The Improved C2C E-Commerce Credit Model ----A Case Study of Taobao

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Abstract. E-commerce has developed rapidly in recent years; the credit problems bring a lot of trouble to consumers. This paper has taken taobao as an example, found out the existing problems, and improved the index system by removing the logistics indicators and taking transaction time and transaction amount into consideration and using weight analysis with AHP method to establish a new credit model. Finally, we have made an empirical analysis by comparing the existing evaluation model and the improved model, the result shows that our new model is more efficient and practical.

Introduction

China Internet Network Information Center (CNNIC) released the latest "Statistical Report of China Internet Development", the report shows that as of June 2014, China's online shopping users reached 332 million, compared with that in 2013, an increase of 60.6 million, with the growth rate of 22.37% [1].

Although China's e-commerce has great development, the trust problem has been existed for a long time. Lee and Turban through investigation and study found that consumers were not shopping online and one of the main reasons is the lack of trust [2]. With more and more new problems about the integrity and service of the e-commerce supplier, to improve users' trust in e-commerce that involves e-commerce credit evaluation.

The existing accumulation model

At present, taobao credit evaluation system which is mainly consists of three indicators, respectively is: the extent consistent with the picture, service attitude and delivery speed. After the buyer confirm receipt, buyers give their evaluation to sellers. The credits of both sides will be calculated according to the accumulation model, to reflect the user's credit status, so that as a reference for other buyers to make choices. Accumulation model shows the credit score of both parties simply and intuitive, to some extent, which can be taken as reference to both parties.

Current evaluation model of C2C e-commerce sites, credit rating established good, average, bad three gears, corresponding to the score of +1, 0, -1, the interval of span and simply accumulative scores, as a result to the information provided is too vague [3]. For example, a seller got 100 "good", while another seller got 200 "good", 100 "bad". In this case, both the seller's credit situation should be different, even vary widely, but the credit accumulative total value is the same, this model is difficult to reflect the seller's real credit value [4,5]. At the same time, there is no account of the transaction amount, which has led users to credit hype [6]; there is no consider of the validity of transaction time, resulting in new and old seller cannot compete in a fair trading environment, make the new one tend to grow slowly due to the beginning of a low credit score, which maybe prompt new users credit hype to improve their credit score.

The improved credit model

The improved evaluation index

The choice of evaluation index is very important to the empirical analysis result, when to select indicators, following the scientific, systematic, operability, decision-making, representative, and the principle of independence, seeks a more comprehensive, truthful and complete reflection of the seller credit rating situation[7]. Therefore, evaluation index system of this paper is shown in table 1.

Table 1. the Credit Evaluation Index System

	first class indicators	second class indicators
The credit evaluation index system	Product quality A_1	the degree of match the description A_{11}
		Product quality A_{12}
		Reasonable price A_{13}
	Service quality A_2	Pre-sale service A_{21}
		Return or exchange service A_{22}
		After-sale service A_{23}
	Delivery quality A_3	Delivery speed A_{31}
		Delivery accuracy A_{32}

Evaluation system is established in this paper does not consider the logistics factors, because the logistics is outsourced to the third party logistics enterprises. Due to the small scale of China's third-party logistics[8], inadequate logistics infrastructure capacity, low level of information technology, the development degree of the third party logistics cannot decided by e-commerce.

Index weigh determination

Determining weight of each index system in the credit evaluation model is very important, because the weight directly affects both trade credit value and the final evaluation result. This paper used the mature AHP method to determine every index weight. Based on the above, using AHP method to determine the weight of the index system. Build the target layer, criterion layer and measure layer three-level hierarchical structure model. This paper uses the 9 scaling method, by consulting the opinions of relevant experts to get the following judgment matrix as shown in table2.

Table 2. Judgment Matrix of the Seller Credit Value

The credit value of seller (A)	A_1	A_2	A_3
A_1	1	5	3
A_2	1/5	1	1/4
A_3	1/3	4	1

The judgment matrix of seller credit value A ,the judgment matrix of A1, the judgment matrix of A2, The judgment matrix of A3 is M_1, N_1, N_2, N_3

$$M_1=\begin{pmatrix}1 & 5 & 3\\ 1/5 & 1 & 1/4\\ 1/3 & 4 & 1\end{pmatrix},\quad N_1=\begin{pmatrix}1 & 1/4 & 3\\ 4 & 1 & 5\\ 1/3 & 1/5 & 1\end{pmatrix},\quad N_2=\begin{pmatrix}1 & 1/6 & 1/5\\ 6 & 1 & 3\\ 5 & 1/3 & 1\end{pmatrix},\quad N_3=\begin{pmatrix}1 & 2\\ 1/2 & 1\end{pmatrix}$$

Thus we could get the weight of each index are shown in the table 3:

Table 3. the weight if each index

	first class indicators	second class indicators
The credit evaluation index system	Product quality A_1 0.6267	the degree of match the description A_{11} 0.2255
		Product quality A_{12} 0.6738
		Reasonable price A_{13} 0.1007
	Service quality A_2 0.0936	Pre-sale service A_{21} 0.078
		Return or exchange service A_{22} 0.6348
		After-sale service A_{23} 0.2872
	Delivery quality A_3 0.2797	Delivery speed A_{31} 0.6667
		Delivery accuracy A_{32} 0.3333

Table 4. Wigeht of transaction amount

Transaction Amount (m)	Weight(W_m)
0-100	0.2
100-200	0.4
200-500	0.6
500-1000	0.8
>1000	1

Table5. Weight of transaction time

transaction time (t)	Weight (W_t)
one week	1
one week-two weeks	0.9
two weeks-one month	0.7
one month-six months	0.5
before six months	0.3

Some speculative sellers at the beginning of the opening, using a large number of small virtual goods transactions, in order to rapidly improve the store credit. This article will give a weight of transaction amount, make the reasonable definition, as shown in table 4. The weight of transaction time is as shown in table5.

Seller accumulated credit

$$C_n = w_t * R_n + C_{n-1} \quad (1)$$

C_n is the seller total credit after the nth trading, C_{n-1} is the seller total credit after the n-1th trading, R_n is the seller credit value after the nth trading.

Empirical analysis

Select 30 groups trading datas as samples. For the convenience of calculation and comparison with taobao's original model, we assume that the seller's original credit base is 0. By comparing taobao's credit evaluation model and the improved credit model, the result is shown in Table 6. The trend chart of two models is shown by Figure 1.

Table 6.The result of taobao model and the new model

No.	Time	W_1	Transaction Amount	W_m	Credit value of taobao	Accumulation value of taobao	Credit value of new model	Accumulation value of new model
1	one month-six months	0.5	150	0.4	1	1	0.43744	0.43744
2		0.5	210	0.6	1	2	0.97602	0.92545
3		0.5	108	0.4	1	3	0.8	1.32545
4		0.5	320	0.6	1	4	1.03218	1.84154
5		0.5	250	0.6	1	5	0.82398	2.25353
6		0.5	480	0.6	0	5	0.26436	2.38571
7		0.5	310	0.6	1	6	1.14384	2.95763
8		0.5	90	0.2	1	7	0.27466	3.09496
9		0.5	350	0.6	1	8	1.2	3.69496
10		0.5	210	0.6	1	9	1.2	4.29496
11		0.5	250	0.6	-1	8	-0.48768	4.05112
12		0.5	330	0.6	1	9	1.2	4.65112
13		0.5	120	0.4	1	10	0.76256	5.0324
14	two weeks-one month	0.7	80	0.2	1	11	0.4	5.3124
15		0.7	210	0.6	1	12	0.82398	5.889186
16		0.7	190	0.4	1	13	0.76256	6.422978
17		0.7	180	0.4	1	14	0.8	6.982978
18		0.7	210	0.6	1	15	0.82398	7.559764
19		0.7	230	0.6	0	15	0.65616	8.019076
20		0.7	320	0.6	1	16	1.2	8.859076
21	one week-two weeks	0.9	88	0.2	1	17	0.4	9.219076
22		0.9	102	0.4	1	18	0.76256	9.90538
23		0.9	320	0.6	1	19	0.82398	10.64696
24		0.9	210	0.6	0	19	0.28014	10.89909
25		0.9	155	0.4	1	20	0.68812	11.5184
26		0.9	188	0.4	1	21	0.54932	12.01278
27	one week	1	320	0.6	1	22	0.82398	12.83676
28		1	440	0.6	1	23	1.2	14.03676
29		1	130	0.4	-1	22	-0.437	13.59976
30		1	360	0.6	1	23	0.82398	14.42374

Combined with Table 6 and Figure 1, we can draw the following conclusions: (1) For taobao's model, after each transaction, the final credit value of only1, 0, -1 optional three values, the credit value of this improved model are more dispersed, showing a gradient of credit value, differentiated.
(2)This new model solves the problem that the score of 200 "good" and 100 "bad" is same as that of 100 "good". (3) The improved model in the beginning stage of the curve, the slope is significantly less than the taobao model, which explained the credit value of seller does not much affect in the initial stage. On one hand, the improved model reduce the barriers to entry for new sellers, while for new sellers, is more equitable; on the other hand, this new model prevent the seller from frequent small transactions that in order to improve credit rapidly.

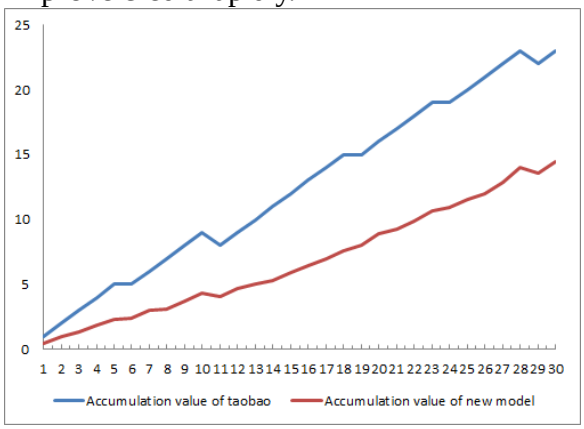

Fig.1. The trend chart of two models

Conclusion

This paper has identified the advantages and disadvantage of taobao credit evaluation system, taobao credit evaluation system cannot effectively prevent credit hype, also because of taobao model doesn't deal with the history credit scores effectively, as a result that the old seller holds an absolute advantage in the trading environment than new ones, this unfair competition in return increase credit hype. This is a vicious circle. This paper on the basis of C2C e-commerce credit evaluation model and summary the problems of the existing model, then find ways to improve it by taking transaction time and transaction amount into account, and give weight to these two factors, and using the method of AHP to determine weight of every index, then the improved model is established. At last, this paper through the empirical analysis to verify the feasibility and advantage of the improved model, which provide a reference for credit evaluation of E-commerce.

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