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Joint quality and pricing decisions for service online group-buying strategy

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ABSTRACT

In this paper, we study the popular group-buying model in which a seller offers a discount on group-buying websites to attract new customers coming to experience his/her service. We analyze the conditions under which a seller could benefit from the group-buying strategy, in addition to discussing the optimal decisions concerning service quality and online price. We find that only when the website scale is sufficiently large will the seller benefit from adopting the group-buying strategy. We also consider the customers' substitution effect, that is, the existing offline customers turn to an online channel when the seller offers a discount on the group-buying website. When the website scale is relatively small and the substitution rate is high, the seller cannot benefit from group-buying. The seller should set a service quality higher than the base service quality when he/she cooperates with large group-buying websites. Moreover, compared to purely offline businesses, the seller will set a higher quality level if adopting a group-buying strategy.

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1. Introduction

With the rapid development of e-commerce, online group-buying has become a common and important sales channel for service providers. Since the birth of Groupon in 2008, group-buying websites have sprung up across the world. In 2014 in China, trading volume for group-buying deals reached 74.75 billion RMB and increased by 108.3% compared to the 2013 turnover (Tuan 800, 2015, Chinese group-buying statistical report). However, not all the sellers who join a group-buying website benefit from this channel. Dholakia (2011) surveyed 324 sellers who have sold products or services through group-buying websites such as Groupon, LivingSocial, Open Table, Travelzoo and Buywithme. The results show that 55.5% of the sellers joining the group-buying website benefited from this channel, while 26.6% lost money and 17.9% broke even. Hence, it is critical to understand how a seller can benefit from adopting a group-buying strategy (GS).

Even with its overall benefits, group-buying comes with some problems. As Groupon CEO Andrew Mason said on his official blog, "It has always been Groupon policy to allow merchants to cap deals. If a merchant sells too many Groupons, they'll have a bad experience, the customer will have a bad experience, and therefore, Groupon loses." Some sellers join group-buying websites without adjusting their service quality, which leads to diminished service quality, such as group-buying customers being treated differently than other customers; these problems cause customers to feel unsatisfied with the seller. According to the Chinese Online Group-Buying Survey Report (Chinese E-Commerce Research Center, 2010) released by the Internet Data Center, the group-buying product's service quality is the main factor affecting customers' decisions to buy on a group-buying website. Service quality has been a strategic measure for maintaining competitive strength in the market. If the seller's service quality level is high, it can attract relatively more customers coming to experience its service in the next period, but doing so requires the seller bearing higher service costs. On the other hand, if the seller's service quality level is low, the service cost will be low, but there will be fewer customers who are willing to experience the service in the next period due to poor reputation. Thus, it is crucial to coordinate service quality with the seller's GS to guarantee its success.

Selling on group-buying websites also introduces the substitution effect (i.e., an existing offline customer takes advantage of the online discount). Based on survey data gathered from 641 small- and medium-sized businesses, Dholakia (2012) found that these businesses attract close to 80% new customers (i.e., customer substitution rate of approximately 20%). We find that a high substitution rate will weaken the marketing power of a GS.

In this paper, we consider two scenarios. In the first scenario, a seller runs purely offline and decides the selling price and service quality to maximize his/her profit over two periods: the current

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and future period. In the second scenario, the seller can join the group-buying website and set the new service quality and online price to maximize profits for both the offline and online businesses. The optimal profits in the two scenarios are then compared to decide whether the GS benefits the seller. We investigate how the seller should adjust his/her service quality to align with the online group-buying channel. Furthermore, we examine the substitution rate's impact on the seller's group-buying decision. We also study the seller's group-buying decision under an endogenous substitution rate that depends on the offline and online prices.

The remainder of the paper is organized as follows: In Section 2, we present the relevant literature; Section 3 introduces the base model; Section 4 develops the group-buying model that is compared to the base model to investigate various parameters' impact on the seller's best strategy; in Section 5, we conduct a numerical analysis with the aim of revealing more managerial implications; finally, we conclude our research in Section 6.

2. Literature review

The group-buying mechanism is a special type of online distribution channel that has been widely studied in literature (Khouja and Wang, 2010; Geng et al., 2016; Tan et al., 2016; Kannan and Li, 2017; Tan and Carrillo, 2017). Thus far, it has undergone three stages: traditional dynamic group-buying, deal-of-the-day group-buying, and today's group-buying. Traditional group-buying adopts a dynamic pricing strategy, whereas the deal-of-the-day mechanism adopts a fixed-pricing strategy. There are minimum deal sizes in both mechanisms. Today's group-buying adopts the same fixed-pricing strategy as the deal-of-the-day mechanism but without the minimum deal size.

Traditional group-buying announces the price-quantity schedules at the beginning of a given selling period. Customers pay the relative price depending on the total quantity at the end of the selling period (Ni et al., 2015). Traditional group-buying has been extensively studied in the literature. Kagel and Levin (2001) regarded the online group-buying auction as a kind of homogeneous multi-unit auction whose price curve steps down from one price-quantity schedule to the next. Chen et al. (2002) recognized that this traditional group-buying mechanism is global and encourages all buyers who want to purchase a particular product or service to join a group-buying website to accomplish the desired purchase within a given time frame. Van Horn and Gustafsson (2002) showed that online group-buying enables individual buyers to obtain the same discount as retailers who buy in large volumes. Kauffman and Wang (2002) collected data on Mobshop-listed products over various periods of time and found three effects are important for customers' buying decision. Anand and Aron (2003) revealed that the dynamic group-buying pricing mechanism outperforms fixed-pricing mechanisms when the seller faces an uncertain market. Chen et al. (2009) analyzed a bidder cooperation's effect on group-buying, and they found that cooperation can improve profits for both sellers and bidders, which differs from traditional auctions.

The dynamic group-buying mechanism gradually became obsolete due to its three main drawbacks, as outlined by Kauffman and Wang (2001): (1) the business model is too complex for common consumers; (2) the group-buying auction cycle is too long and hinders impulse buying; and (3) the transaction volume is too low. Groupon was established in 2008, and it launched deal-of-the-day group-buying by offering certain products each day to help small businesses attract customers. Deal-of-the-day group-buying announces only one price-quantity pair for a given selling period. The transactions are valid only until the number of cumulative customers reaches a given minimum deal size. Groupon broke even after running for seven months and garnered $50 million in net income within its first year. Since then, many researchers have studied this new group-buying model. Dholakia and Tsabar (2011) conducted an in-depth descriptive analysis of the Gourmet Prep Meals experience and found that group-buying has a significant impact on sellers' future profits. Jiang and Deng (2014) put forward the concepts of advertisement with a limited availability and market spill-over effects, and they studied how to set the optimal group-buying price and maximum deal size for service providers. Jing and Xie (2011) investigated the group-buying discount's effect on motivating informed customers to work as sales agents.

In 2012, Groupon began to eliminate the minimum deal size. The seller just needed to set the group-buying price and the selling time frame. Now, most group-buying websites have begun to adopt this business model, but few academic studies have been conducted on it because of its novelty. Ni et al. (2015) studied the package deal group-buying model, which is one form of this new group-buying model; they formulated the basic model as a Stackelberg game where the website is the leader and the seller is the follower. They found that group-buying is more efficient when the customers' search and communication cost factors are low. The UGS model (seller has his/her own group-buying website) is more profitable for the seller than the basic model. However, the model only includes the online business, not the offline business. Gao and Chen (2015) considered customers' preference uncertainty and consumption state uncertainty. By taking a comprehensive perspective, they found that a no-show of voucher buyers might not be a good thing for the merchant, especially for large or start-up businesses. They also found that websites sharing total revenues with sellers and providing full refunds to customers are able to maximize social welfare. Zhang et al. (2016) studied the impact of a group-buying network's positive and negative effects on the group-buying business model's performance. They compared three different scenarios in which the seller runs a group-buying business, an offline business, and both businesses. Zhao et al. (2014) considered a start-up service provider that decides whether to advertise its service product by offering a temporary daily deal promotion. They showed that both the commission rate charged by the daily deal website and the discount level offered by the service provider play important roles in signaling the service provider's initially unobservable quality level. Ni et al. (2015) investigated the seller's GS for both collectivist customers and individualistic customers.

However, with the increasing number of sellers joining group-buying websites, many service-quality-related problems have been exposed. Many group-buying sellers receive complaints about bad service quality and customers being treated unfairly. In San Francisco, a bakery's Groupon orders exceeded 72,000, which forced the bakery seller to increase its daily production capacity from 800 up to 1700, but this still failed to guarantee the customers' service experience quality (Galante, 2010). According to the Internet Data Center's Chinese Online Group-Buying Survey Report (Chinese E-Commerce Research Center, 2010), service quality is one of the primary factors affecting customers' online group-buying website shopping decisions. Thus, it is crucial for the sellers to adjust their service quality when starting an online group-buying business. The service quality's impact on the service industries and individual providers has been systematically studied. Levitt (1972) stated that service quality refers to the measuring of whether the service result can meet the established service standards. Grönroos (1984) believed that service quality depends on a comparison between the customer's expectations and the actual service quality level. Oh and Parks (1997) recognized that customer satisfaction and service quality are quite important in service industries. Yen et al. (2004) supported the proposition that

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