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Study on Distribution Patterns of E-Business Based Agricultural Products Logistics

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ABSTRACT

The circulation of agricultural products is more complex and uncertainty than that of industrial products. The distribution channels of agricultural products are quite unique. The agricultural products logistics directly affect the efficiency of china's economy since agriculture is still main part of the economy. At the same time, with the development of information technology, e-business has affected people's daily life and brought great challenge to the traditional logistics of agricultural products. It is urgent to study the distribution pattern of agricultural products logistics under the circumstance of e-business. In fact, the platform of e-business provides a new approach for rationally deploying agricultural products. The agricultural products logistics system can be optimized based on the e-business-based distribution model. In this paper, we will focus on the logistics patterns and models of e-business-based agricultural products. After discussing the characteristics of the e-business-based logistics system, the model of logistics distribution based on electronic data interchange (EDI) and dynamic allocation mechanism will be presented. Considering the specific processes of agricultural products logistics, we depicted a framework called e-business logistics management (EBLM) model, which can integrate e-business functions and distribution functions. Finally, we will discuss the implementation strategy of EBLM.

Keywords: *agricultural products logistics, E-business, distribution patterns, EBLM model, implementation strategy*

1. INTRODUCTION

The characteristic of the information society is the optimization of information flow and IT-based innovation. The development of the Internet provides such a tool that is changing the market rules and forming the new network economy. As the representative of network economy, E-business has already been applied in nearly every aspect of our social activities, such as retail, service, manufacturing, etc. Especially, Internet has changed the operation behaviors of enterprises thoroughly. Annam, the general secretary of the United Nations, said that e-business is pushing the economy development, improving the trade efficiency, and enhancing the competition ability of enterprises. It can not only integrate the national economy into the world economy, but also can provide the employment opportunities and create more wealth.

Although we still cannot predict when the e-business dominated trade will become the primary trading mode, the potential of the e-business market is endless. According to the U.N. E-business Development Report in 2002, the number of global Internet customers has reached 6.5 billion by the end of 2002^[1]. In China, the number has reached 87 million by the end of June in 2004 according to the latest investigation report from the China Internet Network Information Center (CNNIC). On the other hand, the volume of e-business trade grows fast. Forrester, a famous consultation company, estimated that the volume of global e-business trade in 2002 is about 2,293.5 billion USD, and it will attain 12.8 trillion USD in 2006, which will be 18% of the world retail volume, and the average growth rate is

above 30% each year. In China, The U.N. E-business Development Report in 2001 indicated that the volume of B2B and B2C market would be 4 billion USD in 2003, B2B would increase 194% each year, and B2C will be 274%. Due to intensive labor force in agriculture, the development of e-business of agricultural industry is more difficult than other industries. Although the agricultural circulating network has developed at certain level in our country, and some regions such as southeast area has already started to construct the e-business-based agricultural products system, there are no systematic planning because of lacking corresponding theory. A lot of research works have been done about seasonal products^{[3][4]}, but there is still no special concern about agricultural problems. For the information-based agriculture, it is very important to improve the circulation of agricultural products under the e-business environment. That is why we will study the e-business-based agricultural products logistics patterns in this paper.

2. THE FUNCTION OF THE LOGISTICS DISTRIBUTION IN E-BUSINESS DEVELOPMENT

The logistics distribution is a very important link that completes the whole e-business-based trade.

2.1 Modern logistics is the basis of e-business

Each e-business trading process generally needs three essential elements: the logistics, information flow, and cash flow. The logistics is the foundation; the information flow is the bridge; and the cash flow is the

purpose. Each e-business trading process usually accompanies with the logistics and information flow. The trading partners need information so as to send out, follow, divide, receive, store, pick up and pack the goods, etc. In information era, the cooperation of logistics and information flow becomes extremely important, and must be supported by modern logistics techniques.

Logistics techniques refer to the general name of all professional techniques related to logistics elementary activities, including various working techniques and management skills such as circulating machining technologies, packing technologies, identification technologies, real time tracing technologies etc. With the development of computer network technologies, logistics technologies synthesized a lot of modern information technologies, for instance, GIS, GPS, EDI, Bar code, etc. The logistics industry accelerates to use the modern information technology. This will pave the way for the popularization of the electronic commerce.

2.2 The logistics distribution system is the supporting system of the e-business

Modern logistics distribution can provide service for the customer of the e-business. According to the characteristics of e-business, it can implement the unified management of the information, schedule the whole logistics distribution system, complete to manage the goods at the request of customers, and send goods to the consignee. This logistics mode is significant to logistics enterprises for improving the service quality, reducing the logistics cost, raising enterprise's economic benefits and social benefits.

2.3 The logistics distribution system improves the efficiency of the social economy circulating

The logistics enterprises adopt computer network technology, application software systems and advanced management theory, according to the customer's demand, they carry on a series of arrangements, such as classifying, allocating, ordering, dividing, mixing goods, etc., to deliver all kinds of goods in right time, right place and right quantity. The new logistics model becomes the pioneer in the field of circulation, and represents mainstream of modern marketing. On the other hand, it is easier to realize informationization, automation and socialization in the new logistics system than in the traditional one. It can not only reduce the stock of manufacturing enterprises, accelerate the turnover of the fund, improve logistics efficiency, reduce the logistics cost, but also can stimulate the social demand, promote the sound development of the economy.

3. ANALYZING THE CHARACTERISTICS OF AGRICULTURAL PRODUCTS LOGISTICS DISTRIBUTION

3.1 The characteristics of agricultural products logistics distribution

After China re-entered world trade organization (WTO), the bulk agricultural products of China, such as cereals, oil, cotton and sugar, will be in a inferior position in international market and the production cost is obviously higher than the same agricultural products price in international market. But for the labor-intensive agricultural products, such as vegetable, meat, birds, eggs, as well as aquatic products, it will be in a superior position both in amount and price. The market mechanism of agricultural products has been a certain scale in our country. We focus on the study about logistics system of agricultural products here.

For agricultural products, the logistics chain is depicted in Figure 1.

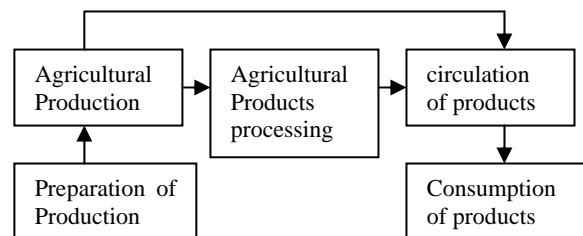


Figure1 agricultural products logistics chain

In Figure 1, the preparation of production includes planting seed industry, feed industry, information guidance, products planning, etc.; agricultural production includes field management, instructor, fertilizer planning, etc.; agricultural products process includes grade classify of products, packing, fresh-keeping, storage, etc.; the circulation of products includes channel planning, a network of commercial establishments laying out, circulation technology of cold chain, market building of product and sale, etc.; consumption of products includes providing enough variety and quality of goods, guiding consumption, etc..

Agricultural products logistics chain includes all links and procedures from cultivating seed to field management, agricultural products processing, keeping fresh until circulation, market sell. Each link on the chain is related with many other industries, and such basic elements as agricultural science and technology, agricultural information and standardization etc. are influencing the agricultural industry chain, the distribution network that takes agricultural production as the main thread will be formed finally. What it pursued is to form various mechanisms to realize the goal of resource rational distribution.

The characteristics, such as localization, seasonal cycle, scattering etc., are very outstanding, meanwhile, the agricultural products are people's everyday necessities, the consumption elasticity is low.. The several characteristics exist in the whole logistics include:

1) The dispersion characteristic of produce distribution link

The producing area of agricultural products is very wide. The production unit, such as farmers, does not understand the market information and lack of essential production planning, thus the production link becomes the most difficult to control in the whole logistics chain. Dispersion characteristic of production leads to dispersion of the front logistics in the industry chain.

2) The region characteristic of circulation distribution link

Agricultural products are widely produced in different regions, and people's demand is diversified, therefore circulate trade occurs in different areas. But because agricultural products are fresh and perishable, even if we take measures to keep fresh, they will still have some proportion loss, and this proportion will be strengthened with time and distance running up. With the circulate cost rising, the radius of the agricultural products circulation is restricted. On the link of the fresh products delivering, keeping cold and keeping fresh of the fresh products and the cycle of the process have restricted in the supporting service radius of the center. This is obviously different from the normal temperature logistics.

3) The specified distribution facilities

Because the agricultural products are fresh and perishable, we must take some measures in circulating, so that agricultural products could be consumed with high quality. Some variety specific container and equipment will be needed^[2] in the course of agricultural products warehousing and transportation. The cost of agricultural products logistics distribution should be higher than the traditional industrial products, so extensive and specialized management will be needed.

4) Integrative characteristic of delivering and trade (the trading process accomplished by distribution)

In recent years, our country builds 3-level marketplaces for agricultural products circulation, namely the wholesale market of agricultural products in producing region, the wholesale market in selling region and the retail market of farm and produce. The 3-level wholesale markets take not only the function of the trade but also the functions of the delivery. It is showed that agricultural products logistics will be difficult to exist independently when it break away from the trade center.

We can see from these characteristics that the agricultural products logistics chain is different from industry's logistics relying mainly on production, its key link lies in circulation that will drives the operation of the whole logistics chain .

3.2 the key problems and solutions of agricultural products logistics distribution

Our country has always pays attention to agricultural products circulation system. According to the characteristics of the agricultural products logistics distribution, our country comes on quite loose policies and regulations for encouragement to set up modern agricultural products logistics system. As the foundation of agricultural products logistics is relatively weak, we still face a lot of problems now. Considered the whole logistics chain, the key problems among them include:

1) Strategy positioning of the agriculture products logistics

In the field of agricultural products circulation, there is still lack of the concept of the whole logistics system at present. The operator on each link is often engaged in the commercial activity taking oneself as the core. In terms of the logistics strategy of the whole industry, the end of logistics chain-consumption- is emphasized. Therefore the development of agricultural commerce centers and fresh food supermarket are fast, but it can't drive other links in the chain.

2) Lacking flow of the information in the logistics chain

Rational flow of the information is even more important in the efficient logistics chain, that is, there should be a valid information share mechanism among each link in Fig. 1, which can improve the operation efficiency of each link. But so far as the present situation in our country, mechanisms which can collect, store, analyze and use information of agricultural products logistics chain have not been set up. The incompleteness and dissymmetry of information results in blindly and inefficient production. Poor information also leads to the existence of a large amount of invalid logistics. According to statistics, agricultural products' losses in the course of circulation are probably 75 billion to 80 billion every year in China, accounts for 20% of the output value.

3) Lacking the unified planning of logistics distribution system

Region and dispersion characteristics of agricultural products make it is difficult to manage and plan logistics distribution. Up to now, we have not set up rational planning method yet. Trans-regional fresh products logistics, because its loss is heavy and its costs are high, whose scheduling is more unable to realize.

For these questions, the government of China has responded correctly, six government ministries jointly point out in 2003: the agricultural products circulation facilities are an important component of the social infrastructure. And the report further defined the strategic position of agricultural products circulation. Under the guidance of this policy, we can solve three key problems mentioned above from three following aspects:

1) Focusing on circulation, build up strategy of the

agriculture products logistics chain

The idea of agricultural products supply chain management should be spread. At the same time, the traditional logistics chain, which taking consuming as the core, should be transformed. Actually, circulation link is the most potential part of the supply chain, so the new strategy should be based on circulation, and the function of the circulate link should be enhanced correspondingly. In detail, based on the traditional collecting and distributing center and new e-business environment, the circulation part should has functions such as production guiding, trading and information management etc. The strategy with circulation as the core will fully utilize e-business environment, contribute to overcome the disadvantage of decentralized agricultural production.

2) Improve information collection and analysis among logistics chains, strengthen the information function of the traditional collecting and distributing center (CDC)

The communication and coordination of information are important foundation of the modern logistics management. Information management in the CDC should be further strengthened after the center of the logistics chain is transferred to the circulation link. The e-business trade platform of agricultural products will be set up on the basis of setting up two levels collecting and distributing system, namely, CDCs in producing area and selling area. On one hand, the information of production, demand and relevant information on the logistics chain will be classified, stored and shared. On the other hand, the trans-region scheduling of the

agricultural products will be realized by the information analysis function. Based on the analysis of demand information, the agricultural production will no longer be blind also.

3) Based on e-business environment, set up new management systems of so-called e-business-based integrated agricultural products logistics
E-business technology and the derived methods of logistics management is the foundation of our new logistics strategy. On the basis of fully considering the characteristics of logistics and information flow in the course of agricultural products circulation, we will set up an integrated e-business-based agricultural products logistics management models.

4. E-BUSINESS-BASED LOGISTICS MANAGEMENT (EBLM) MODEL FOR AGRICULTURAL PRODUCTS

As we mentioned above, the key of solving agricultural products logistics problems is to establish an e-business-based platform that logistics and information flow are considered and integrated. This platform has not only traditional wholesale functions, but also new Internet-based functions such as electronic trade, logistics management, information share, balance of supply and demand and production planning, etc. Aiming at this goal, we will establish an E-Business-based Logistics Management (EBLM) Model for Agricultural Products (figure 2).

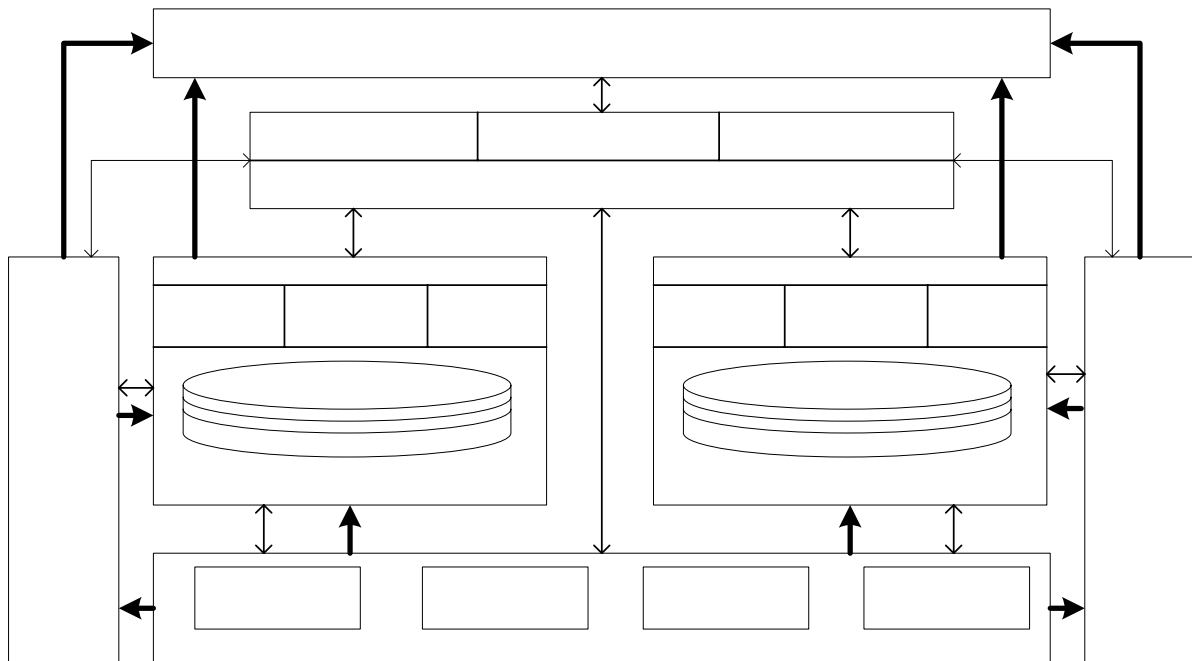


Figure 2 E-business-based Logistics Management Model for Agricultural products

In figure 2, the wide arrows indicate logistics and narrow arrows show information flow. The EBLM model is

composed of 3-level supply chains: agricultural products processing unit, distribution & wholesale center and retailers. The third party logistics will be fully used to fulfill transportation of agricultural products among 3-level supply chain. The functions such as information share, online trade, and schedule optimizing and market prediction will be realized by setting a platform of e-business.

Specifically, agricultural products processing unit is made of farmers, processing factories, farms and importers, which are headstream of logistics and production information provider. As noted previously, agricultural products processing unit in our country has been dispersed, but if we set up the portal system of the regional distribution center, information can be exchanged conveniently on the portal among these processing units. This will solve various kinds of problems because of scatterance. In addition, processing unit will emphasize pre-treatment of the agricultural products according to the demand information, which will effectively lower invalid logistics.

Distribution & wholesale center (DWC) is physical center and information node. It combines the functions of traditional wholesale markets both in producing area and sale area. Different centers may have different functions according to the characteristics of the physical region of the center. Meanwhile, in this center, the two databases: agricultural products database and logistics database, and a portal website will be set up also. In the portal website, the third party logistics can be scheduled and agricultural markets trends will be analyzed. In addition, the center is the hub of downward information flows, and agricultural products processing units can get direction from the analyzing function of the portal.

The retailer is composed of farm produce marketplaces and supermarkets. It is the end of EBLM and faces to consumers directly. The retailers get agricultural products through the coordination of e-business platforms, distribution centers and the third party logistics. An important function of retailer in the model is the collection of the market information. On the basis of the statistical analysis of sales information, it fixes the general market trend and formulates the corresponding purchase plan, then offers information to the e-business trade platform.

The e-business platform is a virtual center of EBLM, which can be operated independently or based on a certain DWC. The platform connects all DWCs to realize information share in each link of agricultural products supply chain, schedule trans-region logistics, deploy limited transportation ability, such as rational utilization of cold chain circulates ability etc..

5. IMPLEMENTATION STRATEGY OF EBLM

The EBLM model has compressed the length of the

traditional agricultural products supply chain by the virtual and physical centers, and strengthened the functions of information share and analysis among every links of the supply chain. This model can improve the efficiency of the agricultural products circulation effectively, reduce circulation cost and contribute to realize strategic idea to set up of new agricultural products circulation system. However, the foundation of the application of agricultural information technology is still very weak, the third party logistics is not developed enough in China either, so it's difficult to implement the EBLM.

In order to implement EBLM smoothly, firstly, we should do the unified planning of the agricultural products circulation facilities, and should prevent repeated construction. The government in policy and in certain regular range should guarantee the unified standards about implementation of the EBLM. The unified planning will contribute to preventing from malignant competition and setting up normal environment of agricultural products circulation.

Secondly, the construction of the agricultural products market's information network should be strengthened. The Ministry of Agriculture has already done the work in this aspect, some agricultural products information networks are running and releasing information now. But the functions of these systems are limited and need further improvement. On the request of EBLM, the agricultural products e-business platform is relatively centralized and simple, so we should adopt the standard component, thus it can lower costs by a large and popularize rapidly. Another focus is how to set up database system, including the mechanism of data collecting, processing, storing and using.

Thirdly, the rational implementation tactics step by step should be constituted. The infrastructure of agricultural products logistics should quickly be constructed at present to promote trans-region circulation of agricultural products and cross-seasons supply and to guarantee the market supplies. Agricultural products logistics in main producing region and main demanding region should quickly be set up, especially for western food to eastern area. The peasant's cooperative transportation organization and large management enterprises should be fostered to guide actively and encourage peasants to transport and sale agricultural products together. This is the basis of forming DWCs. The agricultural products management enterprises should be supported to build some circulation facilities to preserve transport agricultural products. We should strengthen the ability in transport and selling, expand business scale and develop made-to-order farming to improve the organization efficiency in China. Based on the analysis above, the cooperative society and the agricultural products management enterprises should be turned into progressively distribution center of EBLM, these are DWC.

Fourthly, the multi-channels social funds for the development of EBLM are encouraged. Government will encourage, enterprises and individuals to attend agricultural products circulation system construction. The trans-region development logistics distribution and catenation management should be encouraged. The current management system of wholesale marketplace should be reformed to set up the new operating mechanism in which the real investors will get the real benefits, and they will assume sole responsibility for its profits or losses.

Finally, the circulation should open to the world. The involvement of foreign partners can improve the transportation capacity and management level of the logistics industry in China so as to promote the implementation of EBLM model.

In addition, the state's policies should be fully utilized. Our country will arrange some allocating funds every year during the Tenth Five-Year Plan period to subsidize the information system of agricultural products market, pesticides residues monitoring system and electronic settlement and infrastructure such as the roads, marketplaces, etc.. The local government must also offer certain related funds to the project that the central government supports. In the view of this point, The National Development & Reforms Committee issued a document called "the notice on printing and distributing pilot project implementation suggestion of wholesale market of agricultural products of 2003"^[1] in April of 2003, In this document, central government will arrange more than 400 million RMB national debt funds to support 81 projects. Majority of them is the marketplace, others are agricultural products storing and fresh-keeping enterprises. At the same time, the government will continue implementing the supporting policies, such as bank loans, finance pays interest etc.. Taking the year of 2003 as an example, projects on agricultural products circulation, including HuaLian and LianHua supermarket in Shanghai, gained more than 10 billion RMB loan with low interest.

Based on EBLM, agricultural products circulation system can be set up by the country's support, enterprise's participating and rational implementation tactics.

6. CONCLUSION

With the development of information technologies, there

is a strong tie between modern logistics and e-business. It is important to develop an integrated e-business-based logistics system. In this paper, the problems of the e-business-based logistics of agricultural products are explored, and the characteristics of agricultural products logistics distribution are analyzed also. In order to solve the problems in the traditional agricultural products logistics, the e-business-based agricultural products logistics management model (EBLM) is put forward and the implementation tactics are discussed also.

Agricultural products logistics in China has great potential. The operation efficiency of the whole agricultural products supply chain will be improved effectively by setting up e-business logistics system with circulation as the core. Under the guidance of this strategy, implementing EBLM model can carry on effective management to logistics and information flow in the agricultural products supply chain so as to set up normal and efficient agricultural products circulation network.

In order to implement EBLM properly, a systematic approach should be adopted, and get the support from the governments, enterprises, and farmers.

Further research will focus on the analysis of the issues involved to the EBLM from macro and micro views, for example, the study of macro policies of EBLM, the construction scheme of e-business platform, information standard and share mechanism, etc..

ACKNOWLEDGEMENT

This paper is partly supported by the Science and Technology Ministry of Jilin Province and Jilin University. Grant number is 20040528.

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