA	0.039	0.039	0.040	0.982	0.326	2.043
PR	0.163	0.038	0.163	4.249	0.000	1.786
PQ	0.093	0.053	0.083	1.752	0.080	2.708
PU	0.065	0.044	0.061	1.463	0.144	2.121
CN	0.104	0.040	0.111	2.642	0.008	2.142
SA	0.283	0.039	0.303	7.213	0.000	2.138
SN	−0.055	0.030	−0.064	−1.821	0.069	1.517
CM	0.178	0.028	0.225	6.382	0.000	1.507

Notes: PPA, perceived price advantage; PR, perceived reputation; PQ, perceived web site quality; PU, perceived usefulness; CN, confirmation; SA, satisfaction; SN, subjective norm; CM, perceived critical mass. [a]Dependent variable: continuance intention

Table V.
Results of multicollinearity analysis

however, did not have a significant influence on continuance intention, thereby not supporting *H5*. The explanatory power (R^2) for satisfaction and continuance intention were 0.622 and 0.609, respectively.

5.3 Competing model tests

We performed an ad hoc analysis to compare ECM, the hypothesized research model and the integrated model. The integrated model included perceived usefulness into the hypothesized model, specifying all the paths as in the hypothesized model as well as three additional paths in terms of perceived usefulness. We used AMOS to analyze ECM and the integrated model. The results for the integrated model are presented in Figure 3. All causal relationships hypothesized in ECM were supported. In the integrated model, perceived usefulness was not found to be significant. The path coefficient values were almost the same as those in the hypothesized model. First, we compared the predictive power of these three models in terms of R^2 adjusted using Cohen's (1988) formula for calculating effect size (F^2). ECM model predicted $R^2 = 0.324$ of the variance in consumer satisfaction ($F^2 = 0.788$***), and $R^2 = 0.281$ ($F^2 = 0.839$***) in continuance intention. The integrated model explained $R^2 = 0.625$ ($F^2 = -0.008$) of

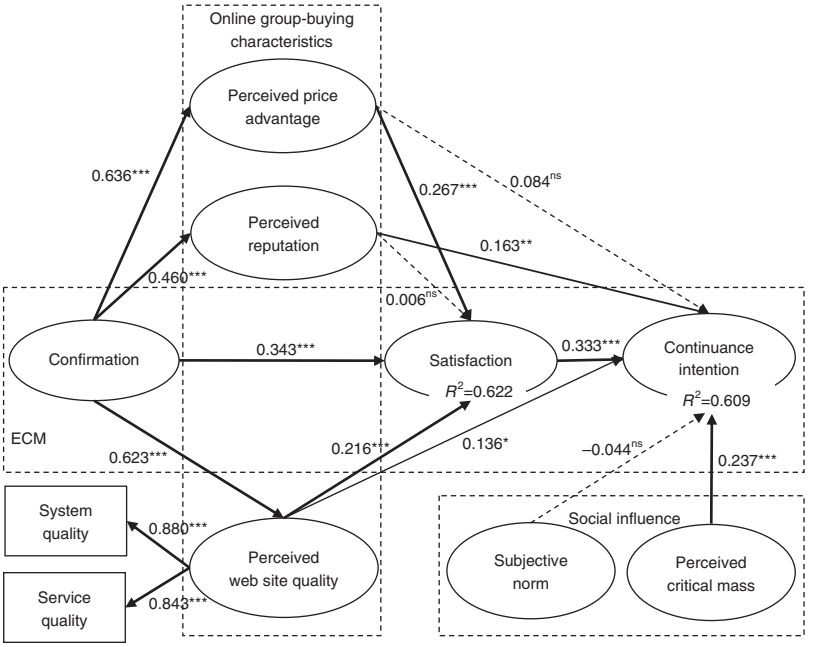


Figure 2.
The result of research model

Notes: ns, not significant. *$p<0.05$; **$p<0.01$; ***$p<0.001$

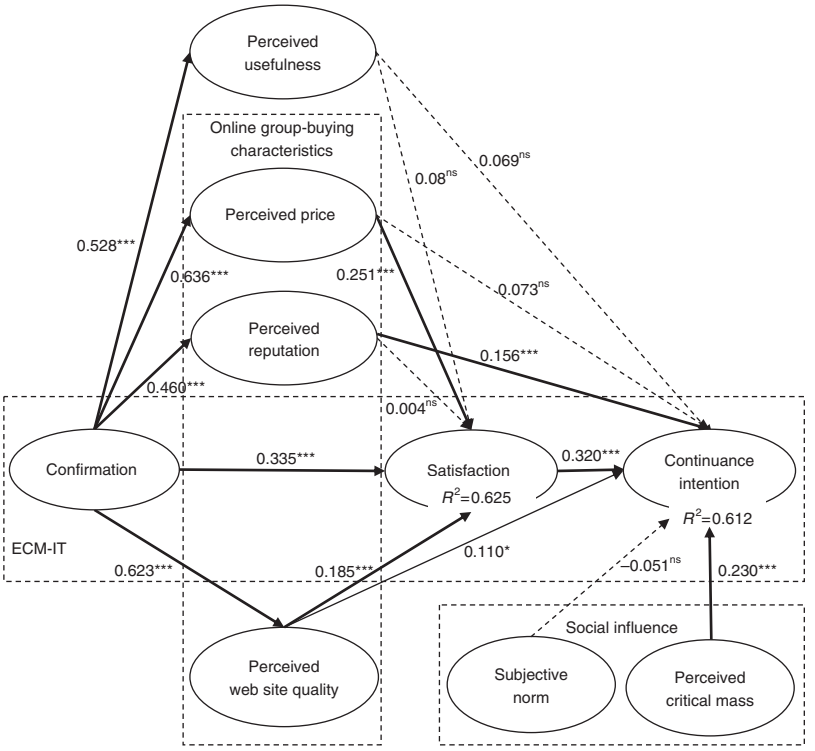
the variance in consumer satisfaction, and $R^2 = 0.612$ ($F^2 = -0.008$) in continuance intention. As shown by the effect sizes, the proposed model had significantly better predictive validity than ECM, while the comparative descriptive power compared to the integrated model (Cohen, 1988; Pavlou and Fygenson, 2006). This demonstrated that the proposed model establishes its explanatory superiority over ECM.

To further compare the proposed model and the integrated model statistically, we tested the χ^2 value and fit indices. Since the integrated model and the hypothesized model are in a nested relationship, they can be compared directly using χ^2 difference test (Bentler and Bonett, 1980). Table VI showed that the integrated model had a relatively poorer fit than the hypothesized model. The aforementioned model comparisons indicated that the hypothesized model is the best-fitting model.

6. Discussion and implications

6.1 Discussion of findings

This study reveals a few interesting findings. First, in terms of online group-buying characteristics, perceived price advantage is found to have a significant impact on consumer satisfaction, and perceived reputation has a positive effect on continuance intention. The study also indicates that perceived web site quality significantly affects satisfaction and continuance intention. Second, in terms of social influence, our results show that perceived critical mass significantly affects continuance intention. Third, we observe that confirmation affects perceived price advantage, followed by perceived web site quality, perceived reputation and satisfaction. Finally, we find that both the system quality and the service quality dimensions of perceived web site quality have strong loadings on the second-order factor.



Notes: ns, not significant. *p<0.05; ***p<0.001

Figure 3.
The result of the integrated model

Although most of our hypotheses are supported, three of the proposed relationships are found to be insignificant. We did not find support for the positive relationship between perceived reputation and consumer satisfaction. A possible reason may be that reputation of a web site is only a source of information in the consumer decision process and thus does not have a direct effect on his or her affect (i.e. satisfaction)

Division	Fit index	Recommended value[a]	The hypothesized model	The integrated model
χ^2	χ^2	–	1,446.077	1,843.604
	df	–	491	626
	p	–	0.000	0.000
	$\Delta\chi^2$	–	–	−397.527***
Fit indices	GFI	> 0.8	0.876	0.826
	NFI	> 0.9	0.922	0.913
	NNFI	> 0.9	0.940	0.934
	CFI	> 0.9	0.947	0.941
	RMSEA	< 0.08	0.057	0.057

Note: GFI, goodness of fit index; NFI, normed fit index; NNFI, non-normed fit index; CFI, comparative fit index; RMSEA, root mean square error of approximation. ***p < 0.001
Source: [a]According to Bentler and Bonett (1980)

Table VI.
The model comparison between the research model and the integrated model

toward the web site. The signaling theory offers rationale for this argument. The theory emphasizes that since consumers are often unable to know a web site in depth, they recall their knowledge about the web site reputation as a signal to direct their purchase decision (Pan *et al.*, 2013). In other words, reputation only represents a positive signal that is transferred from the third party or public opinion of the web site to consumers to guide their decision behavior (Kim *et al.*, 2004). Therefore, this signal of web site reputation exerts no effect on consumer satisfaction. Another reason could be that web site reputation only invokes the process of consumer trust building rather than consumer affect (Chandra *et al.*, 2010; Kim *et al.*, 2004). As suggested by previous studies on e-commerce, reputation is the foundation for trust building (Chandra *et al.*, 2010; Kim *et al.*, 2004) and e-WOM (Park and Lee, 2009) on an e-commerce platform, rather than acting as an antecedent of consumer satisfaction.

Contrary to our hypothesis, the effect of perceived price advantage on continuance intention is not significant. One plausible explanation is that price is not always an important motivator for consumers to use a particular group-buying web site. The managers of Chinese group-buying web sites tend to focus on price and the superiority gaps over price are becoming narrow among web sites (Zhou *et al.*, 2013). Price is no longer the differentiator for group-buying web sites and instead price discount is taken for granted. When the level of price is identical, consumers begin to pay more attention to value, namely, consumers' cognitive trade-off between the perceived benefits and the monetary cost (Venkatesh *et al.*, 2012). Further, in marketing research, consumers' perception of price advantage is usually conceptualized together with the quality of products or services to determine the perceived value of products or services (Venkatesh *et al.*, 2012). Thus, single-dimension price is not important in the consumer decision regarding web site use. Another explanation is that there is the mediation effect of satisfaction on the relationship between perceived price advantage and continuance intention. The results of *post-hoc* analysis reveal that the impact of perceived price advantage on continuance intention is partially mediated by satisfaction (omitted for brevity).

In contradiction to the findings of previous studies (Chang *et al.*, 2013; Chen *et al.*, 2012), our hypothesis regarding the influence of subjective norm on continuance intention is not supported. The reason could be that the subjective norm stresses the influence of expectations from significant others and represents "compliance," whereas online group-buying consumers experience social influence more through the process of internalization rather than compliance in a free choice context (Lu, 2014; Tsai and Bagozzi, 2014). According to Kelman (1958), social influence generally operates through three different processes: compliance, internalization and identification. Compliance occurs only when people perceive that significant others want them to perform a specific behavior, and comply with their expectations. Internalization refers to the process by which an individual's value system becomes congruent with the group's values. The third process of social influence, identification, refers to an individual's acceptance of influence to maintain a satisfying self-defining relationship with the group (Kelman, 1958). In the context of online group buying, consumers are less likely to care for expectations from significant others. They are more likely to adapt their behavior based on the similarity of their values with the values of other group members, and engage in a particular behavior if this behavior is perceived as the norm of their social group (Tsai and Bagozzi, 2014). Therefore, it may be "internalization" (group norm) that influences consumers' decision rather than "compliance" (subjective norm) in online group-buying settings.

6.2 Theoretical implications

This study adds to the research on consumer behavior in online group buying by focussing on consumers' post-purchase perception and behavior. Most of the current studies address the initial adoption of group-buying web sites from different perspectives. For instance, Cheng and Huang (2013) examined the antecedents of participation in online group buying based on the TPB. Shiau and Luo (2012) investigated the salient factors in determining online group-buying intention based on the social exchange theory. The continued use behavior is relatively less understood in online group buying because of its being less researched phenomenon. This study contributes to an improved understanding about how consumers form continuance intention in online group buying.

Second, our study identifies three salient factors (perceived price advantage, perceived reputation and perceived web site quality) that influence consumer attitude and behavior from the perspective of online group-buying attributes. Similar to Lin *et al.*'s (2012) study that uses perceived value to replace perceived usefulness in ECM to better reflect the fee-paying nature of the internet protocol television service, we use the three critical constructs to represent perceived usefulness in ECM. The results indicate that the three constructs should be employed to study consumer satisfaction and continuance intention in online group buying. This is an interesting finding because previous research in online group-buying settings has adopted the behavioral belief of perceived usefulness to reflect consumer expectations (Fan *et al.*, 2010; Tsai *et al.*, 2011). Wixom and Todd (2005) distinguish the beliefs about the system from those beliefs about using the system, namely, object-based beliefs (e.g. system quality, service quality and information quality) and behavior-based beliefs (e.g. perceived usefulness and perceived ease of use). Their study stresses the need to consider object-based beliefs and attitudes. Our results suggest that object-based beliefs are more appropriate to reflect the very nature of online group-buying than the behavior-based belief. This study advances the ECM research stream by a theoretically justified inclusion of the object-based beliefs.

Third, in response to the call for further extension of ECM by incorporating other important user perceptions for a better understanding of consumers' continuance behavior (Bhattacherjee, 2001b), we extend ECM from an integrated perspective of online group-buying characteristics and social influence. We perform an analysis to provide empirical evidence of the comparative utility of the three competing models (ECM, our research model and the integrated model). The findings indicate that our model has a better explanatory power than ECM. Thus, our model provides a better explanation of consumers' post-purchase behavior in the online group-buying context.

Finally, no study to our knowledge has been conducted to integrate social influence with ECM to examine consumers' continuance intention in online group-buying settings. Recognizing the critical role of social influence in determining consumer behavior in online group-buying (Kauffman *et al.*, 2010b; Tai *et al.*, 2012), we concentrate on two social influence factors, namely, subjective norm and perceived critical mass and investigate how they influence consumers' continuance intention. We find that subjective norm does not significantly influence continuance intention, whereas most TPB-based research suggests that subjective norm plays a key role in the consumer decision process (Tsai and Bagozzi, 2014). The insignificant relationship might reflect the mostly voluntary and anonymous features of participation in online group buying. Consumers experience little for the promises that typically underlie normative compliance. However, this study reveals the importance of perceived critical mass in post-purchase phase. Despite the potential of critical mass in reflecting network

externality effects (Kauffman *et al.*, 2010b; Van Slyke *et al.*, 2007), we do not find its use in understanding consumers' continuance behavior in online group buying. In this sense, the present study adds to a growing body of literature that suggests that the compliance-based social influence does not apply to the online group-buying context.

6.3 Practical implications

The findings of this study also have a few important practical implications. First, the results show that maintaining and enhancing web site quality via system quality and service quality is a basic requirement for facilitating online group buying. Therefore, managers should provide the necessary functionality and user-friendly interface to make online transactions more convenient. For improving service quality, practitioners are suggested to provide a good and prompt service during the entire group-buying process for customers (Hsu *et al.*, 2014). For example, some popular group-buying web sites in China (e.g. Lashou, Meituan and Nuomi) provide location-based services to facilitate product searching, as well as integrated and standard operating procedures to facilitate order fulfillment, thus simplifying the transaction process. Recognizing the need for rich communication in China, these platforms have therefore focussed on facilitating social interactions between businesses and customers by embedding a set of social communication tools (e.g. instant messaging, feedback system and virtual community) in the transaction process.

Second, the results indicate that perceived price advantage significantly influences consumer satisfaction. Thus, it is important for managers to monitor and manage consumers' perception of price advantage. They can monitor competitors' prices and do the best to stick to low price policy, thus offering a comparative favorable price to win a price-based advantage over other purchase channels (Venkatesh *et al.*, 2012). The tactics of Lashou and Meituan exemplify this finding. Lashou and Meituan build considerable high-quality merchandise resources by providing attractive cooperation benefits to the sellers, such as well-designed promotion strategies and advertisement planning, and a fair business model for both parties. Thus, they can often invite excellent sellers with good reputation and large market share to provide products with special discounts to consumers. Since consumers pay more attention to the value of seemingly attractive group-buying activities, managers should obtain a genuine ability to give discounts and deliver a truly unique value proposition to consumers.

Third, this study provides empirical evidence that successful group-buying web sites value reputation as a strategic source of sustainable management. Online group-buying managers need to put effort into reputation building. In China, some group-buying web sites build favorable reputation among their consumers by emphasizing their social and environmental orientation toward consumers, such as conducting corporate social responsibility activities and conveying the information that share their concern about customers' interests (Hsu *et al.*, 2014). Managers of these web sites also build a set of policies and rules for the governance of transactions, such as secure mechanism and third-party certification.

Lastly, the findings indicate that the ability to reach critical mass of consumers has become a key factor in determining the success of group-buying web sites. Critical mass helps in attracting new customers, and encouraging existing customers to continue their relationship with the web site. This implies that web site operators should try to reach a critical mass of early customers. In this sense, some practical suggestions include announcing the growth of platforms aggressively to cultivate an atmosphere of an enlarging customer base, encouraging word-of-mouth communication among early

customers and potential customers, making the early customers more visible to the majority, and developing an award for making social recommendations (Tseng and Teng, 2014). We can learn from Nuomi, which combines social networking features with group-buying activities. Nuomi has embedded social networking services, such as Sina Weibo, Tencent Weibo and QQ zone, into its platform to help in facilitating sharing of group-buying information and experience, thus instilling positive social influence in a customer's social network. Once the customer participates in a group-buying activity, the relevant information will be created and initiated among his or her social network automatically and simultaneously. Furthermore, Nuomi enables customers to engage in real-time, media-rich and personalized social interactions, which will reinforce the perception of critical mass. Therefore, managers are suggested to include social networking capabilities in the online group-buying platform (Lu, 2014).

7. Limitations and future research

The limitations of this study should be taken into account before generalizing its findings. First, we identified perceived price advantage, perceived reputation and perceived web site quality as online group-buying characteristics based on the extant literature. However, these three constructs may be insufficient to portray a complete picture of online group buying. Second, the study does not consider the moderating effect of product type. For different categories of products, the results may be different. Finally, this research is based on China, a country with a collectivistic culture that places high value on social interaction. Also its online group-buying industry has developed significantly. The differences in cultures and market contexts may become a potential limitation of this study as the research results may vary across various cultures and contexts.

The current study also presents opportunities for future research. First, prior studies have validated the positive effects of habit on the continual use of an existing IS (Fuller and Dennis, 2009; Limayem and Cheung, 2008). Thus, future studies can examine how habit influences consumer behavior in online group-buying settings. Second, online group buying, as a kind of social commerce, is also an innovative e-commerce business model (Liang *et al.*, 2011). As we know, many online group-buying platforms are developed based on e-commerce platforms, such as Ju.Taobao, 360buy Tuan and Paipai Tuan (CNNIC, 2013). Hence, a large number of online group-buying consumers come from the consumer base of e-commerce. Accordingly, consumers' prior experiences with e-commerce may affect their perceptions and beliefs about online group buying. Future studies can examine the consumer decision process from a dynamic cross-environment perspective. Third, recent advances in technology have significantly increased the importance of social interactions by providing more tools for consumers to interact with and influence each other (Jing and Xie, 2011). Thus, future studies can investigate how online group-buying providers facilitate and manage social interactions to develop a critical mass. Finally, future studies should conduct systematic studies to identify online group-buying characteristics.

References

Ahn, T., Ryu, S. and Han, I. (2007), "The impact of web quality and playfulness on user acceptance of online retailing", *Information & Management*, Vol. 44 No. 3, pp. 263-275.

Anand, K.S. and Aron, R. (2003), "Group buying on the web: a comparison of price-discovery mechanisms", *Management Science*, Vol. 49 No. 11, pp. 1546-1562.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-423.

Bentler, P.M. and Bonett, D.G. (1980), "Significance tests and goodness of fit in the analysis of covariance structures", *Psychological Bulletin*, Vol. 88 No. 3, pp. 588-606.

Bhattacherjee, A. (2001a), "An empirical analysis of the antecedents of electronic commerce service continuance", *Decision Support Systems*, Vol. 32 No. 2, pp. 201-214.

Bhattacherjee, A. (2001b), "Understanding information systems continuance: an expectation-confirmation model", *MIS Quarterly*, Vol. 25 No. 3, pp. 351-370.

Bhattacherjee, A. and Premkumar, G. (2004), "Understanding changes in belief and attitude toward information technology usage: a theoretical model and longitudinal test", *MIS Quarterly*, Vol. 28 No. 2, pp. 229-254.

Chandra, S., Srivastava, S.C. and Theng, Y.-L. (2010), "Evaluating the role of trust in consumer adoption of mobile payment systems: an empirical analysis", *Communications of AIS*, Vol. 27 No. 1, pp. 561-588.

Chang, I.-C., Liu, C.-C. and Chen, K. (2013), "The effects of hedonic/utilitarian expectations and social influence on continuance intention to play online games", *Internet Research*, Vol. 24 No. 1, pp. 21-45.

Chen, J., Chen, X., Kauffman, R.J. and Song, X. (2009), "Should we collude? Analyzing the benefits of bidder cooperation in online group-buying auctions", *Electronic Commerce Research and Applications*, Vol. 8 No. 4, pp. 191-202.

Chen, J., Kauffman, R.J., Liu, Y. and Song, X. (2010), "Segmenting uncertain demand in group-buying auctions", *Electronic Commerce Research and Applications*, Vol. 9 No. 2, pp. 126-147.

Chen, R.R. and Roma, P. (2011), "Group buying of competing retailers", *Production and Operations Management*, Vol. 20 No. 2, pp. 181-197.

Chen, S.-C., Yen, D.C. and Hwang, M.I. (2012), "Factors influencing the continuance intention to the usage of Web 2.0: an empirical study", *Computers in Human Behavior*, Vol. 28 No. 3, pp. 933-941.

Chen, W.-Y. and Wu, P.-H. (2010), "Factors affecting consumers' motivation in online group buyers", *Proceedings of the 6th International Conference on Intelligent Information Hiding and Multimedia Signal Processing*, *Darmstadt*, *October 15-17*.

Cheng, H.-H. and Huang, S.-W. (2013), "Exploring antecedents and consequence of online group-buying intention: an extended perspective on theory of planned behavior", *International Journal of Information Management*, Vol. 33 No. 1, pp. 185-198.

Cheung, C.M.K., Chiu, P.-Y. and Lee, M.K.O. (2011), "Online social networks: why do students use Facebook?", *Computers in Human Behavior*, Vol. 27 No. 4, pp. 1337-1343.

Churchill, G.A. Jr (1979), "A paradigm for developing better measures of marketing constructs", *Journal of Marketing Research*, Vol. 16 No. 1, pp. 64-73.

CNNIC (2013), "The 31th statistical report on internet development in China", available at: www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/201301/t20130115_38508.htm# (accessed January 15, 2013).

Cohen, J. (1988), *Statistical Power Analysis for the Behavioral Sciences*, Lawrence Erlbaum Associates, Hillsdale, NJ.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

Delone, W.H. and Mclean, E.R. (2004), "Measuring e-commerce success: applying the DeLone & McLean information systems success model", *International Journal of Electronic Commerce*, Vol. 9 No. 1, pp. 31-47.

Fan, Y.-W., Chiang, M.-H., Wang, J.-Y. and Wang, E.T. (2010), "A study on consumers' continuing to use online group-buying platforms: the impact of price performance expectations", *Chinese Business Review*, Vol. 9 No. 12, pp. 44-52.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Fuller, R.M. and Dennis, A.R. (2009), "Does fit matter? The impact of task-technology fit and appropriation on team performance in repeated tasks", *Information Systems Research*, Vol. 20 No. 1, pp. 2-17.

Ganesan, S. (1994), "Determinants of long-term orientation in buyer-seller relationships", *The Journal of Marketing*, Vol. 58 No. 2, pp. 1-19.

Hong, S.J., Thong, J.Y.L. and Tam, K.Y. (2006), "Understanding continued information technology usage behavior: a comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol. 42 No. 3, pp. 1819-1834.

Hsu, C.L. and Lu, H.P. (2004), "Why do people play on-line games? An extended TAM with social influences and flow experience", *Information & Management*, Vol. 41 No. 7, pp. 853-868.

Hsu, M.-H., Chang, C.-M., Chu, K.-K. and Lee, Y.-J. (2014), "Determinants of repurchase intention in online group-buying: the perspectives of DeLone & McLean IS success model and trust", *Computers in Human Behavior*, Vol. 36 No. 2014, pp. 234-245.

IResearch (2011), "The research report on Chinese online group-buying market", available at: http://report.iresearch.cn/1585.html (accessed July 25, 2011).

Jiang, J.J., Klein, G. and Carr, C.L. (2002), "Measuring information system service quality: SERVQUAL from the other side", *MIS Quarterly*, Vol. 26 No. 2, pp. 145-166.

Jiang, P. and Rosenbloom, B. (2005), "Customer intention to return online: price perception, attribute-level performance, and satisfaction unfolding over time", *European Journal of Marketing*, Vol. 39 Nos 1/2, pp. 150-174.

Jing, X. and Xie, J. (2011), "Group buying: a new mechanism for selling through social interactions", *Management Science*, Vol. 57 No. 8, pp. 1354-1372.

Jingjun, X., Benbasat, I. and Cenfetelli, R.T. (2013), "Integrating service quality with system and information quality: an empirical test in the e-service context", *MIS Quarterly*, Vol. 37 No. 3, pp. 777-794.

Kauffman, R.J., Lai, H. and Ho, C.T. (2010a), "Incentive mechanisms, fairness and participation in online group-buying auctions", *Electronic Commerce Research and Applications*, Vol. 9 No. 3, pp. 249-262.

Kauffman, R.J., Lai, H. and Lin, H.C. (2010b), "Consumer adoption of group-buying auctions: an experimental study", *Information Technology and Management*, Vol. 11 No. 4, pp. 191-211.

Kelman, H.C. (1958), "Compliance, identification, and internalization: three processes of attitude change", *The Journal of Conflict Resolution*, Vol. 2 No. 1, pp. 51-60.

Kim, H.-W., Xu, Y. and Gupta, S. (2012), "Which is more important in internet shopping, perceived price or trust?", *Electronic Commerce Research and Applications*, Vol. 11 No. 3, pp. 241-252.

Kim, H.W., Xu, Y. and Koh, J. (2004), "A comparison of online trust building factors between potential customers and repeat customers", *Journal of the Association for Information Systems*, Vol. 5 No. 10, pp. 392-420.

Lee, Y. and Kwon, O. (2011), "Intimacy, familiarity and continuance intention: an extended expectation-confirmation model in web-based services", *Electronic Commerce Research and Applications*, Vol. 10 No. 3, pp. 342-357.

Liang, T.P., Ho, Y.T., Li, Y.W. and Turban, E. (2011), "What drives social commerce: the role of social support and relationship quality", *International Journal of Electronic Commerce*, Vol. 16 No. 2, pp. 69-90.

Liao, S.-H., Chu, P.-H., Chen, Y.-J. and Chang, C.-C. (2012), "Mining customer knowledge for exploring online group buying behavior", *Expert Systems with Applications*, Vol. 39 No. 3, pp. 3708-3716.

Limayem, M. and Cheung, C.M.K. (2008), "Understanding information systems continuance: the case of internet-based learning technologies", *Information & Management*, Vol. 45 No. 4, pp. 227-232.

Limayem, M., Khalifa, M. and Frini, A. (2000), "What makes consumers buy from internet? A longitudinal study of online shopping", *Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions*, Vol. 30 No. 4, pp. 421-432.

Lin, K.-Y. and Lu, H.-P. (2011), "Why people use social networking sites: an empirical study integrating network externalities and motivation theory", *Computers in Human Behavior*, Vol. 27 No. 3, pp. 1152-1161.

Lin, T.-C., Wu, S., Hsu, J.S.-C. and Chou, Y.-C. (2012), "The integration of value-based adoption and expectation-confirmation models: an example of IPTV continuance intention", *Decision Support Systems*, Vol. 54 No. 1, pp. 63-75.

Liu, Y. and Sutanto, J. (2012), "Buyers' purchasing time and herd behavior on deal-of-the-day group-buying websites", *Electronic Markets*, Vol. 22 No. 2, pp. 83-93.

Lou, H., Luo, W. and Strong, D. (2000), "Perceived critical mass effect on groupware acceptance", *European Journal of Information Systems*, Vol. 9 No. 2, pp. 91-103.

Lu, J. (2014), "Are personal innovativeness and social influence critical to continue with mobile commerce?", *Internet Research*, Vol. 24 No. 2, pp. 134-159.

Martín-Consuegra, D., Molina, A. and Esteban, Á. (2007), "An integrated model of price, satisfaction and loyalty: an empirical analysis in the service sector", *Journal of Product & Brand Management*, Vol. 16 No. 7, pp. 459-468.

Pan, M.-C., Kuo, C.-Y., Pan, C.-T. and Tu, W. (2013), "Antecedent of purchase intention: online seller reputation, product category and surcharge", *Internet Research*, Vol. 23 No. 4, pp. 507-522.

Park, C. and Lee, T.M. (2009), "Information direction, website reputation and eWOM effect: a moderating role of product type", *Journal of Business Research*, Vol. 62 No. 1, pp. 61-67.

Pavlou, P.A. and Fygenson, M. (2006), "Understanding and prediction electronic commerce adoption: an extension of the theory of planned behavior", *MIS Quarterly*, Vol. 30 No. 1, pp. 115-143.

Reibstein, D.J. (2002), "What attracts customers to online stores, and what keeps them coming back?", *Journal of the Academy of Marketing Science*, Vol. 30 No. 4, pp. 465-473.

Shiau, W.-L. and Luo, M.M. (2012), "Factors affecting online group buying intention and satisfaction: a social exchange theory perspective", *Computers in Human Behavior*, Vol. 28 No. 6, pp. 2431-2444.

Tai, C.-L., Hong, J.-Y., Chang, C.-M. and Chen, L.-C. (2012), "Determinants of consumer's intention to participate in group buying", *Procedia – Social and Behavioral Sciences*, Vol. 57 No. 9, pp. 396-403.

Teo, T.S.H., Srivastava, S.C. and Jiang, L. (2008), "Trust and electronic government success: an empirical study", *Journal of Management Information Systems*, Vol. 25 No. 3, pp. 99-132.

Thong, J.Y.L., Hong, S.J. and Tam, K.Y. (2006), "The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance", *International Journal of Human-Computer Studies*, Vol. 64 No. 9, pp. 799-810.

Tsai, H.-T. and Bagozzi, R.P. (2014), "Contribution behavior in virtual communities: cognitive, emotional, and social influences", *MIS Quarterly*, Vol. 38 No. 1, pp. 143-163.

Tsai, M.T., Cheng, N.C. and Chen, K.S. (2011), "Understanding online group buying intention: the roles of sense of virtual community and technology acceptance factors", *Total Quality Management & Business Excellence*, Vol. 22 No. 10, pp. 1091-1104.

Tseng, F.-C. and Teng, C.-I. (2014), "Antecedents for user intention to adopt another auction site", *Internet Research*, Vol. 24 No. 2, pp. 205-222.

Van Slyke, C., Ilie, V., Lou, H. and Stafford, T. (2007), "Perceived critical mass and the adoption of a communication technology", *European Journal of Information Systems*, Vol. 16 No. 3, pp. 270-283.

Venkatesh, V., Thong, J. and Xu, X. (2012), "Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology", *MIS Quarterly*, Vol. 36 No. 1, pp. 157-178.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User acceptance of information technology: toward a unified view", *MIS Quarterly*, Vol. 27 No. 3, pp. 425-478.

Voss, G.B., Parasuraman, A. and Grewal, D. (1998), "The roles of price, performance, and expectations in determining satisfaction in service exchanges", *Journal of Marketing*, Vol. 62 No. 4, pp. 46-61.

Wang, Y., Meister, D.B. and Gray, P.H. (2013), "Social influence and knowledge management systems use: evidence from panel data", *MIS Quarterly*, Vol. 37 No. 1, pp. 299-313.

Wang, Y.S. (2008), "Assessing e-commerce systems success: a respecification and validation of the DeLone and McLean model of IS success", *Information Systems Journal*, Vol. 18 No. 5, pp. 529-557.

Wattal, S., Racherla, P. and Mandviwalla, M. (2010), "Network externalities and technology use: a quantitative analysis of intraorganizational blogs", *Journal of Management Information Systems*, Vol. 27 No. 1, pp. 145-174.

Wei, P.-S. and Lu, H.-P. (2014), "Why do people play mobile social games? An examination of network externalities and of uses and gratifications", *Internet Research*, Vol. 24 No. 3, pp. 313-331.

Wixom, B.H. and Todd, P.A. (2005), "A theoretical integration of user satisfaction and technology acceptance", *Information Systems Research*, Vol. 16 No. 1, pp. 85-102.

Wolfinbarger, M. and Gilly, M.C. (2003), "eTailQ: dimensionalizing, measuring and predicting etail quality", *Journal of Retailing*, Vol. 79 No. 3, pp. 183-198.

Zhang, Z., Zhang, Z., Wang, F., Law, R. and Li, D. (2013), "Factors influencing the effectiveness of online group buying in the restaurant industry", *International Journal of Hospitality Management*, Vol. 35 No. 2013, pp. 237-245.

Zhou, G., Xu, K. and Liao, S.S.Y. (2013), "Do starting and ending effects in fixed-price group-buying differ?", *Electronic Commerce Research and Applications*, Vol. 12 No. 2, pp. 78-89.

Further reading

Liu, M.T., Brock, J.L., Shi, G.C., Chu, R. and Tseng, T.-H. (2013), "Perceived benefits, perceived risk, and trust: influences on consumers' group buying behaviour", *Asia Pacific Journal of Marketing and Logistics*, Vol. 25 No. 2, pp. 225-248.

(The Appendix follows overleaf.)

Appendix

Construct	Item
Perceived price advantage	PPA1. I think the online group-buying price more reasonable
	PPA2. I think the online group-buying price lower
	PPA3. I think the online group-buying price more satisfying
	PPA4. I think the online group-buying price more favorable
	PPA5. I think the discount of online group-buying price lower
Perceived reputation	PR1. This group-buying web site has a good reputation in this market
	PR2. In public opinion, this group-buying web site is favorably regarded
	PR3. This group-buying web site has a reputation for being honest
	PR4. This group-buying web site has a reputation for being fair in its relationship with its customers
System quality	STQ1. This group-buying web site has a function that allows customers to provide quick responses and feedback
	STQ2. This group-buying web site gives me a variety of alternatives for solving my problems
	STQ3. This group-buying web site provides a friendly user interface
	STQ4. This group-buying web site makes it quick and easy to complete a transaction
	STQ5. This group-buying web site makes it easy to share information with my friends
	STQ6. This group-buying web site makes it easy to search information
Service quality	SVQ1. The group-buying web site is willing and ready to respond to customer needs
	SVQ2. The group-buying web site provides a dependable service
	SVQ3. This group-buying web site gives prompt service to customers
	SVQ4. This group-buying web site pays attention to customers' individual needs
Perceived usefulness	PU1. Using the group-buying web site enhances my effectiveness in products searching and buying
	PU2. Using the group-buying web site enables me to search for and buy products more quickly
	PU3. Using the group-buying web site would make it easier to search for and buy products
	PU4. Using the group-buying web site enables me to access a lot of usefulness information
Confirmation	CN1. My experience with using the group-buying web site was better than what I expected
	CN2. The perceived service level during using the group-buying web site was better than what I expected
	CN3. Overall, most of my expectations from using the group-buying web site were confirmed
Satisfaction	SA1. I am satisfied with the group-buying web site experience
	SA2. I am pleased with my transaction with the group-buying web site
	SA3. I am contented with my transaction with the group-buying web site
Subjective norm	SN1. My colleagues think that I should use the group-buying web site
	SN2. My classmates think that I should use the group-buying web site
	SN3. My friends think that I should use the group-buying web site
Perceived critical mass	CM1. Most people in my group use the group-buying web site frequently
	CM2. Most people in my community use the group-buying web site frequently
	CM3. Most people in my class/office use the group-buying web site frequently
Continuance intention	CI1. I would consider continuing to use the group-buying web site
	CI2. My intention is to continue using the group-buying web site than use any alternative means
	CI3. I will visit the group-buying web site again in future

Table AI.
Questionnaire items

About the authors

Hong Zhang is a Lecturer at School of Management, Wuhan University of Science and Technology in China. Her research focuses on mobile commerce, e-commerce, social commerce, and technology adoption of information system. She has published in *Information & Management, International Journal of Mobile Communications*, and *International Journal of Technology Management*.

Yaobin Lu is a specially appointed Professor in Management Science & Information Systems at the School of Management, Huazhong University of Science & Technology in China. His

research interests include social commerce, mobile commerce, business mode, electronic commerce, and related topics. He is the author of more than 40 publications in leading international journals, such as *Journal of Management Information Systems, Decision Support Systems, Information Systems Journal, Information & Management, International Journal of Electronic Commerce*, and *Journal of Information Technology*. Professor Yaobin Lu is the corresponding author and can be contacted at: luyb@mail.hust.edu.cn

Dr Sumeet Gupta is an Associate Professor at Indian Institute of Management, Raipur. His research interests include supply chain, information systems andretailing. He has published in international journals such as *Decision Support Systems, International Journal of Electronic Commerce, European Journal of Operational Research* and others.

Ping Gao is a Professor at the Institute for Development Policy and Management, School of Environment and Development, University of Manchester. His research interests include e-business, global IT management, healthcare information system and related topics. He has published in *Information Systems Journal, Journal of Electronic Commerce Research, Communications of the Association for Information Systems*, and several other journals.