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# A social recommender mechanism for location-based group commerce



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## ABSTRACT

With the rapid growth of social media platforms, numerous group commerce websites, which exploit both the advantages of price discounts and experience value, have emerged. Moreover, the popularity of sophisticated mobile devices brings great commercial opportunities for local store to gain publicity. In this research, considering user preference, geographic convenience, and friends' influence, a group-coupon recommender system is proposed for promoting location-sensitive products. The results of experiments conducted on Facebook indicate that the proposed mechanism could accurately recommend products and satisfactorily provide a companion list of to customers, significantly increasing willingness to purchase by taking advantage of the power of social influence.

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## 1. Introduction

With the rapid growth of e-commerce markets, several on-line transaction platforms supporting customers have sprung up over recent years and transformed customers' shopping behaviors. In the traditional e-commerce operation pattern, traders exhibit the product on a high-popularity auction website such as e-Bay or Yahoo to attract customers to purchase. Recently, a new type of group commerce, utilizing the advantages of price discounts and social influence, has emerged. According to the general economic rule, the larger the volume of products bought, the lower the unit price. Hence, for e-commerce buyers, aggregating individuals to raise the purchase volume can increase their bargaining power and achieve a lower purchase price.

According to an e-commerce industry research report, the population of Internet users in China is estimated to reach more than 600 million, and the population of online shoppers is predicted to rise to more than 300 million, by 2015 [36]. Moreover, a German research company, yStats.com, reported that the number of online shoppers in the US is predicted to grow to more than 150 million in 2012, with almost 80% of US internet users engaging in shopping online [16]. With the huge business opportunities afforded by the e-commerce market, a substantial number of traders have entered into this e-commerce market and online shoppers are using their social capital to increase the purchase volume to get the lowest price possible. Hence, numerous online group-buying transactions have naturally arisen in this market.

The operational model of traditional online group buying is described briefly as follows. The traders publish products on online e-commerce platforms, such as auction websites, to attract customers to purchase. The group-buying commerce retailer provides products and services at significantly discounted prices on the condition that there exists a minimum number of buyers willing to buy the same item [50]. However, although customers are certainly attracted to products offered at a

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substantial discount, they may well not have the will or patience to put in the inevitable effort involved in forming a large-sized consumer group. As a result, traditional group-buying e-commerce is not particularly promising. Moreover, there is a need for some local shops to increase publicity to enhance their business. Under the above circumstances, a brand new business model exemplified by well-known group-coupon websites such as Groupon, Gomaji and Meituan, was developed to meet the above needs. As the originator of this new group-coupon market, Groupon launched its first market in Chicago in November 2008. There is a major difference between this new group-coupon business model and the traditional group-buying model. The group-coupon platforms play a role in matching traders and end customers. They seek shop-type traders in urgent need of increased publicity and then make an agreement assuring the traders of the sale of a fixed volume of products for an ultra-low price. These group-coupon websites sell the product featured as the “deal-of-the-day”; most products are in the form of a ticket package which needs a certain number of consumer companions to enjoy the product or service together. After purchasing the coupon product on a group-coupon website, the buyer prints off a voucher and claims their discount at the retail trader.

In other words, the effort of bargaining with traders migrates from the individual customer to the intermediary platform. However, because of the low entry barrier of these new group-coupon sites, numerous copycat competitors have rapidly emerged. Recently, CNN Money News reported on Groupon’s precipitous stock decline on June 4, 2012, and the market cap fell below the \$6 billion which Google offered as a buyout in late 2010. The phenomenon of the competitive group-coupon market not only affected the revenue of intermediary platforms but also brought customers the problem of spending more time finding desired products.

In the increasingly competitive environment, group-coupon platforms are currently facing numerous challenges and problems. The main problems faced by these group-coupon platforms are:

- (1) How to develop personalized and value-added services for group-coupon customers.
- (2) How to recommend accurately location-sensitive coupons to customers.
- (3) How to utilize the power of social influence to increase the revenue of a group-coupon platform.

In this study, a group-coupon recommendation mechanism, analyzing the factors of individual preference, location sensitivity, and social influence, is proposed to solve the problem by finding a group of customers who are interested in the product and geographically close to the shop offering the product to assure the success of group-buying transactions by achieving the minimum numbers of buyers. Specifically, for each recommended buyer of package products, a consumer group list of a size equal to the suitable number of consumer companions for a certain coupon product is also suggested to increase their willingness to purchase. Moreover, for group-formed coupon products, a group member list is generated for all the customers in the same group to increase their willingness to purchase a typical product. By conducting experiments on Facebook and comparing with several benchmark recommendation strategies, we verified the superior effectiveness of our proposed group-coupon recommendation mechanism. From the perspective of online group-buying platforms, this customer-value-enhanced mechanism could raise both their popularity and profits simultaneously.

The remaining sections are organized as follows. The literature related to our work is reviewed in Section 2. Section 3 gives a detailed description of the proposed mechanism. In Section 4, the experiments conducted based on the proposed mechanism are delineated. The results and evaluation of the experiments are presented in Section 5. Finally, Section 6 highlights our research contributions and describes research limitations and corresponding directions for future studies.

## 2. Related literatures

### 2.1. Social and group commerce

Social commerce is an emerging new market in which individual sellers are linked over online social networks [46]. Both the quality and social support of the website could affect the user’s intention to participate in social commerce and to continue using the service of social networking [30]. A key benefit of creating a social commerce network is to make stores more accessible to customers visiting the marketplace [10]. Significantly influenced by the preceding fast growth in social networking, social commerce is synonymous with next-generation electronic commerce [28]. Fundamentally different from traditional e-stores, online stores have created a new paradigm of business and sales models within the past several years.

While the phenomenon of group commerce is formed by consumer bundling as well as consumer flocking, the existence of such a grouping phenomenon has been strongly dependent on new information technologies and the global proliferation of the Internet over the last decade [22]. For example, Groupon, as the best known and largest daily-deals businesses vendor, which launched in November 2008, operates a local commerce marketplace that links merchant partners to consumers by providing goods and services at around 50% off the list price [8]; due to its rapid growth, Groupon boasted a \$1.35 billion valuation in just 17 months [44].

The group commerce retailer operates by offering one group-coupon product daily in each of the metropolitan marketplaces it serves [12]. Each successful deal has a minimum number of buyers that must be reached for the deal to occur, and sellers may also set a maximum threshold to constrain the number of coupons sold [22]. The mechanism of time-limited purchase increases customers’ sense of urgency and generates panic buying [35]. Essentially, the business model of group

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