Critical Examination of Online Group-Buying Mechanisms

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Abstract. Online group-buying mechanism evolves from earlier variant with dynamic discount pricing mechanism to daily-deal variant with fixed discount pricing mechanism. Both mechanisms still face the challenge of attracting customers, either merchants or buyers. In this paper, we examine online group-buying mechanisms by conducting an exhaustive review of online group-buying literature. Through identifying key design features for group-buying business models, we aim to propose a more sustainable group-buying mechanism. Based on the review of 46 articles, we propose that sustainable group-buying mechanism need to balance the benefits of both merchants and buyers. The nature of group-buying needs to be emphasized, but the mechanism should not be too complicated or simple.

Keywords: Group-Buying, daily-deal, sustainable mechanism, literature review.

1 Introduction

Online group-buying business has existed for more than a decade. Buyers with similar purchase interests are congregated on group-buying websites to obtain group discounts. Two major variants of online group-buying mechanisms emerge in online marketplace. The earlier model of group-buying is based on the dynamic discount pricing mechanism, through which price of a product decreases as the number of buyers increases. Earlier group-buying websites, such as Mobshop, LetsBuyIt and Mercata, enjoyed considerable success at the beginning of operations. Fig. 1 presents a group-buying product on LetsBuyIt.com. These websites featured products for group-buying in an auction cycle and provided a dynamic price histogram that indicated how prices changed according to the number of products sold, and at which tier the current price was on [1]. When the auction cycle ended, buyers would pay the final discounted price. When the number of buyers is not adequate, buyers might be dissatisfied with the not-so-deep discounted price. These websites ceased operations after a few years by facing the critical challenge of a lack of buyers. The complicated group-buying mechanism and long waiting time for buyers are considered as key contributing factors for the failure [2] [3] [4]. A later group-buying model, coined in 2010,

terms as daily-deal variant that adopts fixed discount pricing mechanism has taken over the market globally. These websites feature interesting deals, such as dining, fitness or spa, with a high discount rate (typically more than 50%). If the minimum required number of consumers is met at the end of the day, consumers will receive redeemable coupons. Merchants need to pay service fees, which could be as high as 50% of the coupon sales, to the websites. Groupon, the leading daily-deal website in the world, has operated in 48 countries and each featured deal can drive 350 sales and $8,750 in revenue [5]. Fig. 2 shows a featured deal on Groupon.com. Although daily-deal variant of online group-buying attracts buyers' attentions, this model brings about a refresh set of challenges including the lack of merchant participation. The deep discount offered by the website prompts the majority of buyers who are bargain hunters to not purchase again at normal prices [6]. In China, the survival rate of daily-deal group-buying website is just 18.6%, which indicates that a large number of online group-buying businesses have bankrupted [7]. There is an urgent need for a more sustainable group-buying mechanism.
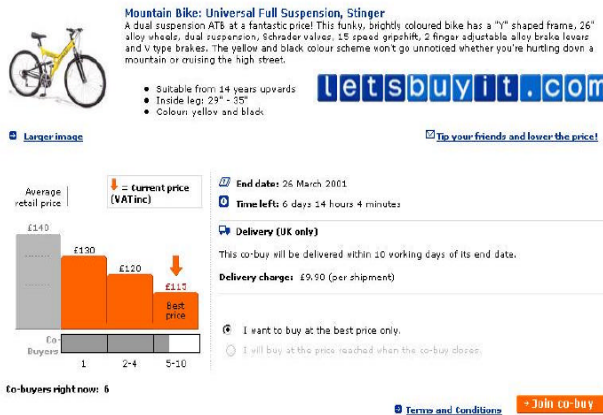

Fig. 1. Earlier group-buying website LetsBuyIt.com (Source: [1])

In this paper, we examine online group-buying mechanisms by conducting an exhaustive review of online group-buying literature. Through the review, we aim to discover the problems emerged from previous online group-buying mechanisms, figure out the research gaps of online group-buying and identify key design features for future group-buying mechanism. This study contributes to researchers and practitioners in several ways. First, although online group-buying has been popular for years, there are still few group-buying studies in academia. This study presents a comprehensive overview of the existing knowledge in this research field. Second, future research areas are identified through extant literature review, which could inspire new group-buying studies. Third, our review and could help group-buying practitioners improve their businesses by adopting more sustainable group-buying mechanism.
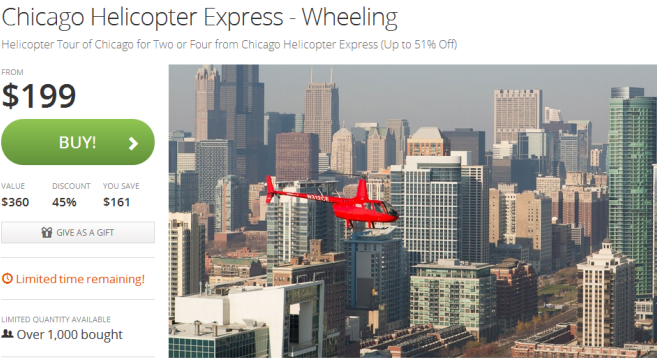
Fig. 2. Daily-deal website Groupon (Source: Groupon.com)

2   Literature Review

A literature review requires the development of criteria for studies to be included and the search strategy [8]. Concerning the search strategy, we searched in Scopus database with the keywords "group buying" and "daily deal". The same search was also conducted on Google Scholar to include more papers. Afterwards, abstracts of these articles were examined and we only include online group-buying studies and the studies which target individual buyers. Studies of pure offline group-buying and group-buying for company procurement were excluded. For the analysis scheme, we first identified the group-buying mechanism the articles examined, and then obtain the research objective, methodology, and key findings of each article. In total, we reviewed 46 articles till the end of October 2013. These articles can be split into three streams based on the group-buying mechanism they examined. Of these 46 articles, 15 papers examined earlier group-buying model and 13 papers examined daily-deal variant of group-buying specifically. Moreover, there are 18 papers which examined group-buying model without targeting specific model. Table 1 indicates the number of studies in each stream, categorized by the employed methodologies, whereas Table 2 shows the details of group-buying literatures. In the following three subsections, we discuss the literatures in details.

Table 1. Methodologies employed in the literatures

Methodology	Business model/Group-buying mechanism examined		
	Earlier	Daily-deal	General
Case study	1		
Ethnography		2	
Lab experiment	4	3	2
Survey		4	1
Secondary data	1	4	
Modeling analysis/ simulation	9		15

Table 2. Online group-buying literatures

Author(s)	Methodology	Objective
Earlier mechanism		
Anand and Aron (2003)	Modeling analysis	Compared the dynamic discount group-buying mechanism with the traditional fixed pricing mechanism
Chen et al. (2002)	Modeling analysis	Investigated buyers' bidding strategy
Chen et al. (2004, 2007, 2010)	Modeling analysis/simulation	Compared the dynamic discount group-buying mechanism with the traditional fixed pricing mechanism
Chen et al. (2006, 2009)	Modeling analysis	Explored the benefits of buyer co-operation
Chen et al. (2012)	Modeling analysis	Explored the benefits of buyer co-operation
Lai and Zhuang (2004, 2006)	Lab experiment	Compared the performance of incentive mechanisms
Kauffman and Wang (2001)	Secondary data	Explored buyer purchasing behavior
Kauffman and Wang (2002)	Case study	Discussed the online group-buying mechanism and analyzed the business model
Kauffman et al. (2010a)	Lab experiment	Investigated the effect of incentive mechanisms
Sharif-Paghaleh (2009)	Modeling analysis/simulation	Investigated the purchase intention of buyers
Tan et al. (2007)	Lab experiment	Investigated the purchase intention of buyers
Daily-deal mechanism		
Boon (2013)	Ethnography	Explored buyer purchasing behavior
Chen (2012a)	Ethnography	Investigated the adoption of buyers
Cheng and Huang (2013)	Survey	Investigated the adoption of buyers
Coulter and Roggeveen (2012)	Secondary data/Lab experiment	Investigated the purchase intention of buyers
Krasnova et al. (2013)	Focus group and survey	Investigated buyer loyalty to daily deal websites
Ku (2012)	Survey	Investigated the purchase intention of buyers
Li and Wu (2013)	Secondary data	Investigated the effect of word-of-mouth communication
Liu and Sutanto (2012)	Secondary data	Explored buyer purchasing behavior
Parsons et al. (2013)	Lab experiment	Investigated the purchase intention of buyers
Pentina and Taylor (2013)	Lab experiment	Investigated the purchase intention of buyers

Table 2. (*Continued.*)

Shiau and Luo (2012)	Survey	Investigated the continuous use of daily-deal buyers
Zhang et al. (2013)	Secondary data	Investigated the continuous use of daily-deal buyers
Zhou et al. (2013)	Secondary data	Explored buyer purchasing behavior
General/no specific		
Breban and Vassileva (2001, 2002a, 2002b)	Modeling analysis/ simulation	Proposed group formation mechanism based on the trust relationships
Chen (2012b)	Modeling analysis	Proposed group formation mechanism by facilitating buyers to find group-buying products
Hyodo et al. (2003)	Modeling analysis/ simulation	Proposed group formation mechanism by allocating buyers into different into websites
Ito et al. (2002a, 2002b)	Modeling analysis	Proposed cooperative mechanisms for merchants
Kauffman et al. (2010b)	Lab experiment	Investigated the purchase intention of buyers
Lai and Su (2007)	Lab experiment	Investigated the effect of word-of-mouth communication
Lee and Lin (2013)	Modeling analysis	Proposed a new mechanism to secure and monitor the group-buying transaction
Li et al. (2004, 2010)	Modeling analysis/ simulation	Proposed group formation mechanism
Mastuo and Ito (2002, 2004)	Modeling analysis/ simulation	Proposed a decision support system based on buyer preferences to help buyers join the most suitable group.
Mastuo (2009)	Modeling analysis	Proposed a volume discount mechanism
Sheu et al. (2008)	Survey	Investigated the effects of the characteristics of buyers on participation
Yamamoto and Sycara (2001)	Modeling analysis/ simulation	Proposed group formation mechanism based on the category of products
Yuan and Lin (2004)	Modeling analysis/ simulation	Proposed group formation mechanism based on the concept of credit-based group negotiation

2.1   Stream 1: Earlier Mechanism

In the first stream, studies have compared the dynamic discount pricing mechanism with the non group-buying fixed pricing mechanism. It has been found that the optimal dynamic discount pricing mechanism is equivalent to the optimal fixed pricing mechanism [9] [10]. Dynamic discount group-buying pricing mechanism outperforms fixed pricing mechanism when the demand regime is uncertain [9] [11], production postponement combines with economies of scale [9] [10], the merchant is a risk-seeker wishing to expand into a market with new products [10], or there is a greater low-valuation demand than a high-valuation demand [12]. Although dynamic discount group-buying pricing mechanism may be a better choice for merchants, congregation of enough number of buyers before the end of the auction to reach a lower price is difficult which motivates researchers to study the buyer behavior of group-buying. On group-buying website, Kauffman and Wang [2] observe the positive participation effect, the price drop effect, and the cycle-ending effect. In order to take advantage of the positive participation effect, incentive mechanisms which are time-based incentive mechanism, quantity-based incentive mechanism, and sequence-based incentive mechanism, are proposed to motivate buyers to place their orders earlier [13] [14] [15]. Buyers are also more likely to place their orders when they are provided with conditional purchase options (purchase only with reserved price) rather than dynamic price histogram [16]. Buyers can also cooperate for the group-buying bid if the number of buyers with higher valuations to a product is large [17]. Buyer collusion could reduce the bidding prices and market expansion, which were beneficial to both merchants and buyers [18] [19]. Chen et al. [20] reveal a weakly dominant strategy for buyers which is the highest permitted bidding price that is no greater than the buyer value to the product is always the optimal bid price. In summary, dynamic discount pricing mechanism is complicated for buyers to understand and they may even do not know the price they should pay [1]. Moreover, the group-buying auctions cost too much time for buyers to wait and get the products they bought. The long waiting time diminished buyers' willingness to obtain slight discounts [3].

2.2   Stream 2: Daily-Deal Mechanism

As the invention of daily-deal group-buying model, the second stream of group-buying literatures emerges. Daily-deal variant overcomes some problems from earlier group-buying mechanism and adopts fixed discount pricing mechanism and short auction time (i.e. one or a few days). Merchants who feature their deals on group-buying websites are mostly not well known to the buyers and buyers worry about the service quality and their image [21]. Thus, the adoption of daily-deal websites and purchase intention of deals are studied. Profit, value, emotion, and achievement are identified as four types of motivations for adopting daily-deal group-buying [22]. Consumer satisfaction, trust, and merchant creativity also contribute to this adoption behavior [23]. The purchasing intention of buyers is positively affected by the previous number of buyers, the purchase limit of deals [24], service quality [25] [26], and online WOM communication [27] [25]. Social media are also integrated in daily-deal

websites and sharing the deals via Facebook "Like" could generate more sales of coupons [28]. Since the minimum required number of buyers for deals is low and the discount is deep, positive starting effect exists during the auction [29] and observational learning effect is also observed [28] [30] [31]. In addition, matching the framing of daily-deal promotional message with the regulatory focus of buyers could strengthen the persuasion effect [32]. Although buyers who are mainly deal seekers prefer deep-discounted deals, merchants shows little interest and loyalty to daily-deal website for future collaboration which results in the lack of deals on daily-deal website [33]. Regardless of the required minimum number of buyers, daily deal variant simplifies group-buying mechanism and exists in the form of time-limited sales, where the nature of group-buying is weakened.

2.3   Stream 3: General

Besides the above studies, there are 18 studies which do not target specific group-buying mechanism. Among these studies, a significant number of them investigate coalition formation for group-buying activities. Buying group can be formed based on the category of products [34], trust relationships [35] [36] [37], various website allocation [38], credit negotiation [39], reservation prices for a combination of items from buyer [40] [41], reservation prices and payment adjustment values from merchants [42], buyer preferences [43] [44], and the web browsing history of buyers [45]. Merchants can also cooperate to exchange goods in an agent-mediated electronic market system [46] [47]. In addition, a group-buying agent which secures and monitors the transactions could mitigate the risk for consumers and merchants [48]. Other studies offer general understandings of group-buying models. For instance, people with higher incomes, and more online shopping experience and time more actively participate in online group-buying [49]. Textual comments positively affect buyers' perceived trust of group-buying [14], whereas the source of group-buying information (friends vs. merchants) affected the attitudes and purchase intentions of buyers [50].

3   Discussions

Online group-buying business faces enduringly critical challenges as earlier online group-buying model ceased operations and the latest daily-deal online group-buying model confronts survival crisis. The sustainability of the online group-buying mechanism becomes an important research topic. Through the extant review of group-buying literature, we find that the sustainable group-buying mechanism should first consider the benefits of both merchants and buyers. Earlier group-buying model, which adopts dynamic pricing mechanism, focuses on merchants' benefits and the first stream of studies mainly investigates whether merchants can gain from this pricing mechanism.   However, the complicated mechanism and long auction time diminish buyers' willingness to participate in [1][3]. Subsequent daily-deal model that adopts a simple pricing mechanism with deep discount and short auction time attracts buyer interests. However, since merchants can hardly attain profits via daily-deal

promotions, merchants shows little interest and loyalty to daily-deal website which results in the lack of merchant participation [33]. Future research can study group-buying businesses from both merchant and buyer sides. The mechanism should not be too complicated which ignore buyers' benefits or too simple which ignore merchants' benefits.

Second, daily-deal mechanism weakens the nature of group-buying by converting group-buying into a form of time limited sales. The first stream of group-buying studies emphasizes the importance of buyer collusion, which could lower down the prices and be beneficial to both merchants and buyers [18] [19]. Buyers are encouraged to form a large group actively. However, daily-deal discount does not depend on a large group any more. Buyers do not need to worry about the depth of discounts if size of the buyer group is small. Although the second stream of literatures notices the importance of WOM and social media on sales, the mechanisms to encourage buyers to form groups via WOM still lack. Thus, the nature of group-buying needs to be emphasized in the future sustainable group-buying mechanism.

4   Conclusion

Online group-buying mechanism needs to be improved given the crisis faced by online group-buying businesses. The extant literatures of online group-buying facilitate us the knowledge on how to design more sustainable group-buying mechanisms. By reviewing 46 articles, we propose that sustainable group-buying mechanism could generate benefits for both merchants and buyers. In addition, group-buying mechanism needs to take advantage of social media to congregate bargaining power from buyers and get deep discounts reasonably from merchants. Buyers can be encouraged to actively interact with others and seek buyers with similar purchasing interests on social media, in order to form large groups for group-buying deals.

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