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Joint distribution models in fast-moving consumer goods wholesale enterprise: Comparative analysis and a case study

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ABSTRACT

Joint distribution means multiple clients were provided distribution services together by only one third-party logistics company. It is a unified plan and implementation used in distribution centres and a distribution activity implemented by multiple consortia. Many problems in distribution can be solved through the joint use of distribution warehouse, vehicles and reasonable logistics business, so as to optimize the overall logistics node and route arrangement. This paper mainly discusses the model of joint distribution of fast moving consumer goods, proposes three types of the optimization model of joint distribution system with Chaopi as an example. We draw the conclusion that Chaopi Trading Co., Ltd. is a joint distribution system optimization business model. This paper puts forward several basic distribution models and analyzes them in combination with practical applications, which has strong practical significance. Although the development of public distribution in China is not very fast, it is an inevitable trend. Through the efforts and explorations of the governments of various countries, there will be more and more choices of public distribution models.

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1. Introduction

With the continuous improvement of China's economy and the rapid development of people's living standard, the sales volume of fast-moving consumer goods (FMCG) increase year by year, which shows the good growth and extensive market demands. Practice has proved that the key factor for the success of fast-moving consumer goods enterprises is market power, and logistics is an important factor for the formation of it. Therefore, efficient logistics system is one of the key factors to support the success of FMCG enterprises. In order to create competitive advantages, FMCG distribution enterprises need to improve their profit level and ensure their survival and development. In recent years, with the continuous expansion of FMCG sales, the integration of FMCG sales channels and the acceleration of innovation, FMCG sales outlets are expanding rapidly. In order to meet the needs of enterprise scale expansion and market competition, they strive to reduce operating costs and improve the reaction speed of stores and consumers. In order to improve the efficiency of operation and logistics and create important material conditions, FMCG distribution enterprises have improved the logistics infrastructure, storage conditions and transport capacity, and they have actively used advanced logistics technology.

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Joint distribution, also known as third-party logistics (3PLs) service sharing, refers to that only one 3PLs company provides distribution service for multiple customers. It is a unified plan and implementation for the use of distribution centers and a distribution activity implemented by multiple consortia. Generally speaking, enterprises are usually decentralized and unable to integrate logistics resources. Due to the different logistics objects, many enterprises often have the problems of unbalanced utilization rate of distribution warehouse, unreasonable lines and high vacancy rate of vehicles. But it can be realized through the joint use of logistics, distribution warehouse and vehicles, so as to optimize the overall logistics node and route arrangement, so as to make an efficient and green logistics through unified commodity distribution.

From the perspective of enterprises, the first is to reduce the cost of distribution and the capital occupation, and the sharing of resources among enterprises can reduce the capital investment and cost of logistics chain.

Secondly, it is to increase the coverage of the network service. The enterprises may choose the distribution with far distance and limited transportation, if without the network service, which can be improved by joint distribution, because it can improve the service level and visibility with the help of network service.

Then, core business of the enterprise can be strengthened. As companies no longer invest too much energy in the distribution sectors, trivial problems no longer occur in the distribution process, therefore it will not take any time to resolve, so that we can concentrate on our core business, have more investment in human resource, put more financial resources on the core issues, and enhance the competitiveness of enterprises.

In addition, it can also improve the technological content. In order to optimize the joint distribution process, it is necessary to unify the identification and packaging, reduce the manual operation, improve the utilization of high-tech, and prepare for the future development.

Finally, in order to improve the degree of specialization of distribution, joint distribution is to complete the detailed planning of time, place and route according to the requirements of various enterprises through professional distribution companies, so that all enterprises can accept and implement network integration and realize the social sharing of resources. In this way, we can make the distribution process more efficient and professional.

From a social point of view, the first is the unified management of joint distribution vehicles, which can achieve a high loading rate of vehicles and avoid repeating the previous transportation routes, cross transportation, circuitous transportation and occupation of road resources. So we can easily relieve the pressure of traffic congestion.

Secondly, joint distribution can reduce the waste of vehicles, with the reduction of the pollution caused by vehicle exhaust and vehicle noise.

Finally, joint distribution means resource centralized management. Based on the conditions of joint distribution, enterprises will build more warehouses. They will not blindly build all kinds of enterprises according to their own interests. From the overall consideration, the problem of scattered and large-scale construction of small warehouses will be solved, and the abuse of land resources can be reduced.

In addition, the concept of joint distribution breaks the traditional single model of transport. It can integrate resources and optimize logistics social system.

Joint distribution is a more reasonable way to meet the needs of customers. In this way, all kinds of resources of the enterprise can be integrated. From an economic or social point of view, its advantages are obvious.

2. Literature review

Foreign scholars call the scheduling problems of distribution vehicle as Vehicle Scheduling Problem (VSP), which was first proposed in 1959 by the Dantzig and Ramser, and was soon attracted by the operations, applied mathematics, combinatorial mathematics, graph theory and network analysis, logistics science, computer applications, and other subject matter experts, transport planners, and managers of great importance, as the field of operations research and combinatorial optimization of front and hotspot issues [1]. In a retailer case study, Claudia and Laura

(2014) mentioned that the importance of 3PLs, aggregation and multi-user platforms must be recognised by transport planners in supporting the use of intermodal transport by retailers and other large shippers [2]. As for 3PLs and self-delivery logistics firms, Chun and Jim(2013) investigated which delivery technique is more efficient by comparing logistics capabilities, logistics services, and logistics performances based upon transaction cost analysis and resource-based theory [3]. The empirical results in this study could be strategic logistics management guidelines based upon the theoretical relationships among logistics capabilities, logistics service, and logistics performance for 3PL users and self-delivery logistics firms. Liu (2015) proposed a conceptual model that delineates the determinants of consumers' perceived service quality and tested the model in the Chinese logistic companies [4]. Based on the former analysis, he presented separately the activated measures of domestic 3PLs by corporate side, the supply side, and the government's policy support. Conducting two in-depth case studies of 3PLs, Cabigiosu et al. (2015) showed that 3PLs extensively rely on service modularity with standard procedures as their constitutive element [5]. A bi-objective model is developed to minimize the total shipping cost and time simultaneously. Lopes (2020) evaluated the relationship between the service capabilities and performance of the 3PLs providers in UK and Taiwan, China [6]. The range of service provision offered by 3PLs does not directly influence the 3PLs' financial performance. However, 3PLs providers with service capabilities that correspond to the key priorities of customers will gain superior financial performance through a better operational performance. In terms of criteria and methods, Aguezzoul (2014) presented a literature review on 3PLs selection decision and revealed that 3PLs selection is empirical in nature and is related to a region/country, industrial sector, and logistics activities outsourced [7]. Cost is the most widely adopted criterion, followed by relationship, services, and quality. From the perspective of 3PLs providers, Arthanari (2016) found that uncertainty, order frequency, and transaction size, but not asset specificity, are significantly associated with 3PLs service, which in turn is significantly associated with value-to-client and benefit-to-3PLs provider [8]. However, there are still some difficulties in the development of 3PLs.

As for the design of logistics scheme and route, many scholars have made many contributions to improve the efficiency. Moutaoukil, Neubert and Derrouiche (2015) focused on the consolidation of goods flows by using a Distribution Center to redesign the flow of goods inside the city while not increase the cost, reduce pollution and make the city more attractive [9]. Freile and Mula (2020) considered the topics of reverse logistics, waste management and vehicle routing and scheduling to introduce the area of Green Logistics [10]. Hu et al. (2019) provided the metrics of logistics service suppliers used for environmental performance measurement and the barriers and drivers that may hinder or facilitate the adoption of these initiatives, which contributes to the knowledge of environmental sustainability for logistics and transportation [11]. In order to evaluate the smart logistics solutions, simulation techniques is proposed by Alberto and Anna (2014) to present the current state of practice in modelling smart logistics solutions, provides a roadmap in simulation techniques for urban freight transport solutions and improves the knowledge around the patterns currently followed [12]. A global enterprise must continuously improve the efficiency of logistic operations between supply chain collaborators. Integrating logistic services, resources, and necessary information flows in the supply chain to ensure efficiency and efficacy is critically important to these companies. So Trappey et al. (2016) systematically designed, analyzed, and evaluated an improved framework for one-stop logistic services [13]. Collaborative two-echelon logistics joint distribution network was organized by Li et al.(2020) through a negotiation process via logistics service providers or participants existing in the logistics system, which can effectively reduce the crisscross transportation phenomenon and improve the efficiency of the urban freight transportation system^[14]. Awaga et al (2020) investigated the role of logistics service providers in the implementation of a differentiated supply chain [15]. In addition, De Marco et al. (2014) researched the factors that influence logistics service provider's efficiency in urban distribution systems [15].

In conclusion, there are many scholars in the study of logistics distribution model, and now no one can be suitable for China's joint distribution model, so this paper is to introduce a common distribution model focuses on in-depth analysis of its characteristics, and hope that joint distribution of development has played a certain role.

3. Joint distribution introduction and comparative analysis

The purpose of joint distribution is to integrate the resources reasonably and effectively and make the best use of the resources. The joint distribution of working modes can be considered globally and can be represented by the following diagram (Fig. 1).

It can be said that in order to realize the joint distribution from suppliers to consumers, there must be good coordination, such as transportation system, information technology, personnel capacity, etc. Only when all parties make concerted efforts to carry out the distribution operation can they be unified. In addition, each company has its own characteristics. Because the project cannot be fully implemented, there are many joint distribution models. Different companies need to choose their own common distribution mode in order to operate effectively. According to the utilization degree of logistics resources, distribution can be divided into three models: joint distribution system optimization model, joint distribution field connection and sharing and distribution facilities use type.

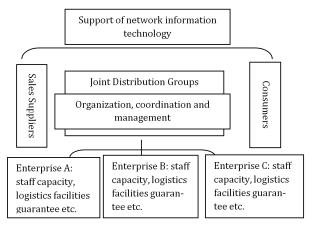


Fig. 1 Joint distribution operation model

3.1 Model 1: Joint distribution system optimization

Professional logistics companies provide the best solution through customer demand, plan and arrange for each user, and make the best processing system in terms of delivery time, quantity, frequency, route, etc., in the premise that all users can accept, comprehensive planning, and reasonable layout.

Main technical conditions: Firstly, all customers have the same conditions. We cannot deviate too much from their delivery time or quantity. The second one is the support of transportation system. Transportation is the basis of distribution system. Once the transportation system is integrated, it can provide guarantee for other aspects of the logistics system. The third is the support of information technology. With the continuous development of society, information technology, network technology and e-commerce technology will continue to innovate, and get the inevitable trend of logistics informatization. If there is no other supports, the joint distribution system will be difficult to carry on. The pattern is shown as Fig. 2.

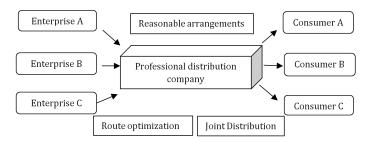


Fig. 2 Optimized joint distribution system schematic

3.2 Model 2: Joint distribution field connection and sharing

The purpose of joint distribution is to unite multiple users to share a distribution field. In general, it can be relatively concentrated in the customer's location. The traffic, roads and sites in the area are relatively crowded, and too many vehicles will cause trouble. Moreover, it is very difficult to go to each customer to prepare for their individual needs. Therefore, multiple users can set up distribution receiving points or cargo handling points together.

Main technical conditions: Firstly, it is the capacity of staff. Logistics and distribution now requires more than mere labour force, besides the IT staff needs to have knowledge of the equipment. Secondly, it is the organization, coordination and management of the various joint distribution models. We may need to organize and manage, and common distribution with warehouse sharing emphasizes this, because it brings the various organizations together in order. Finally, it is the site requirements, which may be connected to a unique requirement yard ground Shared common distribution model. Because the first site needs to be suitable for all customers pick from, and the area should be large enough, or we may have the phenomenon of congestion. In this way, it will have the same effect with direct distribution to the customer. The reason why this model is to the problems of bringing together distribution via vehicles, siting and establishing pick point.

Fig. 3 shows the diagram of location sharing type common distribution business model. After the production is completed, suppliers A, B, C need to make delivery to the customers according to their demands. In the distribution, each supplier completes the process, but the last step is that goods are concentrated on a common place - the yard to build a connection. When the goods delivered, the customers A, B, C will go to the freight yard to pick up their own goods.

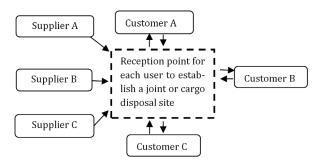


Fig. 3 Shared-off location joint distribution schematic

3.3 Model 3: Distribution facility use type

When many different distribution companies are located in the same city or region, in order to save the investment cost of distribution centres and improve the efficiency of distribution and transportation, many enterprises will establish joint venture partnership and establish joint distribution center, or some enterprises will use the existing distribution centres and distribution facilities to implement distribution jointly for different enterprise users.

Main technical conditions: Firstly, the implementation of joint distribution needs to be guaranteed by perfect logistics facilities, such as transportation equipment, storage equipment, shelves, loading and unloading machinery, office equipment, etc. Secondly, for employees, they must use the appropriate logistics facilities. Then, they need to choose the use and type of standard distribution facilities according to their own characteristics.

As can be seen from

Fig. 4, this is a common type of distribution facilities. In the left column are distribution companies A, B, C, which can also be manufacturers. Their purpose is to use together distribution centres or other facilities, such as sorting machines and warehouses. As mentioned earlier, some companies sell in two seasons, the sales season and the off-season. In the off-season, enterprises do not want to leave warehouses idle, and if they can share facilities and equipment, they will reduce costs. Vehicles can also be used together during distribution. When distribution enter-

prises A and B have customers who need to deliver goods, the vehicles can be used together if the vehicles and locations permit, so as to avoid the distribution enterprises A and B from delivering by themselves.

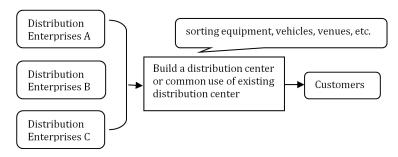


Fig. 4 Distribution facilities using type common schematic distribution model

3.4 Comparative analysis of three models

The three joint distribution of operating models introduced earlier have different characteristics and advantages, and the uses of them are different. We put the following three models here and make a comparison (Table 1).

In fact, each model has its own advantages, and no one is a panacea. Not all companies can apply to the three joint distribution model, and not all business needs a joint distribution. If the cost of a single distribution is less than the implementation of a joint distribution, we do not need to implement it. In the implementation process, the corresponding conditions require more attention paid to personnel management, vehicle scheduling, warehouse distribution, etc. It can be said that joint distribution as a whole, each part of the nodes is not disconnected. There are gains and losses.

Table 1 Comparative analysis of three models

	M1: System optimized	M2: Field connection and sharing	M3: Distribution facilities use
Contrast species			type
Applications in the distribution system	Distribution throughout the application, from the manufacturer to the customer all have to use the whole distribution process	Finally, the application delivery process, only the last link use pick	Applied to a particular aspect of the distribution, use common facilities needed
Advantages	1. It can control the entire distribution process, easy to manage 2. To the greatest possible to meet the needs of suppliers and customers 3. Out significantly lower risk 4. You can cross out the whole distribution process, and focus on strengthening the core competencies	Deliver to the destination can save time and improve distribution efficiency Self-built warehouse cost savings In terms of customers, facilitate their management	Saving the cost of purchasing the facility Easy to use, and you can make a joint application distribution channel
The main technical conditions required	Sound distribution system Professional distribution logistics companies Supporting transport system Support information technology	Relatively concentrated customer location There must be space to build pick point Access to professional yard land management, more customers would easily lead to confusion	Sales of the best seasonal difference To produce a similar product attributes To complete logistics equipment
Suitable business	Basically applies to all businesses, hoping to outsource logistics com- panies	The geographical distribution of the relative concentration of customers, such as supermar- kets, centralized stores, schools, etc.	There are seasonal or a distinguished enterprise logistics links and common use of similar businesses can benefit

4. Beijing Chaopi Trading Co., Ltd joint distribution pattern

4.1. Beijing Chaopi Trading Co., Ltd

Beijing Chaopi Trading Company Limited (Chaopi Company) is a subsidiary of Beijing Jingkelong Group Co., Ltd. The registered capital of this company is 384 million yuan, and the total asset is 1.3 billion yuan. This company engages in FMCG distribution, brand agency, terminal services, logistics and distribution business of commercial wholesale and comprehensive service combined with 3PLs enterprises. The company engages in food, drinks and other FMCG. Operators and agents at home and abroad are more than 300 commercial brands, operating more than 9,000 kinds of commodities, has a long-term and stable sales channels.

4.2 Chaopi Company joint distribution pattern analysis

The business model of Chaopi Company is based on the demand of end customers (Fig. 5). It makes the distribution according to the inventory and product management of the whole supply chain. "Super dispatch model" makes arrangements for delivery time, path planning and quantity. According to the working standards of commodity nature, the utilization rate of cargo hold volume is generally more than 90 % of that of freight cars, and the cost can be greatly reduced. This application model is a typical application of general distribution system optimization in actual distribution.

The joint distribution of the company makes 200-300 suppliers' goods centralized in the logistics distribution centre, and the distribution is arranged in the city according to the customers' orders. Customers can also order in small quantities and in multiple batches according to their own requirements, so as to reduce the bundling of customers' funds and improve the market share of commodity sales. Chaopi distribution centre integrates the orders of different customers into one vehicle, with an average of 10-30 suppliers and 4-5 terminal customers. The distribution and transportation costs are shared by the suppliers, end users and Chaopi Company, so as to reduce the inventory and transportation costs of upstream and downstream enterprises with a huge export and achieve a win-win situation. At the same time, it can also ensure the timeliness of distribution and commodity turnover rate. According to the characteristics that the recovery rate of fast moving consumer goods outside the city is more than 70 %, the distribution solution of "planned replenishment" is adopted, with an average of 150,000 containers per day, of which 750 sets are ordered by customers, 200 containers per day, and 4,500 kinds of products per set; 203 daily working vehicles, with an average of 4000 containers per vehicle. Because the scheme is powerful, and the powerful information platform has set up the "early warning" function, so that suppliers have enough time to allocate goods, so as to minimize the loss. Therefore, the tidal skin model is worth learning from.

If Chaopi do not implement joint distribution model, suppliers A, B and C distribute apart in the previous model. As a result, it is inevitable that there will be no delivery or high vacancy rate, and the distribution model of small batch and multi batch is not suitable for fast-moving consumer goods.

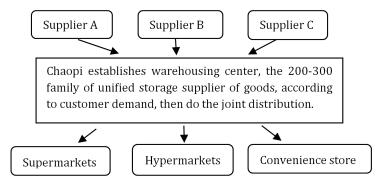


Fig. 5 Chaopi Company joint distribution

Compared to the previous model, it can be seen that Chaopi optimizes the entire middle part of logistics chain and collects all the suppliers and distributors. In this way, the distributor's order is issued to the supplier, and then the delivery plan is implemented to the final delivery. This is a complete system, which reduces duplication and distribution, vacancy rate, etc., and the out rate will be significantly improved. This is good for both suppliers and distributors.

Based on "Chaopi Model" research and investigation, we can make a conclusion that a joint distribution model has significant benefits. In terms of economic or social development, this model is desirable. The advantages are:

• Saving input costs

Select joint distribution model can solve the problems of self-distribution appears to rent the library (or self-built warehouse), vehicle distribution efficiency and management, especially in the season without having to hire more warehouse costs. Variable cost manufacturers choose joint distribution of freight costs just been brought, there will be no investment in fixed costs, which they can use to save money to further strengthen the core competitiveness for the sake of the company's development.

Avoiding shortage cost

Manufacturers consider criteria for the distribution of cost and time from different aspects, but in tight supply, the case of a small amount of orders, there is no choice. Supply not on time will be out of stock, and will affect the sales. Since the joint distribution plan is strong, and there are warnings out, so that manufacturers have "enough" time for stocking ready information platform, so that we can effectively prevent the occurrence of shortage cost.

Increasing turnover

If manufacturers are faced with hundreds of distribution points, sales and inventory requirements are not the same. In order to ensure timely delivery, manufacturers will choose large-tonnage truck delivery, shipping time will be very long, commodity turnover will be increased, and the liquidity of turnover will be affected. In this way, it will cause customers a great impact. Adoption of a joint distribution model, Chaopi Company will integrate each customer's order. In the city, they use the unified distribution, and transportation costs are apportioned to the three parties, greatly reducing inventory costs and transportation costs downstream, while timeliness and turnover rate can be guaranteed.

Improving the overall efficiency of delivery

Import and distribution of trucks loaded cargo compartment, full rate is often less than 50 %, which is a tremendous waste. On the distribution lines, the phenomenon often repeats, and sometimes a small order needs a delivery. Chaopi's joint distribution model is the overall arrangements for the delivery time, times, travel routes and the quantity of goods, delivery route optimization, consolidation work carried out according to the nature of goods, specifications, usually a lorry can be done 4-5 home delivery the amount of cargo tank capacity utilization up to 90 %, an average transport truck supplier 10-30, 3-4 stores 750 containers of goods, delivery vehicles from "floating warehouses" into a "replenishment train".

Logistics and distribution system relies to a large extent complete and convenient urban transport system, starting from the current situation and development trend of Beijing city transportation, logistics and distribution system must take intensive, efficient path, otherwise it is difficult to adapt to the construction needs of the world of the city. Logistics industry with significant economies of scale characteristics, only through continuous integration of various logistics resources to achieve a high degree of intensification and scale, in order to reduce logistics costs of enterprises and society, and joint distribution is not only the realization of highly intensive and large-scale the best choice, but also the construction and development direction of metropolitan distribution system. "Chaopi model" had a very good practice, and achieved good results. It's worth further research and promotion of Chaopi's success.

5. Fast-moving consumer goods joint distribution problems and countermeasures encountered

5.1 Diversification may bring difficulty of management

Management is essential for a business. Generally good management means good development. The inevitable thing of joint distribution of Chaopi is that the ownership relations are too complicated. There exist some disadvantages: different circulation levels, inefficient distribution, and diverse requirements. Each client will have their own distribution requirements, and no one will put the common interests first, so that the management will be difficult. Organization and coordination will be very difficult.

FMCG achieves unified logistics and distribution decisions on the distribution of this platform. It's unnecessary for the companies to hire many managers, and what they should do is have clear division of labour, to prevent each manager being responsible for only one aspect of the mission. Only in this way, will we ensure few errors and more harmonization of all corporate merchandise storage, distribution and other aspects.

5.2 The distribution of benefits may cause disagreement

When doing the joint distribution, what various vendors required the number of items or attributes are not the same. For example, they are used in the same vehicle distribution, some bulky, but lightweight, and some heavy weight, but occupy less area, so items are on the same car, how to count the costs of distribution, we need to have them clearly defined. So when the joint distribution assets to strengthen the internal organizational structure put into use, the division of transparency need monitor efforts to improve the cost-sharing mechanisms and public distribution of benefits principle, need to sign joint distribution agreement for those participating in a more stable unit must, need to focus strictly on divided responsibilities, rights and benefits, members must abide by every cooperation, and need to assume their respective responsibilities and equal treatment. Only by doing so, can each company successfully implement joint distribution.

5.3 The logistics standardization is difficult

If you want to have a greater joint distribution costs of exploitation, logistics standardization is a factor which cannot be unconsidered. Due to differences between each enterprise product packaging, volume, weight, etc., the goods stacked, placed on the link will face great difficulties. Logistics will involve the issues of choice and reference, which are obstacles the joint distribution need to overcome.

Enterprises can start from the inside of the logistics system, overall, the development of technical standards for its various subsystems of facilities, equipment, special tools, etc., and operations standards. Secondly, studies between each subsystem technology standards and business standards will work. According to the requirements, the standard of the entire logistics system is uniform. After studying logistics systems and other systems related to seek unified standard system of logistics, making the logistics standardization can be easy to promote the implementation.

5.4 It's easy to reveal business secrets

Joint distribution is likely to result in the disclosure of business secrets, since the implementation of a joint distribution pattern should be unified management, unified planning and scheduling. Since each company wants unity, we need to discuss and communicate. However, in the distribution process, the expansion list may leak. In the same industry, due to the sharing of information and open, competitive strategy, business development will adversely affect, which is one of the reasons why many companies do not participate in joint distribution.

Therefore, enterprises should pay attention to this aspect, and strengthen management, so as to avoid supplier information leakage. The implementation of a common distribution is to the trust as a precondition. In addition, we need to take effective prevention, surveillance measures to strictly control systems, and make the best-marked confidential matters cooperation agreement, specifying the rights and obligations.

6. Conclusion

In this paper, we did an in-depth research in a joint distribution business model, including joint distribution of conceptual meaning, with three business models and future development, and so on. Based on this, the paper focuses on the logistics of joint distribution, with an example of Beijing Chaopi Trading Company, who uses joint distribution system optimization model to bring the maximum benefit for its producers and sellers, and what the company should pay attention to. On the other two models, joint distribution field connection and sharing and distribution facilities use models, the paper analyzes their processes, features and technical support. Then the paper tells the future direction of development of joint distribution. The purpose of the paper is to let more people know the joint distribution, more in-depth understand the joint distribution, and to choose their own model of operation of enterprises.

Possible shortcomings of this paper are: First, there may exist some cognitive bias or insufficiency of the joint distribution due to most respect and regard of Beijing Chaopi Trading Company, and lack of enough information may have an impact on research. Second, the paper will inevitably have some flaws limited by the individual's knowledge and ability, and we look forward to your corrections.

In fact, China's logistics market potential is huge, and the implementation of joint distribution management will become the development trend of modern logistics. Realization of joint distribution has a long way to go, and the process is bound to encounter a lot of frustration. However, no matter how hard the process, joint distribution will be widely used for the majority of enterprise logistics efficiency, comprehensive, and competitiveness enhancement. From the international market, Japan and other countries are in very common use of joint distribution model. I believe, in the near future, our country will see the benefits brought by joint distribution and use it in a wide range.

No matter from the economic level or social level, the joint distribution model is reasonable. However, in the actual operation, joint distribution companies have many problems to resolve, like different commodity business or attributes. From the perspective of competition, some large companies are reluctant to share with others, because it will increase the cost of other distribution enterprises and enhance the rival's competitiveness. From the perspective of interests, every enterprise does not want to disclose its business secrets, but sometimes it can be seen as "secret" from the orders of some enterprises. So many companies are making some "inconsistency", which requires the guidance of the government. It is understood that China's current policies, no matter in law, have many things to do for a normative system, while some developed countries have established relatively sound laws. The core of joint distribution is to organize distribution uniformly, save cost, save social resources and improve transportation. Therefore, many countries are actively promoting this model, coordinating the logistics distribution capacity and improving the logistics environment. For example, they are trying to solve the problem of distrust among enterprises. Because there is no sound legal system now, I don't know which party the responsibility belongs to, nor which makes some enterprises dare not try. When the government intervenes, there are clear legal provisions and the implementation of supervision can effectively solve these problems. Therefore, we expect the government to attach importance to the logistics industry, and through the joint efforts of relevant departments, the city will have a substantial joint distribution development pattern.

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References

- [1] Vieira, J.G.V., Fransoo, J.C. (2015). How logistics performance of freight operators is affected by urban freight distribution issues, *Transport Policy*, Vol. 44, 37-47, doi: 10.1016/j.tranpol.2015.06.007.
- [2] Gómez, S.C.G., Cruz-Reyes, L., González, B.J.J., Fraire, H.H.J., Pazos, R.R.A., Martínez, P.J.J. (2014). Ant colony system with characterization-based heuristics for a bottled-products distribution logistics system, *Journal of Computational and Applied Mathematics*, Vol. 259, Part B, 965-977, doi: 10.1016/j.cam.2013.10.035.
- [3] Wu, Y.-C.J., Huang, S.K. (2013). Making on-line logistics training sustainable through e-learning, *Computers in Human Behavior*, Vol. 29, No. 2, 323-328, doi: 10.1016/j.chb.2012.07.027.
- [4] Liu, Y. (2015). An empirical study on customers' satisfaction of third-party logistics services (3PLS), In: *Proceedings of the 2015 International Conference on Education, Management and Computing Technology,* Atlantis Press, 1361-1365, doi: 10.2991/icemct-15.2015.282.
- [5] Cabigiosu, A., Campagnolo, D., Furlan, A., Costa, G. (2015). Modularity in KIBS: The case of third-party logistics service providers, *Industry and Innovation*, Vol. 22, No. 2, 126-146, doi: 10.1080/13662716.2015.1023012.
- [6] Lopes, H.S., Lima, R.S., Leal, F. (2020). Simulation project for logistics of Brazilian soybean exportation, *International Journal of Simulation Modelling*, Vol. 19, No. 4, 571-582, doi: 10.2507/IISIMM19-4-529.
- [7] Aguezzoul, A. (2014). Third-party logistics selection problem: A literature review on criteria and methods, *Omega*, Vol. 49, 69-78, doi: 10.1016/j.omega.2014.05.009.
- [8] Shi, Y., Zhang, A., Arthanari, T., Liu, Y. (2016). Third-party purchase: An empirical study of Chinese third-party logistics users, *International Journal of Operations & Production Management*, Vol. 36, No. 3, 286-307, doi: 10.1108/IJOPM-11-2014-0569.
- [9] Moutaoukil, A., Neubert, G., Derrouiche, R. (2015). Urban freight distribution: The impact of delivery time on sustainability, *IFAC-PapersOnLine*, Vol. 48, No. 3, 2368-2373, doi: 10.1016/j.ifacol.2015.06.442.
- [10] Freile, A.J., Mula, J., Campuzano-Bolarin, F. (2020). Integrating inventory and transport capacity planning in a food supply chain, *International Journal of Simulation Modelling*, Vol. 19, No. 3, 434-445, doi: 10.2507/IJSIMM19-3-523.
- [11] Hu, H., Wu, Q., Zhang, Z., Han, S. (2019). Effect of the manufacturer quality inspection policy on the supply chain decision-making and profits, *Advances in Production Engineering & Management*, Vol. 14, No. 4, 472-482, doi: 10.14743/apem2019.4.342.
- [12] Trappey, A.J.C., Trappey, C.V., Govindarajan, U.H., Chuang, A.C., Sun, J.J. (2017). A review of essential standards and patent landscapes for the internet of things: A key enabler for Industry 4.0, *Advanced Engineering Informatics*, Vol. 33, 208-229, doi: 10.1016/j.aei.2016.11.007.
- [13] Li, H.-Y., Xu, W., Cui, Y., Wang, Z., Xiao, M., Sun, Z.-X. (2020). Preventive maintenance decision model of urban transportation system equipment based on multi-control units, *IEEE Access*, Vol. 8, 15851-15869, doi: 10.1109/ACCESS.2019.2961433.
- [14] Awaga, A.L., Xu, W., Liu, L., Zhang, Y. (2020). Evolutionary game of green manufacturing mode of enterprises under the influence of government reward and punishment, *Advances in Production Engineering & Management*, Vol. 15, No. 4, 416-430, doi: 10.14743/apem2020.4.375.
- [15] De Marco, A., Cagliano, A.C., Mangano, G., Perfetti, F. (2014). Factor influencing logistics service providers efficiency in urban distribution systems, *Transportation Research Procedia*, Vol. 3, 499-507, doi: 10.1016/j.trpro. 2014.10.031.