

The Research on Game Model of Business Incubation Network Trust Problems under Electronic Commerce

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ABSTRACT

Firstly, this paper studies the credit mechanism of business incubation network under E-commerce, on the basis of credit mechanism. We put the method of building incubated enterprises virtual communities and customers virtual communities to increase the B to C e-commerce trust within the business incubation network. Then, on the basis of Game theory analysis the trigger policy of incubated enterprises' dishonesty on the incubation network virtual communities, designing stimulating mechanism and restraint mechanism to ensure enterprise sincere sale on the incubation network virtual communities.

Keywords

business incubation network; electronic commerce; virtual community; trust degree; Game theory

1. INTRODUCTION

E-commerce is the application of information technology at the business field; it can improve trade efficiency in the process. This new business model emerging, making commodity buyers and sellers together via a network connection, various virtual and reality cooperation have become possible. But as e-commerce virtuality has brought transaction risk to two trading parties, which led people to e-commerce transactions such reliance on the decline. Therefore, trust is an important decisive factor of customer behavior, a one of key factor of the success of e-commerce. American avant-garde's chief executive officer Jack Brennan said: "Customer trust is our most valuable asset. Enterprises are unable to use advertising and marketing techniques to buy customers trust, enterprises should always think customers to win the trust of customers." The development of trust depending on the contacts experience both customers and sales staff. In e-commerce period, the trust has become more important. CNNIC November 17, 2006 issued by "the investigation reports of Chinese Internet hot spot" that: 53.7% of users do not trust network, due to fear of being cheated to refuse online transactions.

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So the effect of trust problems upon the e-commerce is significant, the trust problems are particularly important to B to C e-commerce. The researchers in different areas, under different backgrounds, had given trust different definitions. Moorman (2005) and others defined trust as "a depending willingness to confidence transaction partners", viewed trust as faith, confidence or trust expectancy of cooperative partners which came into being by reliability, professional or purposefulness of partners. Mayer (2004) and others in the e-business on the basis of trust is defined as: "Based on the expectancy of the other side will be important to complete a particular action, one party is willing to accept the action could lead to injury, instead of having the ability to control the other party." Research on e-commerce trust in literature, the buyer has been considered as placing himself a vulnerable situation of one party, network company is trust object, is attachment of trust and have the opportunity to use one of the main weaknesses. Despite a variety of different literature give out the concept of trust, but with some consensus views: Firstly, uncertainty and perceived risk is the premise of trust, no uncertainty and perceived risk-called trust; Secondly, the general perception of risk is based on the relevant competence, integrity, the directors of the trust friendly. Kim and others define trust initially as the initial all and maintaining relations before loyalty. Trust is a continuous process; its development is an evolving dynamic process, subject to continuous contact with the affected parties. However, the initial trust can not be affected by the experience and contacted, and perhaps over time and repeated exposure to change by the future determined by the degree of contact. In any business, it is very important to build trust. To complete a business transaction, the less understanding of the other side, the level of trust in the higher requirements, the only way to achieve the transaction.

In the e-commerce, the network centered on the incubator, through a series of contracts (including the constitution, agreement, legal contract, etc.) build trust-linked mechanism and operation mechanism in the network members (nodes). The enterprises in the business incubation network are high-tech enterprises, under such conditions can be effectively integrated network organization competitiveness, and reduce production costs and transaction costs, with the completion of the start-up incubator. In the e-commerce, business incubators in the division of labor among members of the network and built a network of interdependent network, network organizations in the coordination among its members rely mainly on market mechanisms and trust mechanism. In the e-commerce, the market

mechanism usually presumes the existence of a strategic distorted expression, in this mechanism, the transactions are random, negotiations are random, can effectively reduce the incubator network members and Ventures' transaction costs.

In e-commerce environment, although the network centered on the business incubator through contracts linked structure and operation mechanism, which is based on trust. Trust could have brought potential effect of this network, attract more external members of the organization around the network, select new members to reduce search costs, and to increase pressure on the existing members of this organization for the network size and structure of the adjustment provided a good foundation. Trust is an effective means in solving block and distorted expression problems, it allows participants of the network for greater risk investment, consultation settles the disputes among members, ensures the relative stability of incubator network.. Business incubators at the core of the network organization's the contract requires not only external constraints, and there should be an inherent incentive effects. In the e-commerce development, the design of contract is the key to build a good self-performance incentive mechanism. Under the conditions of e-commerce, how to build a good self-performance incentive mechanism, network members should be in accordance with the rules of the organization or contract set the goal of nurturing ventures uniformly action. The uncertainty of contract caused contract design which couldn't solve network organization and operation mechanism of linking all the problems, reputation, trust and contract equally important in network. In the e-commerce, trust is the basis of a contract, the normal operation of the network organization can be ensured only on the basis of mutual trust, relying on contracts and common compliance with the code of conduct. Using Game theory to explain that the only Pure Strategy when the Nash Equilibrium Game, its Limited Repeated Games is a balanced outcome of the game still Nash Equilibrium is impossible efficient cooperation results. Two trading parties in the e-commerce transactions are both finite game, leading to the choice of speculative transactions, reduced trust in e-commerce. Using game theory analysis the methods that a B to C e-commerce built sales enterprise virtual community and consumer customers virtual community to increase trust in e-commerce, design the management mechanisms for the members the virtual enterprise and find that the prerequisite conditions and measures to maintain the integrity of transactions.

2. TO CONSTRUCT BUSINESS INCUBATION NETWORK OF VIRTUAL COMMUNITY BASED ON THE TRUST RELATIONSHIP

In the business incubation network, the Internet application is very extensive, E-commerce is developing rapidly. E-commerce development is related closely to the establishment of virtual community, virtual community is the place that some members of the community interested in or around the demand communicates, which use computer networks and communications technology, and build on multi-dimensional space of the virtual communication.

2.1 Restraint Mechanism Design in the Virtual Community Business Trust Sales

In the e-commerce environment, business incubation network virtual communities construct and run as follows:

This paper proposes the establishment of two virtual community idea that incubated enterprises virtual communities and customers virtual communities, running in the community in transactions between trading platform.

The restraint mechanism of incubated enterprises virtual communities. In the business incubation network, the virtual community based on the incubator enterprise object is composed by the incubator enterprises with trust sales quality, the virtual community is the idea of establishing trust sales in customer, the incubator in which plays a vital role. Incubator as a virtual community manager collected a certain amount of corporate bonds to incubator enterprises, managers received customer feedback and complaints and supervision of incubator enterprises. Once an incubator enterprise has fraud acts against the purposes of the community, confiscated the incubator enterprise margin, included in the blacklist and expelled it from the community. Customers virtual community composition and function. In the business incubation network, the customer virtual community is composed by the customers with common value-direction and interests. Through the establishment and management of the virtual community can achieve the following objectives: Provide emotional support, common interest of information sharing, in the contract parties (even if they have never met) product intimacy and social relations, so that users of the existence of a common goal to create an effective environment of trust. In such an environment, the communication of members of the community without the limit of region and time, also among the long-term relationship has been established. Customers virtual community is open, continues to attract new members, so that the transaction could be infinitely possible. Customer virtual community as a whole, the number of transactions made by the two sides into unlimited.

In order to effectively manage the members in the business incubation network virtual community, ensure its trust sales, the author designed the following restraint mechanism: collecting a certain amount of corporate bonds to incubator enterprises, manager (incubator) supervise the behavior of incubator enterprises, once an incubator enterprise has fraud acts against the purposes of the community, not only confiscated the incubator enterprise margin, and adopted the trigger strategy is steeliness strategy. This strategy for the two sides of Game began to actively choose (honesty, trust), if once a member in the incubated enterprise virtual community choose fraud, will be expelled from the community and never included in the blacklist, blacklisted in the information-sharing network. This is probably the enterprise lose forever online sales opportunities because of trust. Using game theory analysis of the restraint mechanism that allows community members in the pursuit of its own profit maximization at the same time to maintain discipline, it should not harm the interests of consumers, thereby enhancing consumer trust in e-commerce. To enable the incubated enterprises trust sales, managers charge the community enterprises margin. Its rules as follows: if the incubated enterprise i trust sale, return the bonds; if the incubated enterprise i has fraud acts in the transaction, confiscated the margin, and adopted the trigger strategy. So the losses of the incubated enterprise i include three components, namely bonds, the profits in the transaction and the future of e-commerce transactions in the expected return. If both sides trust each other, transactions are actively trust transactions, transaction profit B could receive; If the two sides do not trust each other, the transaction will not have, the profit is zero; But, if one side trust,

the other have not trust and taken fraud acts, then trust one loss C , fraud one obtain disloyalty profit C . Assuming that the incubated enterprise i of virtual communities had fraud behavior in the transaction, the manager of virtual communities adopted trigger strategies, and made α for the discount factor of the enterprise i , the margin is D , the expected future transaction income is F . If communities in the Game first choose the fraud behavior at a certain stage, in which its stages receipt is $C - D$, and is not B , it can be a little more current $C - D - B$. But this opportunistic behavior will have "never expelled from the trigger community" punishment, the incubated enterprise i in all stages of subsequent payments are zero. So the profit that the incubated enterprise chooses fraud behavior is $C - D - B - F$, the expected future transaction income is F :

$$F = B + B\alpha + B\alpha^2 + B\alpha^3 + \dots = \frac{B}{1-\alpha} \quad (1)$$

To the e-commerce transactions B to C Game of the incubated enterprise, if every incubated enterprise can be convinced that in a foreseeable future in e-commerce transactions promises to uphold the trust of transactions over fraud transactions to obtain more benefits, community enterprises have to be conscious to do trust transaction, which will not choose fraud.

That is:

$$B > C - D - B - F \quad (2)$$

Substituting (1) into (2), which is:

$$B > C - D - B - \frac{B}{1-\alpha} \quad (3)$$

Formula (3) is the conditions of enterprise choose trust. Transforming type (3) obtains (4) and (5):

$$D > C - 2B - \frac{B}{1-\alpha} \quad (4)$$

$$\alpha > \frac{3}{2} - \frac{C - D}{2(C - D - 2B)} \quad (5)$$

Form (4) can be getting: The margin charged T and the marketing of products profits Q negatively correlated, and also the enterprise discount factor σ negative correlation. Therefore, when the sales profit of products increased, the margin charged reduced; when the expected future income increased, correspondingly the margin charged reduced. Specially, when the product profit reaches a certain level or enterprise pays attention to the expected future income to a certain extent, based on customers virtual communities could offer greater purchasing power, almost no margin collection, community enterprises will be trust sales.

Formula (5) can be getting: The two communities with triggered strategy Game is infinite Game of

Sub-game perfect Nash equilibrium, Pareto Optimum (trust, trust) is corresponding equilibrium path to every stage of a strategy combination. The enterprise discount factor σ and the products profit Q negatively correlated, with the enterprise profits increased, the corresponding decrease the discount factor. Therefore, at the margins and the profit sales of double effect, as long as the customer virtual community to provide purchasing opportunities to generate expectations to the future income, the community enterprise will consciously trust sales.

2.2 Stimulating Mechanism Design in the Virtual Community Business Trust Sales

To ensure that enterprises actively trust transactions, the following stimulating mechanism design: If the enterprise trust sales, give it a trust grade variable β_{ik} , it said that the trust grade variable is the enterprise i after the transaction k . Assuming $\beta_{i0} = 0$, $\beta_{i1} = \beta$, $\beta_{ik} \in (0, 1]$, the discount coefficient λ , correct the enterprise trust grade variable β_{ik} after each transaction, the corrected rule is as follows:

$$\beta_{ik} = \beta_{ik} = \begin{cases} \beta_{ik-1} + \lambda\beta_{ik-1} & \text{when the enterprise trust sales} \\ \beta_{ik-1} - \lambda\beta_{ik-1} & \text{when the enterprise has fraud transaction} \\ 1 & \text{when } \beta_{ik} \geq 1 \end{cases}$$

By the definition of trust, the trust grade variable of virtual community enterprises is an important information whether the enterprise trust sales or not, customers in the virtual community under the same conditions will choose to trust grade variable in the high-level enterprise to have transactions. The enterprise future incomes depend on the trust grade variable, the trust function:

$$F(\beta_{ik}) = \beta_{ik} \times \frac{B}{1-\alpha} \quad (6)$$

When the customer virtual communities could offer greater purchasing power, the income that the enterprises choose trust transaction is:

$$\begin{aligned} U_1 &= B + F(\beta_{ik}) + D = B + \beta_{ik} \times \frac{B}{1-\alpha} + D \\ &= B + (1 + \lambda)\beta_{ik-1} \times \frac{B}{1-\alpha} + D \end{aligned}$$

The income that the enterprises don't choose trust transaction is:

$$\begin{aligned} U_2 &= C + F(\beta_{ik}) = C + \beta_{ik} \times \frac{B}{1-\alpha} \\ &= C + (1 - \lambda)\beta_{ik-1} \times \frac{B}{1-\alpha} \end{aligned}$$

When $U_1 > U_2$, the enterprises choose trust transaction, which is:

$$D > C - B - 2\lambda\beta_{ik-1} \times \frac{B}{1-\alpha} \quad (7)$$

$$C > D + B + 2\lambda\beta_{ik-1} \times \frac{B}{1-\alpha} \quad (8)$$

Formula (6) that the future income of the enterprises in the business incubation network depend on the trust current grade. As customer virtual communities could offer greater purchasing power, the enterprises in the business incubation network to the future income with strong expectations, the establishment of the trust had larger incentives to the enterprises insist on the trust transactions. Formula (7) that set stimulating mechanism of the virtual community trust grade variable in the incubation network, the margin charged by the lowest limit. We can see that, it and the enterprise trust negatively correlated, the higher the trust level, the

lower the charge on the margin. On the restriction of funds, enterprises can improve their level of trust, reduce margin expenditures, and improve using efficiency of funds. Therefore the establishment of the trust had also incentives to the enterprises insist on the trust transactions. Formula(8) that set stimulating mechanism of the virtual community trust grade variable in the incubation network, the relationship between the expected total incomes that enterprises choose trust transactions and disloyalty profit of choice of fraud behavior. From Formula (8), we can see that the higher the trust level, the expected total incomes more than disloyalty profit. In dealing with reputation of the enterprise, the establishment of the trust had incentives to the enterprises insist on the trust transactions.

3. CONCLUSION

When the members of the virtual incubator community free of charge at the margin, fraud transaction is a rational choice; when charged margin more than $C - 2B - F$, trust transaction is a selection to enterprises in the incubation network virtual community. Margin as a compulsive means prevent the phenomena of fraud behavior. As customers based on the expectations of the long-term purchasing power, when the sales enterprise use trigger strategy ,which will be led at every trust transaction stage, reduce the possible occurrence of speculation. Such transactions and the environment of e-commerce virtual communities in the incubation network allows members of the community have intimate relations, the reputation of the enterprise communities in the incubation network represents the reputation of the member, individual members of the poor trust will be refused or eliminate enterprises, which build the trust mechanisms to maintain the trust of the incubation network, thus enhancing the trust of the incubator network B to C e-commerce transactions .

Transactions proceed between the two communities in the enterprise incubation network rather than between two members, despite the number of transactions of members of the community in the incubation network is the limited, but because customers community continuously add new members, the whole transactions of incubation network community do not have a clear time and will be have been working on. This original limited Game changed into the infinitely repeated Game, thus enhancing the trust sales force of the members of incubated enterprise virtual community in the incubation network.

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