

Research on Enterprises Reputation Evaluation Based on B2B Transaction Platform

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Abstract

Based on traders' goods, service, the way of transaction and transaction time, the paper establishes the B2B traders' reputation evaluation index system, and applies the Analytic Hierarchy Process to give weight. Using the reputation evaluation model, the paper takes into account evaluators' own reputation, transaction amount, transaction time and other factors, dynamically adjusting reputation value and generating the reputation value of traders which is as the basis for the traders to choose the trading partners, and to promote the development of B2B e-commerce.

Key words: B2B; Traders; Enterprises reputation; Evaluation

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INTRODUCTION

With the rapid development of economy, the mode of face to face negotiation makes the transaction more and more limited by space, low efficiency and high

cost between enterprises (LENG & GAO, 2010), B2B trading platform provides a broader trading platform for enterprises. Enterprises can get variety supply and demand information by B2B and cooperate with the dispersed geographical location enterprise nodes, so to greatly expand the transaction and the cooperation scope of B2B nodes (FU, QIN & HUANG, 2011). However, when the nodes of supply and demand net choose the partners of transaction and cooperation, it is necessary to consider risks this may lead to, for example, the operation ability, goods quality, with or without malicious breach of contract and other aspects of the other side. In a word, it is necessary to consider the other side's reputation. The sharing of reputation information of enterprises is the implement foundation of the B2B e-commerce mode, every enterprise node is willing to have transaction and cooperation with partners who have a good reputation (HUANG, 2005). Reputation evaluation belongs to another security measures, which is different from encryption and firewall to protect the information confidentiality and integrity technical (ZHAO, WU, JIANG & HU, 2011). Enterprises can conveniently learn the reputation of transaction partners by the system of reputation evaluation to efficiency control the enterprises' opportunism behavior and reduce the transaction risk (HU & WU, 2011). The theory and the practice field have already begun to study and use reputation evaluation mode. In the theoretical field, there is still lack of depth study of reputation evaluation of the B2B enterprises nodes; in the practical field, application model is relatively simple and the evaluation is not comprehensive enough to fully reflect the reputation of the each enterprise. The paper establishes the enterprises' evaluation index system of B2B transaction websites, and explores the calculation method of enterprises reputation based on which to provide decision reference for effective operation.

1. ESTABLISHMENT OF THE B2B ENTERPRISES' REPUTATION EVALUATION INDEX SYSTEM

1.1 Selecting the Principles of the Reputation Evaluation Index

Scientific and rational selection of reputation evaluation index is to ensure that traders' reputation evaluation results are objective and effective prerequisite based on the B2B websites. Following principles are needed to establish a scientific and rational index evaluation system:

- (1) **Accuracy principle:** Select the evaluation index which can efficiently reflect the reputation of the parties in the transaction.
- (2) **Dynamic principle:** Select the reputation evaluation index which can make traders have new trading expectations in order to prompt traders to improve their reputation level constantly.
- (3) **Measurable principle:** In order to quantitatively handle reputation evaluation results, therefore, the selected

reputation evaluation index should be convenient to be applied into analysis and calculation.

1.2 The Composition of the Index System of the Reputation Evaluation

Based on the principles discussed above, starting from the essential connotation of the reputation, combining with the characteristics of B2B trading platform, and learning from the basis of the existing reputation evaluation methods, from two points of view of buyer and seller to see the reputation evaluation system of B2B enterprises, seller reputation includes three primary indexes including product reputation and eight secondary indexes consist of product quality, meanwhile, buyer reputation includes two primary indexes including payment reputation and three secondary indexes including payment method. Due to the different importance of each indexes in the process of the reputation evaluation, we need to determine the weight of the each indexes. We use the analytic hierarchy process to determine the index weight, getting the evaluation indexes and their weights shown in Table 1.

Table 1
Indexes and Weight of Reputation Evaluation of Both Parties

Evaluation object	Primary index	Secondary index
Seller reputation	Product reputation (0.72)	Products quality (0.48)
		Products number (0.22)
		Products price (0.20)
		Products description (0.10)
Seller reputation	Service reputation (0.18)	Consultation and communication (0.48)
		After-sales service (0.52)
Buyer reputation	Reputation of transaction process (0.10)	Transaction method (0.51)
		Transaction time (0.49)
		Payment method (0.38)
		Payment time (0.62)
Buyer reputation	Payment reputation (0.80)	Communication and feedback (1.00)
		Feedback reputation (0.20)

According to the results of the weights, we can see that for the seller, the indicator which affects their reputation the most is the "product reputation", the weight is the greatest overall; the secondary indicator "product quality" belongs to which is the most concern of buyers. For the buyers, the weight of index "payment reputation" is the largest, and the buyers are most concerned about the secondary indicator "payment time". It reflects the focused transaction of the traders when trading in an e-commerce trading center.

2. REPUTATION EVALUATION PROCESS BASED ON THE TRADERS OF B2B WEBSITE

2.1 The Establishment of the Reputation Evaluation Grades

The evaluation level is the comment grades given by both buyer and seller to each other according to the reputation evaluation indexes and degree of satisfaction after the completion of the transaction (ZHANG & CHEN, 2011). Normally, some existing grades of reputation evaluation

are divided into three levels of good, medium and poor, it cannot make a detailed assessment for the reputation. Some scholars believe that in most cases the reputation grades which are divided into will five or seven will be better (YANG, HU & ZHANG, 2005). Therefore, we divide the reputation into seven levels, its value interval is (0, 1.00] and which is shown in Table 2.

Table 2
The Reputation Grades and Its Value

Best	(0.90, 1.00]
Good	(0.80, 0.90]
Acceptable	(0.60, 0.80]
Normal	(0.40, 0.60]
Unsatisfactory	(0.30, 0.40]
Bad	(0.20, 0.30]
Poor	(0, 0.20]

2.2 The Calculation of Subjective Evaluation Value

Based on the evaluation levels of both sides, the two parties evaluate each other’s reputation according to the transaction. The primary index is got as the product of weights of secondary indexes and the reputation grades value, and this calculation process is repeated to get the subjective evaluation value, with range of (0,1.00]. In order to reflect the reputation of both parties more objectively and truly, subjective factors need to be excluded, which means that the subjective evaluation value requires a series of processing to generate the final objective and valid reputation value.

2.3 The Calculation of the Trusted Evaluation Value

Trusted evaluation value is the obtained value after processing of the subjective evaluation value. In network transaction, on the one hand, traders themselves have certain reputation values; on the other hand there may be deceptive behaviors. In order to minimize the impact of these two kinds of factors on the subjective evaluation value, it needs to be further processed with the following formulas:

$$R_3 = R_1 \times R_2 + (1 - R_2) \times R_1 \quad R_1 \geq K \quad (1)$$

$$R_3 = K + (R_2 - k) \times e^{-(K/R_1)} \quad R_1 < K \quad (2)$$

In the formulas, R_1 is the current reputation value of trading party A; R_2 is the subjective evaluation value A makes for the trading party B; R_3 is the calculated trusted evaluation value after trading party A makes the subjective evaluation for trading party B; K is the trusted threshold, which can adjust the influence of the above two factors, and its value is determined by B2B actual needs.

2.4 Reputation Evaluation Values Calculation Considering the Volume of Transactions

Consider the volume of transactions of the reputation evaluation values is that the trusted evaluation values combine with the current volume of transactions, and get the value by a series of calculation process. Currently most of the reputation evaluation model ignores the influence of volume of transactions to the evaluation values, to make the evaluation value is closer to the objective reality, based on the trusted evaluation value, transaction volume coefficient of the introduction is as the variable impact such as shown in Table 3, its value is determined by the average transaction volume of each B2B trading center.

Table 3
Transaction Volume Coefficient Table

Amount coefficient	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Volume of transactions (Ten thousand Yuan)	< 1	1-10	10-40	40-100	100-250	250-350	350-450	450-550	> 550

After considering the volume of transactions, the reputation evaluation value adjusts as follows:

$$R_4 = R_3^{1-(V/2)} \quad (3)$$

Among them, R_4 is the evaluation value generated from the combination of trusted evaluation value and the volume of transactions, V is the coefficient of transaction volume, and R_3 is trusted evaluation value. If the volume of transactions isn’t taken into account as the traditional algorithm did, trusted evaluation values of many traders may be equal.

2.5 The Calculation of the Overall Reputation Value

The overall reputation value combines the evaluation value of the volume of transactions with the reputation value of the evaluators before this transaction generate reputation value by a certain treatment.

Most traditional reputation evaluation model is to simply accumulate the reputation evaluation of before the traders which may generate some problems. On the one hand, if the traders of high value of reputation evaluation once generate the fraud behaviors, it cannot be reflected by the traditional methods. On the other hand, traders of the low reputation value because of recently entering the B2B website will get fewer opportunities of transactions. In order to avoid the two situations above, based on the above evaluation value, introduce the overall reputation value of the traders, the formula for it is as follows:

$$R_5 = a \times R_0 + b \times R_4 \quad (4)$$

Among them, R_5 is the overall reputation value of the traders, R_0 is reputation value of before trading, and R_4

is the evaluation value combined with volume of transactions, a is the transaction weights before this transaction, b is the weight representative of the transaction. From the psychology and behavior of people, traders are most concerned about the transaction behavior of other traders in recent period, so the weight of a is bigger than b, and a plus b is equal to one. By the experiments conducted by Josang, it shows that when trading weights is 0.6, it can best reflect the conformity of the reputation grades and honesty, so in this paper we set b as 0.6 (Josang, & Tran, 2003).

2.6 The Calculation of Current Reputation Value

In order to avoid the situation that some parties in the transaction will never be rehabilitated after a mistake, it needs to introduce time index to adjust the reputation value, and makes traders who have made mistakes before in the B2B website getting opportunities in the next transaction, at the same time adjusts the trader's reputation value to make the reputation value of the traders to be more objective and reasonable. Current reputation value is calculated by,

$$R_6 = K - (K - R_5) \times e^{-R_5 \times t} \quad (5)$$

Here, $R_5 < K$. In above equation R_6 is the current reputation value of traders; R_5 is the overall reputation value of traders; K is the threshold value of the reputation adjustment; t is time interval of traders last transaction and the current transaction which value is determined according to the actual situation of each B2B websites, the unit of t can be day, month or year. If traders don't have any transaction in a period of time, reputation value can also adjusted by this formula.

CONCLUSIONS

Compared to the traditional reputation evaluation model, the innovation of reputation evaluation model in this paper lies in the following aspects:

- Detailed analysis and processing of the evaluation indexes affecting reputation. It divides the level into two indexes, and uses AHP to determine its weight to construct index system of reputation evaluation of traders.
- The established reputation grades are more detailed. The past reputation grade generally consists of three levels, while the model in this paper divides reputation grades into seven levels, in order to make a more precise evaluation of the traders' reputation.

- Consider the evaluator's own reputation values, by analyzing and processing the subjective evaluation value to get the more comprehensive trusted evaluation value.
- According to different volumes of transaction, the results of reputation evaluation are also different; this combines the reputation evaluation value with volume of transaction together, and makes the calculated reputation value more objective.
- Comprehensively take some of the traders' own situations into account, measure reputation and adjust reputation value constantly and dynamically to make the traders' final reputation value more compatible with the objective reality and the transactions more secure in the B2B website, and thus reduces the risks in the transaction.

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