THE USE AND VALUE OF SOCIAL INFORMATION IN SELECTIVE SELLING OF EXCLUSIVE PRODUCTS

ABSTRACT. We consider the use and value of social network information in selectively selling goods and services whose value derives from exclusive ownership among network connections or friends. Our stylized model accommodates customers who are heterogeneous in their number of friends (degree) and their proclivity for social comparisons (conspicuity). Firms with information on either (or both) of these characteristics can use it to make a product selectively available at personalized price to desired customers to manage the trade-off between exclusivity and sales. We find that, in contrast with the practice of targeting high-degree customers, the firm’s best targets are, in fact, high-conspicuity customers within low-degree segments. Interestingly, we find that degree-information is systematically more valuable than conspicuity-information. Analysis of many model variants, and of scenarios with full graph information, suggest that there are two canonical categories of social information—less valuable “consonant” information on characteristics where the firm’s preferred customers are also the most interested customers and more valuable “competing” information on characteristics where they are not. Customers can be incentivized to act in a way that their actions are a perfect substitute for consonant information, but there is no such recourse for the lack of competing information.

1 Introduction

Each day, social networking platforms such as WeChat, store, catalogue and make available for use billions of pieces of data about its numerous users. WeChat also hosts millions of “official accounts”, most of which are e-commerce portals used by major brands to launch, promote, and sell products and services – for example, cars, designer apparel, public services, taxi rides, and even banking services. When combined with unprecedented availability of data on social interactions, the confluence of e-commerce and social networking offers firms a game-changing opportunity to improve the targeting of their products and services. In particular, the ideal products selling which social network information plays a major role are exclusive products. For customers, the value of these products derives at least in part from social comparisons (or “showing off”) within the social network of their friends. This paper provides guidance on how firms selling exclusive products could use rich social network data to enhance product pricing and distribution to attain the optimal trade-off between exclusivity and top-line sales.

Specifically, this study offers some initial insights into the use and value of different kinds of social network information for firms selling exclusive goods and services to selected customers on a social-commerce platform. Our stylized model formulates firm’s problem of choosing optimal availability of the product and its price which both directly define customers’ buying behavior in a social network. We
demonstrate that certain factors, such as influence of a customer’s friends on her consumption decision and network structure, should be taken into account by a firm when making such a strategic decision. In particular, we find that customers with higher conspicuity can be charged higher prices and the firm’s optimal targets are poorly connected customers (those with low number of friends) with sufficiently high sensitivity to social comparisons (conspicuity). We further explore the value of different kinds of social information. We show that not all social information is equally valuable and in generally the information for which firm’s interests are aligned with the customers’ preferences is less valuable as compared to the information for which this is not the case.

To summarize, we make two important contributions. To the best of our knowledge, this is one of the first studies in operations management literature that builds theoretical framework of interactions over the social network and derives firm’s optimal customer discrimination policies when selling in a socially connected environment. Secondly, we explore the value of information for availability and price discrimination in a setting where social exclusivity is one of the leading factors influencing customer’s decision process.

2 The set up

We consider a firm that sells a product whose value derives not only from its functionality but also from the social comparisons that customers engage in with their peers upon obtaining this product. We model a social network as a random graph with pre-specified degree distribution.

**Consumers.** The utility function of each customer who obtains the product consists of two parts: functional and social. The former represents how much she values functional properties of the product. The latter is the result of social comparison within the network: each customer prefers the product that she owns to be exclusive. The more friends have the product, the lower social component of the utility is. Customers are homogenous across functional utility, while differ in how much they value social benefit of the consumption (we call it customer’s conspicuity).

**Firm.** Firm maximizes its profit by choosing the best availability and price strategy. That is, it chooses which customers to sell (not to sell) the product to and at what price. The firm faces the following tradeoff. When setting a low price or high availability, the firm while satisfying all the demand makes the product less exclusive thus lowering social component of customer’s utility. Alternatively, the firm can keep the product exclusive by setting higher prices or lower availability. These measures induce more customers to want to buy the product. Possessing information about conspicuity and degree of each customer, firm can assign different availability and price to different groups of customers (segments).
The game. We study a sequential move game played by a firm and the social network of customers. Firm moves first and decides on its strategy. Each customer decides whether (or not) she wants to buy the product. Customers make this choice without observing what their friends do. The product is further rationed according to firm’s availability strategy.

Equilibrium concept. An equilibrium is such that the strategy for each customer is the best response to the play of other customers given any firm’s strategy. Firm’s equilibrium strategy in turn is profit maximizing given the best responses of customers.

3 Major results

In the game described above, any firm’s strategy leads to the best response of the social network as a whole, which, by itself, constitutes an equilibrium of the simultaneous move game of strategic substitutes played by individual customers. Customers’ best response thus defines the mapping between the firm’s strategy and the demand for the product or in other words, the set of customer segments willing to buy the product. Splitting the set of all available to the firm strategies into subsets each leading to the same customers’ equilibrium outcome allows us to identify the highest profit strategy within each such subset. The initial problem can then be reformulated as choosing the set of willing to buy the product customers which corresponds to the highest profit.

Our analysis reveals that optimal strategy of the firm when both price and availability discriminating is such that: 1) price assigned to a customer is proportional to her conspicuity; 2) firm offers the product exclusively to high conspicuity customers within low degree segments. Such customers derive enough social value from social comparisons and thus can be charged sufficiently high prices, yet these customers impose low negative externality on the system, when given the product: they do not significantly reduce the opportunities for other customers to earn social utility when possessing the product.

We further show that not all social network–based information is created equal; the most valuable information is that on the traits where the firm’s objective (either pricing or targeting) is misaligned with the customers’ incentives, or information of the competing kind. In contrast, consonant information (on the traits where firm’s objective is aligned with customers’ incentives) is less valuable. This finding stands in contrast with conventional practice of firms, who attempt to collect, manage and sell all social network information under the presumption of its value.