The Study of the Design of B2B Auto Parts Trading Platform Based on Buyer Members

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Abstract—This paper discusses the necessity of the construction of auto parts trading platform based on buyer members from the perspective of theory and practical needs, and builds a B2B auto parts services trading platform based on buyer members on this basis, and breaks through the B2B e-commerce model that always centers on the sellers in auto parts market. At the same time, the platform provides the function of online bidding, which charges the sellers and be free of charge to the buyers, and fully meets the needs of both sides of trade in auto parts market, and has good prospects of application. (Abstract)

Index Terms—Buyer member, B2B Auto parts platform
(key words)

I. INTRODUCTION

The traditional e-commerce is seller-oriented. The sellers show themselves on the Internet as real shops for the buyers to choose. However, it’s difficult to form the stable cooperation relationship that e-commerce activities need in e-commerce market of auto parts which has large quantity of buyers and sellers and is a kind of many-to-many transaction that the buyers are in a weak situation in terms of information. Especially in remote purchase, repair enterprises often wish cash on delivery, while accessories manufacturers prefer delivery against the payment. Unwritten hidden rule that repair enterprises connive at the matter that the buying clerk get 5% rebate appears for lack of middle guarantor like "Alipay". All of these suggest that it is need to design a new e-commerce model against the characteristics of e-commerce market of auto parts in order to reduce transaction costs, and make breakthrough in terms of reducing the buyers’ search costs and the factors that against the buyers.

At the same time, as the customers’ demand of the timeliness of vehicle maintenance, the traditional logistics system of auto parts industry has hindered the development of auto parts industry obviously. Traditional transaction pattern and existing e-business model are hard to really change the logistics pattern of auto parts industry currently.

To solve this series of problems, this study designs a B2B auto parts trading platform based on buyer members. The platform uses new bidding rule against the buyers and sellers. And by means of designing corresponding flow, we can achieve a win-win situation between buyers and sellers in auto parts market and efficient flow of auto parts logistics system, and reduce the time and costs of the warehousing, transportation and purchase of auto parts.

II. REVIEW OF EXISTING LITERATURE

New institutionalists represented by Coase value the missing system of the neoclassical economics highly. They expand the methods of neoclassical economics in the economics research field greatly, using game theory and other new mathematical tools, adding information, transaction costs, property constraints and time dimension, and analyzing the role and function of the system historically and realistically. This study combines the way of bidding and e-commerce, and tries the "commission-agent" issue of purchasing in auto parts industry, using the approach of neo-institutional economics.

Modern economics (Stiglitz, Larry Hsien Ping Lang) thinks that the process of realizing and creating the value of industry is the concept of large logistics which includes the following six sections: the first is product design, the second materials procurement, the third storage and transportation, the fourth order processing, the fifth wholesale, and the sixth terminal retail. This study conducts a large-scale survey of auto parts market in Chongqing. The results show that the manufacturing area only creates a dollar value which also includes the loss of resources and environmental destruction while the six sections of auto parts industry create 9 dollars value; The six sections of the big logistics area represent high-end value of industrial chain, neither destroy the environment, nor consume resources. At the same time, there are now the following viewpoints in the study of e-commerce and modern logistics in theory circle: (1) The rapid development of e-commerce exposes the lagging of logistics system in China. Logistics becomes a problem that needs urgent solution in the process of the development of e-commerce; (2) With the vigorous development of e-commerce, How the e-commerce enterprises choose logistics mode becomes a prominent issue. Enterprises must select a logistics mode that fit for the development of themselves according to their own various situations to ensure the stable development of e-commerce; (3) E-commerce not only pushes forward the transformation of logistics operation model of enterprise, but also affects the development of modern logistics enterprises deeply. The future development of e-commerce is related to the management model of logistics closely for modern logistics enterprises. However, the rapid development of e-commerce exposes the lagging of logistics system. How the e-commerce enterprises choose appropriate logistics management mode is a theoretical and practical problem that urgent to be solved in China's economic development. Therefore, it has been a problem...
III. THE SYSTEM FRAMEWORK OF THE B2B AUTO PARTS SERVICES PLATFORM BASED ON BUYER MEMBERS

This study puts forward a B2B auto parts services platform based on buyer members to solve the problems existing in auto parts market currently through the analysis of auto parts transaction under the traditional e-commerce platform in China. The platform intends to use the vertical B2B e-commerce platform based on B/S structure, and will provide a secure trading platform for repair enterprises and auto parts enterprises. At the same time, the platform will also collect the buyers’ (repair enterprises) requirements, then classify the products quickly, and bulk purchase parts from the sellers (auto parts enterprises) by the way of bidding. The platform will also provide logistics services for both sides of buyer and seller after reaching purchase agreements with the sellers. The platform is a combination of e-commerce and modern logistics in the field of auto parts, and is the bridge to achieve efficient cooperation and communication between repair enterprises and auto parts enterprises, namely between upstream and downstream enterprises in industrial chain. It will help to improve the position of China's auto industry in international automotive industry value chain.

This study uses the modular approach of system analysis, and subdivides the system step by step proceeding from the overall system, and expands the trading platform model step by step according to tree structure. The structural units of every grade are all removable modules, which can be dismantled flexibly according to the needs of system in order to describe the structure and function of the platform. Based on the above train of thought, the study will explore the establishment of the B2B auto parts trading platform based on buyer members in terms of following six aspects:① Build the model of B2B auto parts services trading platform based on buyer members; ② Design the trading mechanism and trading process of B2B auto parts services based on buyer members; ③ Develop buyer members virtual community management system; ④ Develop B2B auto parts services trading management system based on buyer members; ⑤ Develop B2B auto parts services trading security system based on buyer members; ⑥ Conduct the laboratory simulation of B2B auto parts services trading platform based on buyer members.

A. The establishment of the model of B2B auto parts services trading platform based on buyer members

The module builds the trading platform model of the system on the whole (as shown in Fig.1). It contains three structural units initially, that is: buyer members virtual community management system, B2B auto parts services trading management system based on buyers, B2B auto parts services security system based on buyers. Herein, the trading products are automotive parts, and the buyers of products are repair enterprises, and the sellers of products are the operators of the trading platform. Buyer members virtual community consists of many repair enterprises registered online; And the auto parts services trading platform is the auto parts virtual supermarket for repair enterprises. The module sets up the B2B auto parts services trading platform based on buyer members on the whole: sorts out the needs of buyer members from the repair enterprises virtual supermarket, then bulk purchases parts from auto parts virtual supermarket in time.

Fig.1 the basic framework of the platform

B. The design of the trading mechanism and trading flow of B2B auto parts services based on buyer members

Based on the establishment of the basic framework of B2B auto parts trading platform based on buyer members, this study proposes the trading mechanism and trading process of the platform, in order to encourage repair enterprises to purchase auto parts by using online trading platform, and follow online trading process, and comply with online trading system. At the same time, the study intends to design a trading mechanism that can be adopted by both two sides of transaction rationally, using the trading security mechanism of motivation theory. The specific transaction technologies include large-scale centralized purchase pricing of trading platform, proxy bidding pricing of trading platform, proxy pricing of trading platform, buyers credit rating, sellers credit rating, third-party transaction security, payment intermediary, and third-party payment. The specific details of trading mechanisms include trading negotiation mechanism, products validation mechanism, price formation mechanism, payment security mechanism, trading security mechanism, trading dispute settlement mechanism. The major parts of the trading process include buyers browsing trading information, buyers releasing the requirements information, platform recommending products, buyers selecting products, buyers online transferring accounts, platform purchasing products, platform delivering products, buyers inspecting products, and payment intermediary...
completing the online payment. The flow chart of online trading of the platform is shown in the Fig.2.

![Flow chart of online trade of the platform](image)

**Fig.2 The flow chart of online trade of the platform**

C. **Buyer members virtual community management system**

As the buyer members virtual community is an important component of the system platform, this study intends to develop a buyer members virtual community to achieve online management of the getting in and out, behavior and communication of buyer members. The system consists of buyer membership management system module, buyer members business operation module, and buyer members virtual community self management module. Herein, the buyers of products are repair enterprises which become members of the buyer members virtual community through registration in accordance with the procedures provided. The structure of the system is shown in Fig.3.

To achieve the general management of the buyer members virtual community, the following technical measures will be taken.

1. Use the way of combining system certification and manual review, in order to ensure the effectiveness and efficiency of qualification examination, and ensure the truth and validity of the buyers’ membership;

2. Introduce open dynamic collaboration technology, in order to achieve the exchange of information and business collaboration between the trading platform and buyer members;

3. Establish operating specifications for the conduct of community members, and carry out the reputation evaluation, disorderly conduct exposure, and suggestion feedback of the community members and so on, to achieve self management of community members.

![The buyer members virtual community management system](image)

**Fig.3 The buyer members virtual community management system**

D. **The development of the B2B auto parts services trading management system based on buyer members**

The platform needs a system to realize integrated services including releasing product requirements information, recommending products, selecting products, purchasing product, logistics and distribution, third-party online payment, tracking product quality, and buyers’ suggestion feedback after the full collection of trading information of auto parts services based on buyer members. Therefore, this study intends to develop a B2B auto parts services trading management system based on buyer members to achieve global management of B2B auto parts services trading process. The system consists of online trading management module, product purchasing management module, logistics and distribution management module, online payment management module, and after-sales services management module. The structure of the system is shown in Fig.4.

Meanwhile, to realize the full process of auto parts services transactions on the e-commerce trading platform, this study uses the program development method based on B/S structure, relational database management system, and SaaS business model, and adopts the following technical measures:

1. Make abstract description and data dynamic update for features of buyer members, characteristics of supplier, product requirements information, product supplies information, using feature extraction and incremental learning method;

2. Analyze product requirements information and product supplies information connectedly, using correlation data mining analysis technology, and implement associated management of customers and supplier;

3. Achieve the instant communication by the way of text, images, audio and video between the trading platform and the buyer members, using online community interactive technology, and through the interaction of text, two-dimensional images and three-dimensional scenes;

4. Realize the progress control, process monitoring and effect evaluation of transaction process using progress control, semantic mining, and similarity judgment technology.

![The B2B auto parts services trading management system based on buyer members](image)

**Fig.4 The B2B auto parts services trading management system based on buyer members**

E. **The development of the B2B auto parts services trading security system based on buyer members**

As the platform involves the security of buyers’ identity, information, and transactions in auto parts services trade, this study intends to develop a B2B auto parts services trading security system based on buyer members. The system consists
of buyer members identity security module, buyer members information security module, and buyer members transaction security module. The structure of the system is shown in Fig.5.

Meanwhile, in order to protect the identity security, information security and transaction security of the system during use, and improve the stability of network, and prevent illegal invasion and information distorting, this study takes the following technical measures:

1. Establish conventional security systems, including setting security firewall, setting IP address access restrictions, equipping data backup system, equipping virus protection system, encrypting the disk and data according to grades, and setting up network security log;

2. Establish the authentication algorithm based on chaos technology, and develop authentication system with core technology, and combine with the server CA certificate authentication to ensure the validity of user's identity;

3. Establish the encryption algorithm based on chaos technology, and develop encryption system with core technology to ensure the security of sensitive information in process of transmitting and storage in system and prevent the illegal theft and malicious distorting of sensitive information.

Fig.5 The B2B auto parts services trading security system based on buyer members

F. The development of the laboratory simulation of B2B auto parts services trading platform based on buyer members

After the initial setting up of the auto parts industry B2B e-commerce platform based on buyer members, this study intends to build auto parts services online trading test platform, and carry out the laboratory simulation of the B2B auto parts services trading platform based on buyer members, to test, debug and improve the function of the system, and increase application value of the system, and simplify the procedures of the system, and enhance the system's friendliness. And intends to use system emulation and simulation method, establish enterprise virtual cluster innovative test platform, and simulate the transaction process of B2B auto parts services on the e-commerce trading platform through multi-terminal system. And debug and improve the system repeatedly according to the simulation results until meeting the design requirements of the system. The laboratory simulation process is shown in Fig.6.

Fig.6 The laboratory simulation of B2B auto parts services trading platform based on buyer members

IV. CONCLUSION

This study proposes B2B auto parts services trading platform based on buyer members creatively against the actual demand of auto parts industry, using the theory of neo-institutional economics and large logistics, and brakes through the B2B e-commerce model that always based on sellers. At the same time, the platform provides the function of online bidding, which is free of charge to the buyers and charge the sellers, and fully mobilizes the enthusiasm of both sides of supply and demand.

REFERENCES