Customer acquisition in a connected world:

Revenue leaders vs. Opinion leaders

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by

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Table 1: Acceleration value and social value by seeding approach

	Seeding percentage = 0.5%					
	Analysis I (value clustering)			Analysis II (value clustering + influence)		
	Acceleration value	Social value	Total value	Acceleration value	Social value	Total value
Random	2.5	24.6	**27.1**	2.5	23.5	**26.0**
Opinion leader	2.3	36.0	**38.3**	2.4	34.1	**36.4**
Revenue leader	31.8	27.0	**58.8**	31.8	72.0	**103.8**
Revenue lagger	0.5	22.7	**23.2**	0.5	5.9	**6.4**

	Seeding percentage = 4.0%					
	Analysis I (value clustering)			Analysis II (value clustering + influence)		
	Acceleration value	Social value	Total value	Acceleration value	Social value	Total value
Random	19.9	112.4	**132.3**	20.6	111.9	**132.5**
Opinion leader	18.7	133.4	**152.1**	19.1	131.6	**150.8**
Revenue leader	116.3	90.1	**206.4**	116.6	143.3	**259.9**
Revenue lagger	4.6	106.0	**110.6**	4.8	35.1	**39.8**

The Social Value of Revenue Leaders

Abstract

When confronted with the decision to attract new customers, firms face a fundamental choice. Either they acquire customers with high expected customer lifetime value (revenue leaders) or they attract clients with a high number of social connections (opinion leaders). While the acquisition of revenue leaders results in higher direct value, the acquisition of opinion leaders leads to higher social value. Our study analyzes this tradeoff, esp. in situations where both sources of value are not independent. Using an agent-based model we show under which conditions focusing on revenue leaders can lead to higher value than focusing on opinion leaders.

Key words: WOM programs, Seeding, Opinion leaders, Revenue leaders, Acceleration value, Social value

Introduction

A fundamental principle of informed customer acquisition is that firms should give priority to attracting customers that will supply the most value. On the one hand, companies today have an increasing ability to assess the lifetime value of their customers and to understand how it is distributed (Bolton, Lemon, & Verhoef, 2004; Gupta, et al., 2006; Kumar & Shah, 2009). This information can be used to assess which are the best potential customers to acquire. On the other hand, customers provide the firm value not only through what they buy, but also in the way they affect others via social influence such as word of mouth. Here, the idea that some people, often as labeled as opinion leaders, have disproportional effect on others had been fundamental across the social science literature (Watts & Dodds, 2007) and among marketing academics (Goldenberg, Han, Lehmann, & Hong, 2009; Iyengar, Bulte, & Valente, 2011; Nair, Manchanda, & Bhatia, 2010).

The tradeoff between focusing on the acquisition of the higher lifetime value customers – which are labeled here revenue leaders – and the higher social influence customers – labeled opinion leaders – is in the base of this study. Using an agent-based model, we highlight the complexity of this trade off due to the possible relationship between the two sources of value. As we will discuss later, high lifetime value customers may also have high social value which will affect the acquisition priority decision.

Background

The view of the firm's customer base as a portfolio of heterogeneously valued assets is a key idea of customer relationship management (Gupta & Lehmann, 2005). Within this larger area, the relationship between word of mouth activity and the profitability of acquisition has

received increasing attention in recent years. Two streams of literature have emerged in this respect. The first relates to the process before the acquisition and focuses on the role of word of mouth in acquiring high CLV customers, for example in the context of referral programs (Nam, Manchanda, & Chintagunta, 2010; Schmitt, Skiera, & Bulte, 2011). A second stream, relevant for this study, examines the way in which customers create monetary value via their word of mouth (Hogan, Lemon, & Libai, 2003; Kumar, et al., 2010) and how such "social value" can be measured.

An area where the distribution of social value has received considerable attention is that of the diffusion of innovation (Rogers, 2003). Here it has been well established that there may be large variation in the social influence of individuals, and that some individuals that are opinion leaders (also labeled influentials, influencers and hubs) have a high effect on the behavior of others. What had had been notably absent from the literature on opinion leaders is the monetary value of the recipient, partly because much of this literature had not been marketing oriented, and did not focus necessarily on issues of monetary profitability. Yet, from the firm's point of view, the aim is not to maximize talks or even number of people influenced, but long term monetary gains.

This issue is especially notable given consistent findings from a diverse set of industries that point to a significant concentration of the customer profitability distribution, where a relatively small percentage of customers provide the firm with disproportional contribution to profitability. While there are some customer that bring the firm high CLV (which we label here "revenue leaders"), there are many other that may create low, and even negative profitability (Zeithaml, Rust, & Lemon, 2001). It is expected that an effect on revenue leaders will result in higher social value. What is less obvious is if revenue leaders themselves have social value that is different than other customers.

We suggest there may be an association between social value and CLV due to the following two reasons. The first reason relates to a probable association between a customer profitability and the profitability of others in their social network. There is rich literature across disciplines that points to homophily or tendency to communicate and affect similar others (McPherson, Smith-Lovin, & Cook, 2001). Haenlein (2011) found a significant and substantial degree of positive network autocorrelation in customer-level revenue where high (low) revenue customers tend to be primarily related to other high (low) revenue clients. The second issue to consider is that heavier users may affect others more via word of word of mouth – either due to the relationship between satisfaction and purchase levels as well as word of mouth or since heavy users have more experience with the product and thus can supply better advice (Kumar, et al., 2010).

Considering the above, a firm that wants to make an informed customer acquisition decision faces a tradeoff between focusing on opinion leaders and revenue leaders. Opinion leaders are the ones who will create the most social impact on others which translate to a high social value. Revenue leaders are the one that will ensure high cash streams which will result in higher purchase based profitability. In addition revenue leaders may create an extra social value because of homophily in consumption or word of mouth effectiveness. This tradeoff, which had not been explored to date, is the focus of our investigation.

An agent-based model of new product entry

To examine this tradeoff described above, we use stochastic cellular automata, an agent-based modeling technique that simulates aggregate consequences based on local interactions among individual members of a population (Goldenberg, Libai, & Muller, 2002). Essentially an agent-based model is composed of individual cells that that represent individuals connected via a

social network. The firm introduces a new product into a network of potential adopters. Each adopter brings the firm a certain lifetime value, and so the firm's overall profitability is the customer equity of the adoption process – the net present value of the lifetime value from current and future adopters. The agent based model helps us to understand what the customer equity will be under different condition.

Specifically, our simulation is based on four design factors which we varied on eight levels each, leading to 8^4 = 4,096 different combinations. The first design factor is the standard deviation of the revenue distribution which measures the degree of difference between "good" and "bad" customers. The second design factor is the correlation among customer-level revenue of connected nodes. The third design factor is the structure of the underlying social network, reflected in the clustering coefficient. The fourth and last design factor is the seeding percentage, corresponding to the size of the word-of-mouth program.

To obtain ranges for the variation in these four parameters, we built on previous empirical research in the areas of CRM and social network analysis (e.g., Haenlein, 2011; Kumar & Shah, 2009; Libai, Muller, & Peres, 2010; Watts & Strogatz, 1998). Regarding the standard deviation of the revenue distribution, we assumed values of 0.10, 0.25, 0.50, 0.75, 1.00, 1.25, 1.50 and 1.75. With respect to the correlation among customer-level revenue of connected nodes, we assumed values of 0.00, 0.10, 0.20, 0.30, 0.40, 0.50, 0.60 and 0.70 for the Pearson correlation coefficient between an node's own revenue and the average revenue of all other nodes connected to this node. Concerning the clustering coefficient, we assumed values of 0.04, 0.08, 0.12, 0.16, 0.20, 0.24, 0.28 and 0.32 for the rewiring probability of the Watts-Strogatz model. These values result in clustering coefficients between 0.06 and 0.54. Finally we assumed values for the seeding percentage of 0.005, 0.010, 0.015, 0.020, 0.025, 0.030, 0.035 and 0.040.

For each of the 4,096 combinations of these four design factors, we generated three social networks building on the Watts-Strogatz (Watts & Strogatz, 1998) small world model with 1,000 nodes and three revenue distributions consistent with the respective design factors (resulting in 4,096 x 3 = 12,288 runs). We then simulated an adoption process for this network and revenue distribution over 30 consecutive time periods.

For each node i in period t, we determined the probability of adoption as a function of an external influence parameter δ_i and an internal influence parameter q_i as detailed in Libai, Muller, & Peres (2010). Both, the external and internal influence parameter were drawn from a uniform distribution with a minimum of 0.001 (0.040) and a maximum of 0.020 (0.160) respectively. We simulated the adoption process twice, once with seeds (selected either based on number of connections, highest/ lowest revenue or randomly) and once without seeds, which resulted in two vectors of adoption times for each nodes. We then discounted each node's revenue by the adoption time using a discount rate of 10%. Subtracting the discounted revenue under no seeding from the discounted revenue under seeding gives the total incremental value obtained by the seeding process. Acceleration value is defined as the fraction of this total value that is attributable to nodes selected as seeds and social value the fraction that is attributable to other nodes. To avoid that our results suffer from random variation, we simulated the adoption process 30 times, resulting in 30 estimates of acceleration value and social value for each run, and determined the average acceleration value and social value over these 30 repetitions.

Results – Analysis I

Table 1 summarizes the results of our simulation (i.e., acceleration value and social value) by seeding approach for a seeding percentage of 0.5% (corresponding to five seeds) and 4.0% (corresponding to 40 seeds). Analysis I (value clustering) only takes account of the fact that there

is a positive correlation between an node's own revenue and the average revenue of all other nodes connected to this node.

For the 0.5% case, we see that random and opinion leader seeing approximately result in the same value creation (2.5 vs. 2.3). This is to be expected as our simulation assumes the degree distribution and revenue distribution to be independent. Seeding to revenue leaders results in a 13-fold increase in acceleration value (31.8) while seeding to revenue laggers leads to an 80% decrease (0.5). Looking at social value shows that opinion leaders score highest (36.0) and revenue laggers lowest (22.7), although the spread between those extreme values is less dramatic as in the case of acceleration value. A first key result emerging from this analysis is that seeding to revenue leaders is substantially more attractive than seeding to opinion leaders as it leads to an increase in total value (i.e., acceleration value + social value) by approximately 50% (58.8 vs. 38.3). This is due to the fact that the relative disadvantage of revenue leaders in terms of social value (27.0 vs. 36.0) is largely overcompensated by their higher acceleration value (31.8 vs. 2.3). Another point worth highlighting is that seeding to revenue leaders leads to a social value that is approximately 50% higher than the one of random seeding (36.0 vs. 24.6.). This shows that revenue leaders share some part of the social advantages usually attributed to opinion leaders.

Looking at the 4.0% seed percentage condition confirms that revenue leader seeding dominates the other approaches in terms of total value creation although the difference to opinion leaders becomes smaller (35% vs. 50% in the previous case). Additionally, the relative benefit of revenue leaders in terms of social value creation when compared to random seeding disappears (90.1 vs. 112.4). A more detailed analysis (available from the authors on request) indicates that once the seeding percentage exceeds 1.0% revenue leaders perform worse than random seeding and beyond 1.5% they even perform worse than revenue laggers. This finding is important as it

implies that the social value created by a customer is not constant but depends on the specific conditions under which the customer is analyzed.

Results – Analysis II

As highlighted above, Analysis I takes account of the fact that people connected to each other are likely to be similar in terms of their revenue potential. This leads to a certain degree of value clustering within the social network which ultimately drives the attractiveness of revenue leaders for the seeding process. Yet, in addition to being connected to customers of similar attractiveness, revenue leaders are also likely to exert a stronger influence on the people they are connected to. To take account of this effect, we conducted an additional analysis in which the influence of a node is proportional to that node's value (CLV).

As can be seen, considering an influence effect in addition to a value clustering effect has no impact on acceleration value for any seeding approach nor on social value for opinion leader and random seeding (all values for Analysis II are within 5% of their corresponding values in Table 1). Yet, the social value of revenue leader seeding increases 2.7 times (72.0 vs. 27.0) while the social value for revenue lagger seeding drops by 75% (5.9 vs. 22.7). When considering value clustering and influence effects simultaneously, revenue leader seeding not only leads to the highest acceleration value (13 times higher than opinion leader seeding), but also to the highest social value (2.1 times higher than opinion leader seeding). It is therefore by far the seeding approach with the highest overall value creation.

Discussion

From a managerial perspective, our results indicate that under certain conditions seeding to revenue leaders can lead to higher total value (i.e., acceleration value + social value) than seeding to opinion leaders. This finding is of importance as it implies that in some cases firms might not need to identify customers with disproportionally large social influence (opinion leaders). Instead, it could be sufficient to focus on clients who generate a high revenue, which are much easier to spot within any customer database.

In terms of theoretical implications, this result is consistent the statement made by Watts and Dodds (2007) that in certain situations opinion leaders might be less important for the adoption process than they are believed to be. Apparently positive network autocorrelation in revenue combined with a higher impact of word of mouth spread by heavy users can lead to the fact that revenue leaders already share some of the desirable characteristics usually attributed to opinion leaders.

With respect to areas of future research, our analysis needs to be extended to other network structures besides the Watts-Strogatz small world model in order to test the generalizability of our findings. This includes artificial social networks (e.g., the Jackson-Rogers model) as well as real life networks. Once this is done, it would be interesting to analyze the factors (e.g., social network characteristics, revenue distribution characteristics) that drive total value of revenue leader seeding as well as the difference in social value between revenue leaders and opinion leaders.

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