

Research on the Integrity Transactions of Online Shopping Under E-Commerce Platform ----game analysis based on the Perspective of rational economic man

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Abstract

With the rapid development of Internet and logistics, the online shopping is more and more getting the favor of Internet users. Its convenience, fast and cost-effective has been recognized by Internet users, but in the rapid development of online shopping today, it also met some bottlenecks; some questions have gradually highlighted, such as incomplete credit system, incomplete legal system and the problem of passing faking imitations for genuine. Based on the case that both parties are rational economic man and their utility maximization is satisfied, this paper uses the method of game theory to analysis the problem of integrity transactions of online shopping.

Key words: Online shopping; Integrity; Game

Introduction

On the tide of transformation from the product type, manufacturing-based to service-oriented in this 21st century, the most important is the honesty. And its problems give economists, sociologists, management theorists a new perspective. Online shopping integrity dealing problems has become a heated topic in e times, and many domestic and foreign scholars and experts have done researches about it.

Professor Weiyang Zhang (1996) focused on the relationship between faith and the law, By comparing the faith and the law, and discussed this issue, he pointed out that the law is the two basic mechanisms, which maintain the operation of the market. In credit transactions, fraud prevention network, Zeng Yong, XU Mao Wei (2004) from the perspective of the game C2C transactions between parties to the transaction credit mode selection to analyze. Then, Ma Huimin, Qian Ruobing (2005) analyzed the credibility of such effects in the e-commerce market mechanism, and put forward some targeted countermeasures and suggestions to reduce market operations tripartite fraud. Improvement in the measures, Zhang E, Yang Fei (2007) proposed a regulation can be implemented directly by the trading market registration deposit and margin trading mechanism, hopes pre-trade risk controlled measures to promote all parties to the transaction can be good faith transaction in online trading.

Not only domestic scholars have studied this issue, many foreign experts and scholars have also studied on the transaction integrity a lot. Hitoshi Yamamoto and Kazunariishida (2004) in their paper, proposed a C2C online transactions based on computer simulation model. The subject of the model is C2C online transactions buyers and sellers reputation management system, pointing out that in online trading, a positive reputation is more efficient than a negative one. Dellarocas (2003) through the game demonstrate that in completely balanced market environment, sellers continue to make fraud, the reason is that high-quality products than low-quality products more profitable, so sellers often promised to sell high-quality products.

Research on the current point of view on this issue, researches mainly in the e-commerce entities market, both the analysis of buyers and sellers is not very in-depth, especially based on buyers and sellers are rational economic man, in the process of online shopping, buyers and sellers will try their best to meet their own needs, research in this area has not yet, this article is from this point of view, from a game to a repeated game and then analyze based on rational integrity issues for both parties research.

1. The Status of Online Shopping

In 1998, China made the first business on the Internet, and now has gone through more than 10 years history. With the continuous improvement of China's Internet environment and the increases of Internet users, and e-commerce gradually improved, online trading, as an important part of e-commerce ,has become a part of the economy not be ignored. It also has increasingly shown its huge market potential and economic benefits.

Minister of Commerce Chen Deming in the "two sessions" also said that online shopping is changing people's lives, spending way. What's more, it also has an influence on China's total retail sales of social commodities.

According to China Internet Network Information Center (CNNIC) said, up to the end of December 2012, the number of Internet users reached 253 million, ranking first in the world netizens. Online shopping which is one of the top ten web applications, marks the practicality of e-commerce web application as the representative of Internet users already take a certain position in people's daily life. Airui's research data show that in 2012 China's online shopping market transactions amounted to 1.304 trillion Yuan, an increase of 66.2% compared with 2011. In the total retail sales of social consumer goods, it take 6.2%, and this proportion will continue to rise.

Online shopping's convenience, speed, and cost-effective is highly favored by users, but behind the rapid development of online shopping, a number of problems occur. As we all know, online shopping is finished in a completely open virtual space; the buyer cannot see the real goods, only be expressed through online credit information to determine the extent of other's faith, only via pictures, product details to feel the product is good or bad.

In such a platform, considering China's current social security systems are still inadequate, cause some bad chances for sellers. The integrity of the seller will have a direct and fundamental effect on consumers shopping choices. For example, Some online stores intentionally do some false advertising or shoddy the sale of counterfeit and shoddy goods, in order to deceive consumers. Such reports we can often see that in the CCTV and many other news media. As for the delay in delivery, do not fulfill their commitments of service, customers' personal data and other private information leaks and other incidents have also happened. The lack of business integrity behaviors lead to consumers greatly reduced the credibility of online shopping.

According to one pair of Internet users have not tried online shopping causes survey: 62.4% of the people are afraid to be deceived. 47.7% of people worry about the quality of goods, 42.3 percent doubts the security of online shopping. Either buyer or seller, honest transaction process has been seen as the most important part.

Based on the China Consumers Association statistics on consumer consultation cases, the main content of online shopping complaints are mostly fake, false advertising, no the gifts promise, goods are not right and so on. In order to better encourage electricity supplier companies concerned more about the user experience and service, electricity providers to build a bridge between users, improve user's shopping satisfaction. March 16, 2013, China Electronic Commerce Research Center released an announcement "China electricity supplier integrity Declaration": integrity management; reasonable publicity; guarantee quality; improve service; accept supervision; privacy; strengthen management, in the announcement the first is honesty. We can see Internet users more and more value integrity. Honesty issue has become increasingly the key to achieve critical transactions.

This will be based on buyers and sellers as participants, game model, combined with payment function, consider the utility maximization of both parties, then analysis that if it is selected about the integrity of transactions for sellers and buyers. Finally give some suggestions and countermeasures.

2. Build Game Model

(1) Assumptions

Participant assumptions: In online shopping, the buyer and the seller to become parties to the transaction, and the transaction parties are rational economic man, the maximum to meet their own interests, pursue their own utility maximization.

Assuming action: When the buyer shopping online, there are two options, trading or non-trading; sellers in the online shopping process also has two kinds of selection, integrity and non-credit management. In the case of the integrity, sellers sell better goods. On the contrary, sellers sell bad goods without honesty.

Information hypothesis: Incomplete information when the seller chooses to not be honest and sold buyers defective products, the buyer will be found that a certain probability trading commodities as defective.

Payment function assumes: Price P , quality product cost C_1 , defective product cost C_2 , Psychological utility obtained after the buyer get the quality product U_1 , the psychological effects of buyers get defectives U_2 , the buyer time cost is T , the cost of the seller to build a network platform is the EC , the probability of defective found is θ ($0 < \theta < 1$), the probability of not being discovered is $1-\theta$, the fraud costs when sellers have bad faith is A .

(2) Construct Payoff Function

Based on these assumptions, buyers and sellers can have the following policy options:

A. When the sellers take integrity management:

Purchaser selects transaction

□ Take seller’s efficiency into consideration, because of the seller sells to the purchaser at a price P, but the prices of their products is P, and for the establishment of Internet trading platform costs EC, then the buyer utility is P-C1-EC.

□ Consider buyer’s benefits, when the buyer obtained the psychological satisfaction after buying goods is U1, payment of commodity price is P, the cost of online shopping time is T, and then the buyer utility is U1-P-T.

The buyer chooses not to deal

□ Consider seller’s efficiency, this moment, the transaction is not completed; the cost of the seller paid for the construction of online trading platform is EC, then the seller utility is-EC.

□ Consider buyer benefits, as the transaction is not completed, the buyer pay the cost of online shopping time T, then this time the buyer utility is-T.

B. When the seller chooses not integrity management:

Purchaser selects transaction

□ take income into consideration, known by the assumptions, the defective probability found isθ, the probability of not being discovered 1-θ, with probability 1-θ is not found, The Vendor utility is P-C2-EC, asθprobability of being found in the utility is-C2-EC-A, considered all, then the seller utility is (1-θ) (P-C2-EC) + θ (-C2-EC-A)

□ consider buyer gains, from the assumption that, when defective with probability 1-θ not to be found, its buyer utility U1-P-T, the probability asθis found, its utility as a buyer is P-U2-T , in the comprehensive consideration, the utility of this time the purchaser is (1-θ) (U1-P-T)+θ (-P-U2-T)

The buyer chooses not to deal

□ consider sellers to pay benefits, then transaction cannot be successfully carried out, sellers not only to pay the costs of the network platform EC, but also in the choice of the cost of fraud bad faith A, then the Vendor utility of the time is -EC-A.

□ Consider the buyer to pay income, trading at this time cannot be carried out smoothly, the buyer to pay the time cost of T, and then the buyer utility of time is -T.

In summary, to build a game model, as follows:

	Vendor Strategies	
Purchaser Policy	Faith	Bad faith
Transaction	P-C1-EC U1-P-T	$(1 - \theta)(P - C2 - EC) + \theta(-C2 - EC - A);$ $(1 - \theta)(U1 - P - T) + \theta (- P - U2 - T)$
Not trading	-EC; -T	-EC-A; -T

Simplify the analysis, so that Y1 = P-C1-EC; Y2 = (1-θ) (P-C2-EC) + θ (-C2-EC-A); L3 =-T; Y3 =-EC; Y4 =-EC-A; L1 = U1-P-T; L2 = (1-θ) (U1-P-T) + θ (-P-U2-T) ; L4 =-T

The parties to the transaction to simplify online shopping game matrix is:

	Vendor Strategies	
Purchaser Policy	Faith	Bad faith
Transaction	Y1; L1	Y2; L2
Not trading	Y3; L3	Y4; L4

It can be seen: When the parties to the transaction is the integrity of the transaction, the seller will pay benefits at this time as Y1, buyer pay benefits as L1; when the parties to the transaction are not honest transaction, the seller to pay benefits Y3, buyer pay benefits L3 ; when the two sides are not honest transaction, the seller pay benefits Y2, buyer pay benefits for L2; when the two sides are not dishonest transaction, the seller to pay benefits Y4, buyer pay benefits L4.

3. The Game Theory Analysis

(1) The buyer chooses not to deal

Vendors choose integrity, the seller utility $Y_3 = -E_c < 0$, choose not to faith, the seller utility $Y_4 = -E_c - A < 0$, the moment, for the purchaser, $L_3 = L_4 = -T < 0$.

Such a situation, the buyer and seller are not worth, utility are negative, the seller at a loss, the buyer is wasting the cost of time for online shopping, this time buyers and sellers do not meet the assumption of economic man under the assumption.

(2) The buyer selects to deal

In order to determine buyers and sellers to meet to the assumption of economic man when the transaction, what the seller is to choose honesty or not honesty, Y_1 and Y_2 may wish to compare, comparison of L_1 and L_2 :

First compares the Y_1 and Y_2 as follows:

$$\begin{aligned} Y_1 - Y_2 &= P - C_1 - E_c - [(1 - \theta)(P - C_2 - E_c) + \theta(-C_2 - E_c - A)] \\ &= P - C_1 - E_c - (P - C_2 - E_c) + \theta(P - C_2 - E_c) - \theta(-C_2 - E_c - A) \\ &= P - C_1 - E_c - P + C_2 + E_c + \theta P - \theta C_2 - E_c \theta + \theta C_2 + \theta E_c + \theta A \\ &= C_2 - C_1 + \theta(A + P) \end{aligned}$$

If $Y_1 - Y_2 = 0$, then the simplification obtained: $\theta(A + P) = C_1 - C_2$

Calculated: $\theta = (C_1 - C_2) / (A + P)$ it can be seen,

① When $\theta > (C_1 - C_2) / (A + P)$, $Y_1 - Y_2 > 0$, when the probability of defective is found is greater than $(C_1 - C_2) / (A + P)$, the time the game balance solution (integrity, transaction), then $Y_1 > Y_2$;

② when $\theta < (C_1 - C_2) / (A + P)$, $Y_1 - Y_2 < 0$, when the probability of defective is found is greater than $(C_1 - C_2) / (A + P)$, this time the game equilibrium is (bad faith, the transaction).

However, when taking into account the probability of defective was found is smaller, that is θ tends to 0, for the seller, in order to achieve greater effectiveness, reducing the probability of defect is found, then the commodity price has been fixed, either reduce the value of $C_1 - C_2$ or increase the cost of fraud.

First consider the value of $C_1 - C_2$, when the value of $C_1 - C_2$ decreases, and the difference reduced between the cost of superior product and defective products, superior product and the defective at this time, the difference is small, the seller in order to attract customers, must take good faith attitude to deal, or will likely to lose customers, causing some extra losses, which is consistent with the seller's assumption of economic man. At this point, the game's equilibrium evolves to the matrix (integrity, transaction).

Then consider the cost of fraud, and improve the cost of fraud in the transaction, A means the seller must pay the higher costs, the person paying the cost is too high, it may cause deficits, for the selection of the costs incurred by fraudulent sellers are not arrived gains, so for sellers transaction integrity is the best choice, then evolved into a game equilibrium (integrity, transaction).

Comparison of L_1 and L_2 as follows:

$$\begin{aligned} L_1 - L_2 &= U_1 - P - T - (1 - \theta)(U_1 - P - T) - \theta(-P - U_2 - T) \\ &= U_1 - P - T - (U_1 - P - T) + \theta(U_1 - P - T) + \theta P + \theta U_2 + \theta T \\ &= U_1 - P - T - U_1 + P + T + \theta U_1 - \theta P - \theta T + \theta P + \theta U_2 + \theta T \\ &= \theta(U_1 + U_2) > 0 \end{aligned}$$

Then the permanent establishment $L_1 > L_2$, seen from the assumptions, L_1 is the case of transactions in good faith buyers' utility, L_2 as in the case of non-faith buyer's utility, from identity it can be seen in the condition of the integrity, the buyer utility maximum, meet the buyer assumption of economic man, and for the game equilibrium (integrity, transaction).

4. The Extended Game Model

Through the above analysis know that in a single game, both buyers and sellers are based on rational economics, in the transaction process will choose transaction integrity.

In real life, a single game is ideal for situations. In online shopping transaction, buyers and sellers is not necessarily only do this once a lifetime deal, even for the same network of sellers, different buyers, we may assume that all previous sellers' information is public, and all the different potential buyers know this information, so we set up these different buyers in the model is still the same game participants.

For extended repeated game model, add the following assumptions:

1. For the same seller, although there may be different potential customers, but we still put these customers as one participant, that is, only one buyer.
2. Buyers take the "Cold policy", that is simply repeated game, the seller adopt acts of bad faith once, it will trigger the buyer's strategy in the future will always choose "no deal" policy.
3. In the case of bad faith, the benefit of total pays W_1 , when the integrity of the total benefits paid W_2 .
When the seller chooses be not honest: The first game is that buyers in the case of selected information opacity transactions; second time buyers based on the "cold policy", will choose not to trade, and later also will not deal.

Seen by the game model, the first game in the process of buying, selling a total payment for the parties to the transaction $Y_2 + L_2$, the second game in the process of buying, both sellers and buyers the total payment is $Y_4 + L_4$. In this case, this transaction interrupt. That is when the seller is not honest, the total payment is

$$\begin{aligned} W_1 &= Y_2 + L_2 + Y_4 + L_4 \\ &= (1-\theta)(P-C_2-EC) + \theta(-C_2-EC-A) - EC - A + [(1-\theta)(U_1-P-T) + \theta(-P-U_2-T) - T] \\ &= P - C_2 - EC + U_1 - P - T - \theta U_1 - \theta P - EC - A - T \\ &= -C_2 - EC + U_1 - T - \theta U_1 - \theta P - EC - A - T \end{aligned}$$

When sellers choose integrity: gaming process is the integrity of transactions, then this game will always continue, consider the case in good faith, for the first time during the game a total payment of utility

$$\begin{aligned} W_2 &= Y_1 + L_1 = P - C_1 - EC + U_1 - P - T = U_1 - EC - C_1 - T \\ W_2 - W_1 &= U_1 - EC - C_1 - T - (-C_2 - EC + U_1 - T - \theta U_1 - \theta P - EC - A - T) \\ &= EC + T + \theta(A + P + U_2 - U_1) + A \end{aligned}$$

Seen by the assumption, A is when the integrity of the seller chose not fraud costs, P is the product price, U_1 is the buyer's psychological effect on the quality product, U_2 is quality product for the seller's psychological effect, known $A + P + U_2 - U_1$ is greater than 0 holds.

Ie $W_2 - W_1 > 0$, when the integrity, the time $W_2 - W_1$ is far greater than 0, we can draw the seller's expected payment, when the seller has maintained the integrity of the expected payment is greater than he once obtained payment without faith, he will remain integrity strategy in each transaction, cooperative game arises, the two sides the final strategy game would be buyer to buy goods, the seller has maintained integrity, transaction integrity of the game will go on continuously and credit transactions will be more satisfied rational economic man assumptions.

It can be seen that integrity mechanisms generated by the repeated game, repeated game between buyers and sellers to solve the "Prisoner's Dilemma", and laid the foundation for the integrity of online shopping transaction.

5. Recommendations and Strategies

From the above analysis, online shopping to proceed smoothly, the two sides are in the case of rational economic man, consider to maximize efficiency, transaction integrity is the best choice, but for now China's Internet market, the growing incidence of online fraud. Consumers also cast a phishing shadow. It can be seen, the integrity of online shopping is increasingly becoming a key for the platform to work smoothly and largely affect consumers confidence and spending will. Therefore, set about establishing the integrity of the online shopping platform, is the e-commerce industry, the common aspiration of the Chinese government and netizens.

To build the integrity of the online shopping platform, the following four recommendations:

(1). Improve the integrity of the online shopping market mechanisms

Make efforts to accelerate and improve the country's social security system of credit, especially construction of online transaction integrity mechanisms.

Constantly improve the level of e-commerce businesses integrity evaluation, publicity and other social credit system, increase the integrity of e-business supervision for online shopping to create a good credit environment. Establish a viable network transactions penalizing system. Make clear pathways of consumer's complaints and responsibility of regulatory department. For acts of dishonesty enterprises to keep a strict and clear penalties policy and establish the integrity of the file name system promises to restrain speculative business conduct of operations.

(2). to strengthen the security of online shopping security system

First, improve online shopping related laws and regulations, strengthen the network security system, prohibiting criminals to destroy the network security and impede online transactions. Second is to improve and strengthen the network Certification Center management functions to enhance the security of online transactions, confirm the legitimacy of the seller identity, to maximize the protection of the legitimate rights and interests of consumers. Third, increase technical support online payment security, encryption, authentication, digital signature technology, firewall technology, we must strive to develop and actively promote the popularization and application, for the entire network security of transactions to provide strong technical support.

(3). to improve the cost of fraud

Consumer information is at a disadvantage during the game party, we must strive to raise the cost of fraud inferior goods to ensure the integrity of the business level. However, the cost of fraud on the Internet commodities are very low, the cost of fraud A should be further promoted as sellers' full consideration of fraud, including the government's punitive measures. Must establish effective punishment mechanism, increase supervision and punishment, traders will choose the game behavior depending on the size of the cost of default, so that you can resolve this conflict.

(4). Eliminate information asymmetry

Transaction process, to solve the problem of asymmetric information, it should be the effective use of Internet information dissemination functions, in addition to provide consumers with independent communication platform, it should focus more on improving third party trading platform, administration regulators, certification and credit rating system, etc. Major measures including: □ the product by a third party grading, evaluation and inspection. To consumers, provide product information as much as possible to combat poor quality products; □ the constraints of electronic contracts and punishment. Each sellers and intermediaries signed electronic contract to require that the participants' responsibility and punishment after violations and more the specific content. Also stipulates electronic contract implementation process as well as recognition of these electronic contracts, the same effect as a written contract.

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