基于 C2C 的电子商务信用体系研究①

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A Model of the C2C Credit Evaluation System

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Abstract: Credit problem is the main bottleneck which hinders the development of e-commerce. This paper analyzes the current representative C2C credit evaluation models of Taobao and Youa, and proposes an improved model. The improved model uses a multi-standard evaluation system and new credit rating rules. And the evaluation algorithm considers the score of multi-standards, category and price of the commodity together, using a weighted system to calculate the credit score then to determine the credit rating. It solves the main problems which the current C2C credit rating algorithms haven't settled. In addition, the model puts forward some identification measures of false trading, the ID verification rules, and a third-party credit certification center, which partly solve the credit fraud problems arising from the credit island and credit speculation. Finally, the paper compares the improved model with current models to show its superiority.

Key words: e-commerce; C2C; credit evaluation

1 Introduction

With the popularization of the Internet, e-commerce is developing rapidly. "The 23rd China Internet Development Statistics Report [1]" showed that up to Jan. 13, 2009, the number of China's Internet users had reached 298 million, and 24.8% of them use online shopping. E-commerce has been one of the top ten network applications. It has occupies a certain position in netizens' life.

Nowadays, C2C is the most active mode of Chinese e-commerce. But the anonymous system of online transactions can easily lead to the confidence problem, which impedes the transactions. Hence, establishing and perfecting the credit evaluation system is very important for the development of C2C e-commerce.

2 Current C2C Credit Evaluation System Models and Their Problems

The credit evaluation system for C2C e-commerce is a system that can reflect the user's credit by calculating (sum up or average of) the feedback evaluations of each transaction. As a tool of spreading credit information, its purpose is to help the two sides of trading acquaint each other with the credit conditions, in order to reduce transaction risks and increase transaction rate [2].

At present, many C2C e-commerce websites have set up their own credit evaluation systems, such as Taobao[3], Baidu Youa[4], eBay[5], Paipai[6], etc. Each of them has something different with the others. In China, Taobao and Baidu Youa are the most representative ones.

2.1 The credit evaluation system of taobao

Taobao separates the credit rating of seller and buyer. The evaluation is divided into three levels of "positive", "neutral", and "negative", which correspond to the score of +1, 0, and -1. For each successful transaction, users can give an evaluation of credit rating to each other as a feedback within a validity period. The evalua-

tion will take effect after the buyer and the seller-evaluates each other. And the sum of all the buying (or selling) scores is the credit score of the buyer (or seller), which is used to determine his credit level. In addition, the website also provides a percentage of positive rating for reference.

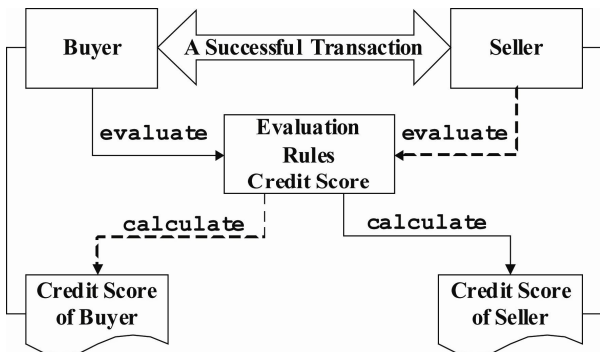Its credit evaluation model is shown in Fig.1 [7].

Fig.1 The credit evaluation model of Taobao

2.2 The credit evaluation system of Baidu Youa

Compared with Taobao, Baidu Youa which officially initiated in October 2008 had done some improvements in its credit evaluation system. Youa adopts the same rule of "separating credits as the seller and the buyer" and the three levels of credit rating that are named as "satisfied", "medium" and "unsatisfied". What the difference is, the buyers of Youa mark a satisfaction value (6 levels of a percentile value) to each other after successful transactions, and the credit rating is relative to the satisfaction value according to the following rules: "satisfied" corresponds to the satisfaction value of 100, 90 and 80 degrees; "medium" corresponds to 60 and 40 degrees; "unsatisfied" corresponds to 20 degrees. The arithmetic average of satisfaction values that the seller got in the last 6 month is the satisfaction score of him, which is updateing dynamically; and a price-weighted score of all the credit rating he got is the overall credit score, which is cumulative.

In addition, Youa achieves a multi-standard evaluation system, which is a powerful complement to the transaction evaluation. While evaluating the satisfaction value, the buyer can evaluate in three aspects - the extent that the commodity consistent with the description on the web, the service attitude of the seller, and the speed of

delivery - with satisfaction stars from 1 to 5. 1 star refers to "should be improved" and 5 stars refer to "perfect". The multi-standard stars are only concerned with the commodity, and has nothing to do with the satisfaction value. If a buyer hasn't marked the stars, the multi-standard evaluation will not be credited to the overall satisfaction evaluation of the commodity.

In general, the credit evaluation system of Youa is shown in Fig.2. The scores in yellow bubbles are made by users.
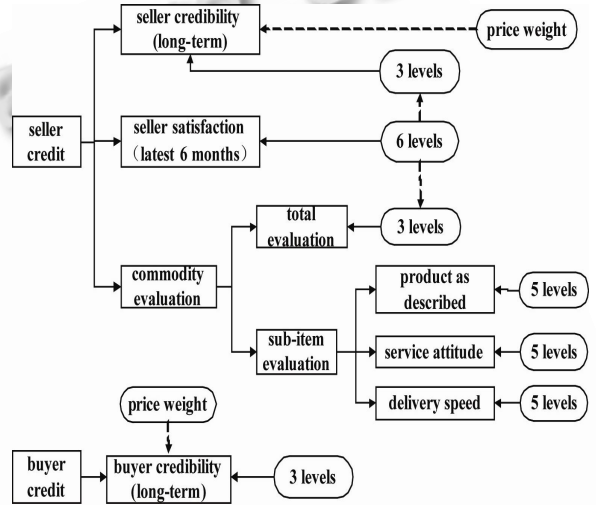

Fig.2 The credit evaluation system of Youa

However, Taobao has improved its credit evaluation system in February 2009, which is similar with Youa's. For ease of description, in this paper we will name this model as Youa Model, and the old model which Taobao used as Taobao Model.

2.3 The problems in current credit evaluation systems

According to the analysis of the credit evaluation system of Taobao and Youa, we can find out that the current evaluation systems have some problems as follows:

(1) ID verification is too simple.

Anonymity is one of the roots that lead to the e-commerce credibility problem. In China, most of the e-commerce websites have their own ID verification systems, but they are simple. Although convenient to users, they provide an opportunity for racketeers.

Current C2C websites provide that the sellers must be ID verified while buyers needn't. ID verification means, to provide your name, resident ID number (or passport number), phone number, address, and bank

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account in order to make your identity to be verified [8]. This helps buyers feel more confident when trading with sellers. In practice, however, it plays a limited role. For example, people can use one resident ID number to register a number of username. If one of them has been detected as fraud, the others are still useful or he can register a new username. Similarly, a faithless seller's phone number maybe not true, and so is his resident ID number. Thus the ID verification system loses its role.

(2) Credit rating is unscientific.

Only three levels of "positive", "neutral", and "negative" sometimes are unable to reflect the buyer's assessment accurately. Such simple partition of rating can not reflect the quality of commodities, the service of the seller and the speed of delivery respectively and clearly [7].

Compared with the Taobao Model, Youa Model is much better: It gives three standards to show the satisfaction of the commodities. But these standards have nothing to do with the credit evaluation. In other words, the buyer can give a "positive (satisfied)" rating in credit evaluation while setting the three standards at the worst level. This is obviously unscientific.

(3) Credit calculation is irrational.

Most of the sellers with a high credit score sell commodities at a low price. Because of the independence of the price, the credit rating scores that he got from each transaction, no matter it is low-priced or high-priced, are same. Thus, a seller can increase his credit score through selling low-priced commodities quickly, and then sell high-priced commodities after he reached a high score [7].

Youa Model improves this calculation into price-weighted, but the weighted algorithm is simple, and the score is not related to the category of the commodity. It is still not rational enough.

(4) The authenticity and timeliness of evaluations are questionable.

According to the current credit rating rules, the evaluation will take effect after the buyer and the seller evaluates each other. In this instance, some of the sellers do not evaluate the buyers whom they think will give them a negative rating in order to keep a high rate of positive ratings, because the negative feedbacks can not take effect immediately [8].

Another point is that, the current systems allow users to evaluate each other only after a successful transaction. The two sides of a returned purchase will not get evaluations. So the seller can ask buyer to return the purchase if he found it is not as said or is imitation in order to reject negative ratings. This would also mislead the new buyers.

What's more, the system will automatically give one user a default rating of "positive" if the other hasn't evaluated him in the validity period after the transaction. So the credit score is greatly affected. If a user receives a considerable portion of the evaluations made by the system, then the authenticity of the evaluation is questionable[8].

(5) The credit island[9].

Because the current credit evaluation systems are all designed and managed by different C2C e-commerce websites themselves, the websites can not share credit information with each other. A user may have different reputations in different websites, but what we can inquire about is just one of them, not a comprehensive assessment.

3　An Improved C2C Credit Evaluation System Model

In order to solve these problems we have talked above, we designed an improved credit evaluation model, as shown in Fig.3.

3.1 ID verification rules

In the current system, the sellers need ID verification, while the buyers don't. A resident ID number can register multiple accounts at one website. In this case, a seller can use other accounts to buy commodities from himself and make evaluations in order to increase his credit score. Of course his credit information is not the true, and it will mislead the buyers. Furthermore, the seller can use other accounts to sell commodities when a certain account has been detected as fraud.

In order to avoid the occurrence of the above, in the improvement system model, we restricted a resident ID number to one account on an e-commerce website. And an account can set up one shop; a shop may sell many categories of commodities.
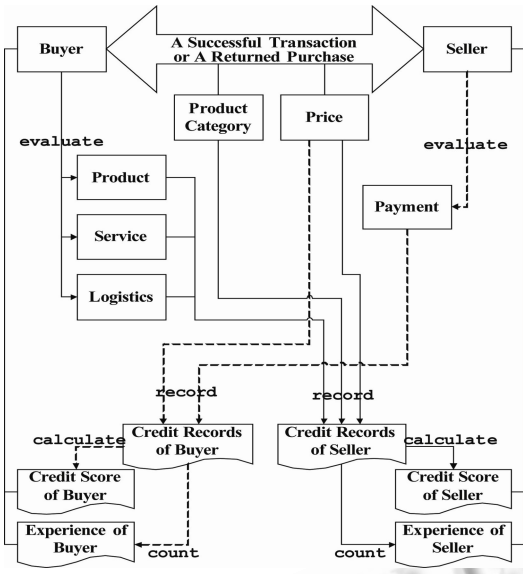
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Fig.3　An improved credit evaluation model

3.2 The credit evaluation index and rating rules

Credit evaluation index system is the basis of credit ratings. Through the measurements of a number of key indicators, we can express the credit of the user in a particular aspect objectively, impartially and scientifically. Therefore, the indicators must be able to reflect the content of the evaluation well.

Here we propose the indicators[10,11] of C2C credit ratings as shown in Table 1.

Table 1　The credit evaluation index system

Role	First Order Assessment Index	Secondary Assessment Index
The Seller	Product	Item as described
		Appearance & packaging
		Quality & shelf life
	Service	Courtesy & friendliness
		Service speed
		After service
	Logistics	Speed & quality
The Buyer	Payment	Pay in time

Each secondary assessment index has five grades, which is, very good (100), good (75), medium (50), poor (25), and very poor (0). These are evaluated by the user. And the scores of first order assessment indexes are calculated by the system, which is a weighted sum of the secondary assessment indexes for each. These indicate the user's credit as a seller or a buyer.

All the buyers and sellers can give an evaluation to

each other after a successful transaction or a returned purchase (canceled transactions are not included). And they can make a text comment while evaluating. Once an evaluation is made, it takes effect immediately. The evaluation period is a certain time period after the successful transaction (or returned purchase), e.g. 30 days. If the user hasn't made his evaluation in time, he abstained. Abstentions are not included in the calculation of credit score, but included in the statistics. This can avoid the situation that some users delay or reject bad evaluations intentionally, or a default rating of positive given by the system.

3.3 Credit calculation rules

The credit rating of seller and buyer are separated. The credit evaluation system is shown in Fig.4, in which the scores in yellow bubbles are made by users.
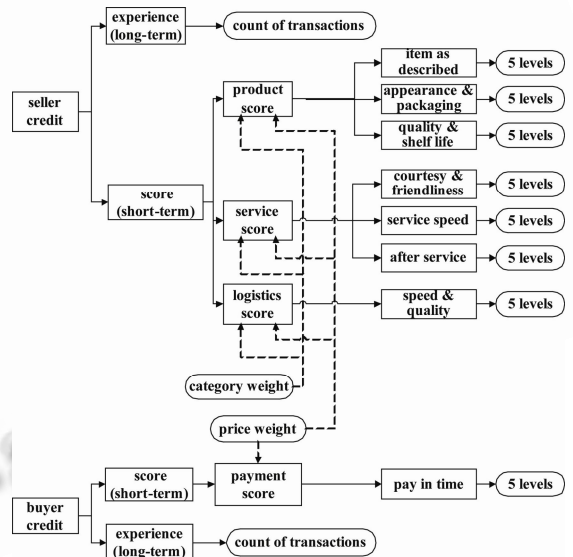

Fig.4　The improved credit evaluation system

The improved evaluation system model binds the credit ratings of the seller with the commodity category and the price together. The three scores of first order assessment index show the credit of a specific commodity. Each of the three is an arithmetic average of that was made by different buyers.

Relatively, the three scores of the seller are calculated by this expression respectively:

$$Score = \frac{\sum_{EachEvaluation} S \times W_p \times W_c}{\sum_{EachEvaluation} W_p \times W_c} \tag{1}$$

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It is a weighted average (weighted by the price and category of the commodity). Here we donate S as the first order index's score, W_p as price weight, and W_c as category weight of each evaluation. Thus, the score is in the range of 0 to 100.

After the three scores have been figured out, the weighted sum of them is an overall value of the seller's credit. For example, product score weights 0.6, service score weights 0.3, and logistics score weights 0.1. In addition, a percentage of effective evaluation is provided for reference.

The buyer's credit is calculated by the payment score, which is the price-weighted average of all the evaluations he got as a buyer.

Here we define recent 6 month as a validity period. Only the evaluations which are made in the validity period will be calculated. And the count of all the successful evaluations (including abstentions), that is, the count of successful transactions (recorded as +1 for each) and returned purchases (recorded as -1 for each) since the user registered is merely to indicate the experience of the user (as a buyer or seller). Thus, users' credit is updated dynamically, and credit speculation can be avoided to some extent.

3.4 False trading identification

Buyers are paying more and more attention to the online sellers' credit. So some sellers utilize the loopholes of the evaluation rules for credit speculation. Credit speculation refers to that, both the buyer and seller make a "positive" rating to each other in the absence of actual transactions for the purpose of improving their credit rating rapidly [4].

Here we take the following two measures to prevent false trading:

(1) There are two methods to determine whether an actual transaction is real or fictitious. One is to confirm the time interval of transportation; the other is to check the authenticity of the logistics order. Nowadays, most of the logistics orders can be inquiries on the Internet by order number, so we can use the time and place of the package to determine the authenticity. In this case, the e-commerce websites should be connected to the logistics order query systems, then it will be convenient for inquiring.

(2) For virtual commodities (such as game card, prepaid card, etc.), it is relatively much more difficult to determine whether it is a false trading. In this paper, we suggest to reduce virtual commodity transactions: If a seller wants to sell virtual commodities, he must deliver the corresponding proof of sales certificate.

3.5 The Third-party credit certification center

At present, most of the researchers are interested in putting forward a new model or algorithm to solve cumulative or average problems in the current credit evaluation models. However, the studies of the credit island are infrequent. In order to solve the credit island problem, we suggest a credit inquiry platform based on the third-party credit certification center.

This model prescribes that a resident ID number can only apply for one account on an e-commerce website, which guarantees the uniqueness of user accounts. Thus, the credit of a person in all business transactions on each website can be inquired by his resident ID number uniquely.

The credit evaluations of users are stored in the local server of each website. The third-party credit certification center can inquire information from all the websites through resident ID number and figure out the result (weighted or averaged) as a comprehensive credit score which can not be changed [9].

Furthermore, the third-party center can inquire not only the user's credits on all of the e-commerce websites, but also his bank credit records; not only the credit of individual users, but also of registered enterprises. It can be used not only as a credit assessment platform, but also as a platform with the combination of ID verification. In such a unified credit certification platform, the user's credit information will be reflected comprehensively and synthetically.

3.6 Contrasts and analysis

In order to confirm the superiority of the improved model, we compare it with the Taobao Model and Youa Model. As shown in Table 2.

The contrast shows: The multi-standard index system is more scientific. Immediate effect, evaluations of returned purchases, and abstain rules make the evaluations more accurate and timely. Price and category-weighted algorithm, dynamic calculation rules, and false trading identification methods make credit speculation to be more difficult to succeed. The uniqueness of ID verification and the third-party

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certification center makes personal credit information comprehensive and reliable. Thus, we can declare that the improved model is more rational, scientific and reliable.

Table 2　Contrasts of the three models

	Taobao Model	Youa Model	Improved Model
ID Verification Rules	Simple: a resident ID number to many accounts, one of them can be a seller (need ID verification)	Simple: a resident ID number to many accounts, one of them can be a seller (need ID verification)	Unique: a resident ID number corresponds to one account, ID verified when register
Credit as a Buyer/Seller	Separated	Separated	Separated
Rating Rules of Evaluation	Simple: 3 levels of overall evaluation	Improved: 6 levels; Appends multi-standard evaluation, but it is independent	Scientific: 5 levels of multi-standard evaluation, and it is related to overall credit evaluation
Evaluation Restriction	Only successful transactions	Only successful transactions	Successful transactions & returned purchases
When Evaluation Take Effect	After buyer/seller evaluates each other	After buyer/seller evaluates each other	Immediately
Default Evaluation	A positive rating	A positive rating	Abstained
Credit Calculation Rules	Static, cumulative	Both cumulative & dynamic	Dynamic; a cumulative score for reference
Price & Categories of Commodity	Independent	Price weighted; Separate actual and virtual	Both weighted
Control of Credit Speculation	Rely on users' report and verification	Rely on users' report and verification	Has false trading identification methods
Reliability & Precision	Inaccurate	A little better	Strict & exact

4　Conclusions

　　Based on the analysis of the current C2C credit evaluation models and their problems, this paper suggests an improved credit evaluation model and its evaluation algorithm. The new algorithm considers the score of multi-standards, category and price of the commodity together, using a weighted system to calculate the credit score then to determine the credit rating. It solves the main problems which the current C2C credit rating algorithms haven't settled. In addition, this paper puts forward some identification measures of false trading and a third-party credit certification center, which partly solve the credit fraud problems arising from the credit island and credit speculation. Finally, a contrast was made to show its superiority.

　　Although this model has a lot of improvements, there are still some inadequacies. For example, the scientificity and effectivity of the evaluation index system should be further researched; the credit calculation algorithm and the weights are not described and defined clearly; and the third-party credit certification center is also difficult to achieve.

References

1 CNNIC. The 23rd China Internet Development Statistics Report. 2009. www.cnnic.cn.

2 Wang HW, Fu J. A Technology Adoption Model of General Trust Factors in Online Shopping. In: Huang JH, ed. Information Technology Adoption: Theories and Practice in China. Proceedings of CNAIS 2006 Symposium on IT/IS Adoption. Chengdu: The Press of UEST China, 2006:109－112.

3 Taobao.www.taobao.com.

4 Baidu Youa. youa.baidu.com.

5 eBay. www.ebay.com.

6 Paipai. www.paipai.com.

7 Pu CH, An J, Fang MQ. Research on Credit Evaluation Model and Algorithm for C2C E-commerce Website. Journal of Information, 2007,(8):105－107.

8 Hong Q, He G.. Analysis and Research on Credit Evaluation Model for C2C E-commerce Website. China Management Informationization, 2008,11(6):96－98.

9 Zhu SL, Yang B, Zhang WZ. A Reputation System Based-on the Third-party. Agriculture Network Information, 2007,(5):54－56.

10 Resnick P, Zeckhauser R. Trust Among Strangers in Internet Transactions: Empirical Analysis of eBay's Reputation System. Advances in Applied Microeconomics, 2002,1:127－157.

11 Chang E, Hussain F, Dillon T. Trust and Reputation for Service-oriented Environments: Technologies for Building Business Intelligence and Consumer Confidence. New York: John Wiley & Sons, 2006: 235－240.