

Empirical study on the Relationship between online reviews and sales of household appliances

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Abstract. At the age of the online shopping, information asymmetry between consumers and sellers leads that consumers are not sure of the quality of purchased household appliances. Online reviews as a new kind of communication mean provides consumers with the strong support, and its spread will undoubtedly have a certain impact on the sales of household appliance. Taking refrigerator as an example, this article analyses the relationship between online reviews and its various influencing factors and sales of refrigerators on Amazon sales top 100 by statistical analysis software spss17.0, and then establishes the multiple regression model and proves that there is an evidently slight relativity between product sales and the number of online reviews, the number of positive comments and the number of five-star comments.

Introduction

As we all known, the Internet provides a broad platform for consumers to purchase goods, customers can make comments through platform provided by the buyer, twitter or a third party professional platform (such as the mushroom street). Storage and searching function of the Internet can be more objective than the sellers on the product information, they also can eliminate the doubts and uncertainties when consumers make a purchase decision, therefore more and more consumers browse other consumers' comments to examine the quality of the products to help them make the right decisions.

Consumers make comments on the Internet platform, and then the comments will be preserved for a long time for other buyers. Online reviews, as a new kind of communication mean, will becomes a new spreading way which can influence consumers' behaviors finally. Online evaluation not only provides consumers with more real comprehensive product information, but also provides a direction for the sellers to improve its mode of operation and business performance. This paper explores the influences of online reviews on product sales from the perspective of online product reviews.

Research hypothesis and research method

Research Hypothesis. In this paper, we study the influences of the number of online reviews, grade and Emotional tendency on product sales, and product brand and the product price as control variables, and put forward the following eight assumptions.

According to the literature review, we find that the number of comments has a certain effect on product sales [1, 2, and 3]. The reason is that the number of comments shows the products popularity. The more the number is, the more comprehensive the information is. Consumers can avoid the risk of purchase, and sellers will promote sales. So we put forward the following hypothesis:

Hypothesis 1: there is a positive correlation between the number of online reviews and home appliance sales

According to previous studies, film review ratings have effect on box office, which may explain that the ratings have an impact on sales. According to the shopping experience, product rating will affect the impression of the overall product, that high level means the high quality of the product, low rank tends to have some shortcomings, and therefore we put forward the following assumptions:

Hypothesis 2 a: there is a positive correlation relationship between rating of online reviews and home appliance sales.

Hypothesis 2 b: there is a positive correlation relationship between the number of five-star comments and home appliance sales.

Hypothesis 2 c: there is a negative correlation relationship between the number of one-star comments and home appliance sales.

Ratings are comprehensive evaluation, but they cannot reflect the effects of different emotions on product sales. Historical research shows that different emotions have different effect on sales [4, 5]. In order to explore the different impact of different emotions on product sales, we make the following assumptions:

Hypothesis 3a: there is a positive correlation relationship between positive online reviews and home appliance sales

Hypothesis 3b: there is a negative correlation relationship between negative online reviews and home appliance sales

Many factors can influence the sales of products. People will consider the price, brand and other factors when they buy home appliances. Here we select the brand and price as control variables to study its effect on the product sales.

Hypothesis 4: there is a positive correlation relationship between brand and home appliance sales

Hypothesis 5: there is a negative correlation relationship between price and home appliance sales

Research Methods. To ensure the authenticity of the comments, we chose Amazon rather than Taobao as an investigation object to collect online trading data. We select the top 100 refrigerators on Amazon's sales (until 2, 12, 2014, at 3 pm.) as the research objects, meanwhile we get the number of online comments, rating, and product prices from the Amazon website. The brand ranking of refrigerators is from PCHOME. All variables are defined as follows:

Table 1 Variable Definitions

Name	Symbol	Definition
Sales	SQ	No refrigerators sales data, replaced by Amazon refrigerators sales ranking, Ranked first is equal to the sales for 100; Ranked the last is equal to the sales of 1
Number of online reviews	MQ	"0" for no one evaluation
Rating	R	Five star for the highest rated; one star for the lowest rated
Number of positive reviews	PQ	The number of five-star rating
Number of Negative reviews	NQ	The number of one-star rating
Product price	P	Amazon price at the time, missing price instead by average price of Baidu and Jingdong
brand score	B	refrigerator top 35 on the PCHOME, missing value is 36,brand score = $100 - (\text{rank}-1) * 99 / (36-1)$
Number of Star level	S5,S1	S5 for the number of five star comments,S1 for the number of one star comments

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100 refrigerators are composed of 20 brands, and three brands which are not on the list are set 36 as its brand rankings. Brand score and the number of each brand product are as follows. We can know that Haier ranked the first, so as its refrigerators sales.

Table 2 Brand statistics

Brand name	Haier	Siemens	Midea	Meiling	Rongsheng	Frestec	Hisense	Bosch	Konka
Ranking	1	2	3	4	5	6	8	13	15
Score	100	97.17	94.34	91.51	88.69	85.86	80.2	66.06	60.4
Product quantity	22	2	9	2	6	1	1	1	10
Brand name	TCL	Homa	DIQUA	Jinsong	Narcissus	SKG	Weili	AUX	Others
Ranking	17	20	26	27	28	29	30	35	36
Score	54.74	46.26	29.29	26.46	23.63	20.8	17.97	3.83	1
Product quantity	13	13	2	3	2	1	4	3	5

Correlation Analysis. To verify the hypothesis 1 to 5, we have carried on the correlation analysis on sales of refrigerators and online reviews. The results are shown in table 3 below. According to the data in table 3, the correlation between the sales and the number of online reviews is 0.229, and it is significant at the 0.05 level. It shows that there is a weak positive correlation between the sales and number of online comments, namely the assumption 1 is established. The correlation between the sales and the number of positive online reviews is 0.231, and it is also significant at the 0.05 level. That means there is a weak positive correlation between the sales and number of positive online comments, that is to say, the assumption 3a is established. In the same way, the assumption 2b is established. In addition, the data shows the correlation between sales and negative evaluation is not obvious, probably because the number of level 1 comments is too little (accounts for only 5% of the total number of comments).

Table 3 Correlation analysis

P	SQ	B	P	MQ	R	PQ	NQ	S5
SQ	1							
B	0.124	1						
P	0.085	.286**	1					
MQ	.229*	0.071	-.337**	1				
R	-0.078	-0.085	-.292**	.269**	1			
PQ	.231*	0.096	-.318**	.995**	.274**	1		
NQ	0.16	-0.057	-.359**	.838**	.194*	.787**	1	
S5	.273**	0.176	-.262**	.984**	0.112	.994**	.735**	1
S1	.215*	-0.05	-.299**	.770**	-.219*	.711**	.964**	.674**

**Correlation is significant at the 0.01 level (1-tailed). *Correlation is significant at the 0.05 level (1-tailed).

According to the first column, there is no relationship between the sales and product brands, price, rating, and negative evaluation. Namely Hypothesis 2a, Hypothesis 2b, Hypothesis 3b, hypothesis 4 and hypothesis 5 are not set up.

Summary

According to previous studies, online reviews have a certain influence on economic benefits. This study has verified it. This paper uses spss17.0 to analyze the influence of online comments on its sales, and finally draws the following four conclusions:

(1) There are weak positive correlation between product sales and the number of online reviews. The conclusion is consistent with previous research conclusion. A large number of comments information shows high attention, which will arouse consumers' purchase desire without doubt. According to the conclusion, the sellers should take some effective measures to encourage users to comment, which can increase product sales.

(2) There are weak positive correlation between product sales and the number of positive online reviews. Negative online comments have low impact on product sales, in other words, consumers pay more attention to the number of positive product reviews, which will attract consumers to buy the products.

(3) There are significant positive correlation between product sales and the number of online five-star comments. This conclusion is consistent with previous research conclusion of film critics. And the numbers of other stars have no obvious impact on product sales.

(4) There is no significant positive correlation between product sales and evaluation grades. According to previous studies, the reason is that consumers are more focused on the reviews and quantity than evaluation grades.

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