

How to Influence My Customers? The Impact of Electronic Market Design

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ABSTRACT

This paper investigates the strategic decisions of online vendors for offering different mechanism, such as sampling and online reviews of information products, to increase their online sales. Focusing on measuring the effectiveness of electronic market design (offering reviews, sampling, or both), our study shows that online markets behavior as communication markets, and consumers learn product quality information both passively (reading online reviews) and actively but subjectively (listening to music sampling). Using data from Amazon, first we show that sampling along is a strong product quality signal that reduces the product uncertainty after controlling for halo effect. In general, products with sampling option enjoy a higher conversion rate (which leads to better sales) than those without sampling because sampling decreases the uncertainty of consuming experience goods. Second, the impact of online reviews on sales conversion rate is lower for experience goods with a sampling option than those without. Third, when the uncertainty of the societal reviews is higher, sampling plays a more important role because it mitigates such uncertainty introduced by online reviews.

Categories and Subject Descriptors

K.6.0 [Management of Computing and Information Systems]: Economics.

General Terms: Economics, Human Factors, Management.

Keywords: Electronic Market Design, Conversion Rate, Halo Effect, Online Product Reviews, Sampling

1. INTRODUCTION

Online Word of Mouth (WOM) literature provides useful insights and incentives for online vendors to give an online consumer review option for the products they sell [1, 2]. However, besides these societal reviews, online vendors have many other options, such as offering sampling of the original products (e.g. music CDs), to help consumers to learn the quality of a product, to reduce the quality uncertainty associated with the consumption, and thus increase the related sales. Previous research studies focus on the societal reviews without a clear picture about how consumers learn the quality of a product through both subjective opinions and societal reviews. They provide limited guidance about how these two channels interact with each other, under what circumstances online retailers should provide which options, and when subjective opinions are more important than the societal reviews. So, overall, previous research offer limit strategic guidance to online vendors about the marketing strategies (reviews vs. sampling) they should adopt.

Furthermore, previous researches focus on the sales of products instead of conversion rate. Across products, sales might not be a good measurement of the effectiveness of strategic efforts (offering online reviews, sampling, both, or neither) a vendor adopted because product sales can be influenced by both marketing efforts and intrinsic product demands. By focusing on the conversion rate, we can measure the effectiveness of electronic market design and answer the following research questions 1) whether should online retailers offer sampling for their experience goods, such as music CD? 2) Under what circumstances sampling is more important than societal reviews?

2. BACKGROUND AND HYPOTHESES

Electronic market places can be viewed as communication markets in which relevant product quality information is exchanged and learned among market participants. Due to the displeasing nature of the uncertainty associated with online transactions, consumers seek information to mitigate and to reduce it.

Online reviews written by previous customers are a reflection of customers' perceived value. These reviews are helpful for purchase decision-making because they provide new customers with indirect experiences. Product quality reflects a product's intrinsic value. The average rating reflects the over-all assessment of product quality. A higher mean of online product reviews indicates a better product quality with less uncertainty. Therefore it increases the conversion rate of a product.

H1: The higher the mean value of the consumer rating of a experience goods, the higher the experience good's conversion rate will be.

To some degree, online reviews are not verifiable and may not be objective and creditable to potential customers. Consumers might attribute the review scores more to the reviewers' experiences instead of the product itself. To reduce the uncertainty introduced by online reviews, consumers will actively seek other information to reduce the uncertainty, such as listening to the samples of the songs included in a CD.

On the surface, sampling itself can be both good and bad in terms of influencing the conversion rate. The reason is that sampling itself provides a way for consumers to correct the bias introduced by online reviews and to form their subjective opinions about a product's quality. Introducing a sampling option to a weak song might result in a decreasing conversion rate. Then, why do online stores introduce sampling at the first-place?

Before Internet, if users hear one song that they like on the radio or at their friends' houses, or by any other means, they would have to purchase the whole album to get that single song without knowing whether they would like the rest of the songs included in that Album. Now, with a sampling option, consumers can hear maybe

10 to 30 seconds of individual song in that album before they decide to buy it or not. In this way, providing sampling dramatically reduce uncertainty for the consumers. Furthermore, the uncertainty/variance of sampling itself is much smaller than that of the online reviews. According to the principle-agent theory, consumers should put more weight on a less noise signal.

H2: Sampling increases the conversion rate of experience goods, and experience goods with sampling option enjoy a higher conversion rate.

H3: Sampling mitigates the impact of online reviews on sales. In other words, the impact of online reviews on conversion rate is lower for experience goods with sampling option than those without sampling option.

According to the Axiom of Uncertain Reduction Theory, higher variance of product reviews will increase the uncertainty of inferring product quality. Therefore, when the uncertainty of online reviews is higher, consumers might put more weight on subjective and personal options, which is sampling, because it is less creditable for online reviews under such circumstances.

H4: For products with both reviews and sampling option, the impact of sampling on conversion rate is bigger for the products with a higher online review uncertainty, approximated by the variances of online consumer reviews.

3. DATA, METHOD, ESTIMATION, and RESULTS

To answer our four hypotheses, we collect review and sales related data of around 12000 CD from Amazon (early March 2007) using both Amazon Web Service (AWS) and Crawlers because AWS does not provide the information related to actual conversion rate and whether Amazon provides a sampling option for a music CD or not.

We take an incremental approach and estimate the following five models shown in Table 1. Product price and numbers of reviews are also included in all models to take care of the potential confounding factors. Sampling is included as a dummy variable. This variable equals to 1 if Amazon provides sampling option for that product; and 0 otherwise. Conversion rate is a continuous variable on individual music CD level. Standard Deviation of reviews (STD) is included as a dummy variable. It equals to 1 if the STD of the reviews of that item is among the top 25% percentile; and 0 otherwise.

One potential problem for the above models is that Amazon selectively offers sampling options to those products with some

common features, for examples, items with better historical sales. To control for such halo effect, we re-estimated our models by including the historical sales variable (model 5), and found that the results did not change qualitatively.

Table 1 shows that for every one unit increase of average rating, there are around 5% increase on conversion rate for model 1 to model 5 (support for the hypothesis 1). The estimated coefficients on the sampling variables are significantly positive for all five models as well, indicating that offering sampling along will increase the conversion rate. This supports our hypothesis 2 that predicts the positive relation between sampling strategy and conversion rate. It indicates that sampling itself is a very creditable signal associated with better production quality and lower uncertainty.

The coefficient of the interaction between sampling and average rating is significant negative, indicating that online reviews have greater information content if there is no sampling. And when there is sampling available, online reviews play a less significant role, which supports our hypothesis 3. In contrast, the coefficient of the interaction between sampling and the standard deviation of review dummy is significant positive, suggesting that consumers put more weight on sampling when there is larger uncertainty associated with online reviews. This validates our hypothesis 4. Furthermore, the coefficients on the standard deviation of review dummy are significant negative, indicating that higher uncertainty along will lead to a lower conversion rate.

To summarize, the evidence thus far supports the view that consumers adopt both active strategies and passive strategies to reduce the product uncertainty. And providing sampling does help increase sales. Overall, we see that sampling plays a bigger and more important role than online reviews in terms of influencing the conversion rate. The paper is one of the first to address the issue that under what circumstance online vendors should provide which options to disseminate the product information by linking online reviews and sampling to conversion rate instead of sales.

4. REFERENCES

- [1] Chevalier, J., and Goolsbee, A. "Measuring Prices and Price Competition Online: Amazon and Barnes and Noble," *Quantitative Marketing and Economics* (1:2) 2003, pp 203-222.
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Table 1: Regression Results of Impact of Review, Sampling, and Uncertainty on Conversion Rate

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.3573***	0.3786***	0.2877***	0.3388***	0.3789***
Average_Rating	0.0538***	0.0496***	0.0700***	0.0599***	0.0602***
Total_Reviews	0.0002***	0.0002***	0.0002***	0.0002***	0.0001***
Sampling	0.0322***	0.0325***	0.1444***	0.0849***	0.1018***
Std_Rating Dummy		-0.0106***	-0.0109***	-0.0378***	-0.0366***
Average_Rating*Sampling			-0.0251***	-0.0134**	-0.019***
Sampling*Std_Rating_Dummy				0.0310***	0.0290***
Lag_SalesRank					-0.0000***
Price	0.0001	0.0001	0.0001	0.0001	0.0003**
N	19023	19023	19023	19023	19020
R Square	0.0420	0.0426	0.0436	0.0442	0.0806

(***: $p < 1\%$, **: $p < 5\%$, *: $p < 10\%$)