

Optimizing operation pattern of VMI in bonded logistics

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Keywords: supply chain; supplier management inventory; VMI; bonded logistics; operation mode optimization

Abstract: The use of vendor managed inventory (VMI) strategy in the bonded logistics enables to bring great benefits for the supply chain operation, such as promoting the development of China's bonded logistics, reducing the operation cost of the supply chain, and helping to make efficient bonded policy of supply chain. This paper first summarizes the development and the main characteristics of VMI in bonded logistics, introduces the key factors and existing problems of using VMI in bonded logistics business and then analyses -the basic requirements, application, scope and synergistic effect of VMI in bonded logistics. According to the case and the application of VMI operation mode, this paper proposes an optimization scheme of the supply chain, including the optimized proposals and application suggestions of the operation mode of the bonded logistics VMI. This provides a decision-making support for business operators who manage the bonded logistics, commerce, manufacturing and other related industry managers.

1. Introduction

In order to adapt the new requirements of the new situation, promote the steady growth of foreign trade and the upgrading of transformation and promote healthy steady economic development, it needs to accelerate the innovation of special customs supervision system, extend the improving experience of free trade area and special customs supervision pilot, so as to develop the port economic growth pole through integrating processing, circulation, modern logistics, and cultural tourism, etc. The construction and operation of special customs supervision areas, such as comprehensive bonded area, bonded port area and export processing area, as the platform and carrier of "internal customs and external customs", will further promote the logistics cooperation and linkage development between inland and coastal and border ports. The implementation of the bonded logistics VMI operation mode can enable the whole supply chain to obtain the bonded policy; the combination of bonded logistics and VMI strategy will produce good synergistic effect, reduce the overstock of inventory in bonded logistics, reduce storage cost, realize effective integration of resources, and improve the operating efficiency of supply chain (Lixin Zhou, 2004). Based on the current development situation of trade and cross-border electricity in recent years, combining with the service function and policy of the comprehensive free trade zone, bonded logistics center and other areas under special customs supervision, this article summarizes the VMI

and bonded logistics development situation and the main characteristics, analyzes the application of VMI in the bonded logistics strategy, proposes optimized bonded logistics VMI operation mode, and gives suggestion of using VMI operation mode in the bonded logistics application.

2. Development Situation and Mainfeatures of Vmi and Bonded Logistics

2.1 Development Situation of VMI and Bonded Logistics

2.1.1 Development of VMI

VMI is well developed abroad. The cooperation between p&g and wal-mart in 1980s enabled VMI to be successfully applied in practice (Chunguang Quan, 2010). After that, more and more industries began to follow it, such as retail Kmart, telecom company Bell Canada, medical system and automobile industry. However in China, VMI is still in the exploratory stage. Some large domestic enterprises with rapid development, such as lenovo group, has implemented VMI management on upstream raw material suppliers since 2004, and has achieved good benefits. Meanwhile, large enterprises such as haier, midea and huawei have successfully applied VMI (Hong Xiao, 2007). In particular, many foreign multinational companies mainly use VMI to manage their distributors in China, such as foxconn and Intel.

2.1.2 The development of bonded logistics

At present, bonded logistics is developing rapidly in China. There were 169 special customs supervision areas in China until 2016, of which 58 were operated in comprehensive bonded areas. The comprehensive bonded zone, as an advanced type of customs special supervision area, has many service functions such as bonded processing, bonded logistics and bonded storage. There are also numerous bonded logistics centers, bonded port areas and other types of special customs supervision areas nationwide. The development of bonded logistics business will play an important role in regional economic development.

2.2 Main Features of VMI and Bonded Logistics

2.2.1 The main features of VMI

Supplier managed inventory should be a method that the supplier monitors the user level and periodically executes replenishment decisions involving order quantity, shipment and related operations (Waller, M., 1999). VMI strategy is a mode of rapid material distribution between suppliers and users through the rapid operation and information processing of third-party service providers. The main features of VMI are as follows.

(1) The goods are stored in users' warehouse, but they belong to the supplier. Users decide the inventory level and the strategy of continuous replenishment through consultation with the supplier, and carry out distribution and safety replenishment according to the actual production volume;

(2) It is suitable for products with price sensitivity and high market risks. At the same time, products present high demand response requirements, complex manufacturing, and a large number of parts to be purchased. This makes demand unstable and difficultly determines the quantity of material preparation.

(3) If the third-party logistics enterprise is involved in the management of inventory, the third-party logistics shall have comprehensive resources, such as transportation, warehouse, business processing personnel, logistics operation and customs clearance operation personnel, etc;

(4) Most of the enterprises applying VMI mode are multinational enterprises engaged in the

manufacturing of electronic products, based on the time-sensitive operation strategy of "quick clearance, prior post-release and direct switch".

2.2.2 The main features of bonded logistics

"Bonded logistics" can be defined as the import and export activities of goods under the bonded state, such as transportation and distribution, warehousing and inventory, circulation and processing under the supervision of the customs. It specifically refers to the business related to warehousing, distribution, transportation, circulation and processing, loading, unloading and handling, and logistics information within the customs supervision area. The main features of bonded logistics are as follows.

(1) It is not only the connecting area of international logistics and domestic logistics, but also a system boundary crossing area;

(2) To enjoy the "internal and external customs" system implemented by the customs as well as other special policies on taxation, foreign exchange and customs clearance;

(3) The whole process from entry, storage or processing to re-shipment of exports, the entry of goods is the starting point, and the final settlement is the end point, which is a linear management process;

(4) In addition to the basic logistics elements (transportation, warehousing, information service, distribution, etc.), bonded logistics also includes the key elements such as customs supervision, port, bonded, customs declaration and tax refund, which are closely combined to form a complete bonded logistics system.

2.3 Key Factors of Carrying Out VMI in Bonded Logistics Business

According to the main features of VMI and bonded logistics, the key factors of carrying out VMI in bonded logistics are as follows:

2.3.1 Customs openness

In the process of using VMI, users can quickly respond to the needs of enterprises, especially in the international logistics operation process. The goods are mainly bonded goods, which need to be cleared when entering or leaving the warehouse. Therefore, at the present stage, the customs has gradually realized the agile strategy of "batch shipment -- centralized declaration -- tax guarantee -- first release and later tax -- green channel" for the customs clearance of high frequency and small batches of goods. The opening policy of customs clearance has been gradually improved, which will largely support the application of bonded logistics VMI (Peng Dong, 2013).

2.3.2 Cooperation mechanism of suppliers, users and third party logistics

Cooperation between suppliers, users and third-party logistics companies is conducive to changing the business model starting from the maximization of enterprises' own interests and the maximization of overall interests. Among them, trust is the most problematic link, and building a sound credit system will be the foundation of VMI strategy application. In order to highlight the benefits of VMI application, it is necessary to further strengthen the cooperative partnership, standardize the cooperation mechanism, develop efficient communication, exchange accurate information, and carry out sustainable cooperation and consultation.

2.3.3 Information system on time, sharing and interaction

Due to the problem of Information Island, information transmission between enterprises is often

blocked, which restricts the use of VMI in bonded logistics. Therefore, enterprises can develop corresponding software and external interfaces to provide software support for enterprises to implement VMI according to their own characteristics, so as to achieve connectivity between enterprises and realize timely information sharing and exchange.

2.3.4 VMI inventory operation management capability

It includes integrating modern enterprise management thought and innovation consciousness, combining with enterprise's own characteristics, improving the ability of management personnel and operation personnel, and improving enterprise management and operation level. Third-party logistics companies can apply and develop advanced management methods to provide enterprises with professional services, integrate and utilize social resources, optimize the entire supply chain system, reduce enterprise costs, and realize supply chain service integration.

2.3.5 Advanced management ideas and professional talents

In the process of implementing VMI mode, professional talents are needed to change the management thought of the enterprise. Advanced technology and information processing mode can be adopted to promote business process reorganization and make it adapt to VMI mode.

2.4 Problems of the Bonded Logistics VMI Operations

In the process of implementing VMI, enterprises need to establish a perfect information platform and timely update information such as logistics and inventory to improve the efficiency of VMI operations. At the same time, under the influence of national customs policies, enterprises may have conflicts with policies in the implementation of bonded VMI mode. How to properly use VMI mode under the supervision of customs is also a problem that enterprises need to consider at present, mainly as follows:

(1)According to the survey of enterprises around the bonded area, most of the enterprise information systems have not yet built the VMI-based information system, lack of cooperation awareness among enterprises, incomplete construction of enterprise credit mechanism, and delayed information communication, which reduces the operating efficiency of the VMI model.

(2)In order to implement the bonded logistics VMI mode, enterprises need to set up relevant supporting facilities that meet the requirements of the customs, and at the same time arrange special staff to conduct cargo safety inspection and send the inventory information to the customs for verification, which increases the operation cost of enterprises.

(3)In the implementation of VMI mode, in order to meet the requirements of customs electronic purse seiners, enterprises need to change their original internal systems, logistics, customs clearance and other operational processes to improve the system operation, so that the goods can be quickly declared and cleared, but at the same time, they also bring inconvenience to themselves. The original operation process is changed to increase the problem of operation nodes, and enterprises need to spend a lot of energy to deal with these problems encountered in the operation (Zilu Zhao, 2009).

(4)Most of the goods in the bonded logistics VMI warehouse are bonded goods. It needs to go through customs clearance procedures for these bonded goods to enter and exit the bonded warehouse. These procedures involve several departments such as the customs, customs clearance management department and port customs logistics supervision department, which will reduce the speed of goods clearance, thus making goods overstocked, reducing the utilization rate of warehouse and increasing the cost of warehousing operation. In order to clear the goods as soon as possible, some suppliers choose to store a certain amount of duty-paid inventory in the warehouse,

which can improve the efficiency of the import and export of goods, but there is still a backlog in the inventory (Xiaoyi Jiang, 2010).

(5) In the VMI model, third-party logistics enterprises are often used to manage inventory, while third-party logistics companies often conduct customs declaration in their own names, leading to the third-party logistics companies that operate, declare and receive goods on the customs declaration forms, which is inconsistent with the actual property owners.

(6) In developed coastal areas, China's customs authorities give priority to trial implementation of the mode of "first out, first reported, and centralized customs declaration". However, due to the lack of details of relevant regulations, actual supervision requirements of each customs are different. However, it increases the management difficulty for enterprises setting VMI projects at multiple ports. For some companies which are involved in transshipment bonded transport across customs areas, because the information cannot be digitized, it results in their delayed information transmission and delayed inventory allocation (Wenwu Que, 2013).

3. Application Analysis of Bonded Logistics Vmi

3.1 Basic Requirements for the Application of Bonded Logistics VMI

3.1.1 Construction of bonded logistics center supplier transit warehouse

Areas under special customs supervision (or areas) can provide public bonded warehouse, bonded logistics for the supplier. Suppliers can establish main facilities such as transit warehouse, and have a certain amount of safety stock in transit warehouse (Huijun Zhu, 2012), which meet the demand of a number of production materials from inside and outside users, and even meet their needs of JIT production. The transit warehouse itself shall be equipped with an effective management system. When the inventory is below the safety threshold, the transit warehouse shall send the notice of material replenishment to the supplier. Meanwhile, the transit warehouse can also send a waiting material warning to the supplier and the manufacturer, reminding them of dealing with this material as soon as possible.

3.1.2 Convenient and fast traffic conditions of transit warehouse

The transit warehouse should be located close to the factory. Depending on its location advantage and the transportation network of the inner and outer factories, it can realize quick distribution and meet the production demand of the factory.

3.1.3 All-weather operation ability of transit warehouse

In order to meet the continuity of JIT production and 24-hour production, the temporary change of production schedule may require the transit warehouse to have the ability of replenishing materials at any time, so the transit warehouse should also have the ability of all-weather delivery (Ming Xiang, 2003).

3.1.4 Establishing a common information system Shared by related parties

A public information system linking the supplier, the customs, users and transit warehouses is developed to, realize the communion of the user's production logistics requirements planning system, the supplier's production plan system, transit warehouse management system and docking of customs supervision and control system, all kinds of business information and processes, including receiving instructions and confirmation, delivery instructions and confirmation, inventory information, customs supervision through public information system can realize automatic sending

information, such as data updated in real time and automatic forwarding business processes.

3.1.5 Appropriate trade cooperation between both parties

In order to restrain both sides, we should adopt appropriate trade cooperation mode and establish a long-term cooperation mechanism. For example, whether the supplier bears all risks and costs of transporting the goods to the designated destination, and whether it includes any "taxes and duties" (such as customs duties and risks, as well as fees, duties, duties and other expenses) payable required by customs formalities in the country of destination. Whether the user shall bear such "taxes and fees" and the costs and risks caused by his failure to timely complete the customs clearance procedures for the import of goods.

3.2 Scope and Object of Bonded Logistics VMI Application

3.2.1 Applicable scope being transnational procurement or distribution of various goods

VMI is applicable to electronic communication products with price sensitivity and high risk of price reduction, products with high response level, complex manufacturing and multi-party procurement of parts and components, and products with extremely unstable demand and difficult to store in advance. Since bonded logistics is only for import and export business services. This nature limits the scope of business applied by VMI in bonded logistics to cross-border procurement or distribution of various goods.

3.2.2 The applicable object being foreign trade enterprises or third-party logistics companies with convenient transportation conditions

Due to the VMI transit warehouse established by the supplier in the special customs supervision area (or place), in order to ensure timely delivery and its own unique advantages, the applicable objects of VMI in bonded logistics are trade enterprises or third-party logistics companies close to the transit warehouse or with convenient transportation.

3.2.3 Suitable for enterprises in retail and manufacturing industries

The most obvious examples are wal-mart and dell. They have a common feature that they are very close to the final consumers in the supply chain, that is, at the end of the supply chain.

3.3 Synergistic Effect of the Application of Bonded Logistics VMI

The combination of advantages of the two will produce great synergistic effect, which not only realizes information sharing between the supply and demand parties, reduces or eliminates the bullwhip effect, but also integrates supply chain resources and improves supply chain efficiency.

Because the production enterprises have no need of the inventory of production enterprises, it makes their inventory production be close to zero, Thus it save production enterprises in the international procurement inventory cost and artificial cost. At the same time, the supplier inventory located in the areas under special customs supervision (or place) also brought bonded policy advantages for suppliers and overseas competitive advantage.

4. Optimization of Operation Mode of Bonded Logistics Vmi

4.1 Application Case Analysis of Bonded Logistics VMI

A large international enterprise has global suppliers. Before the implementation of VMI, multinational procurement is often conducted with the supplier for the delivery of goods rights, through the customs declaration company for customs declaration and inspection, and then by the third-party logistics company to transport the goods. Due to the complex procedures, long ordering period, and high safety stock threshold, the warehouse cost control of enterprises is greatly challenged (Zhuoshun Yao, 2011).

By setting up public bonded warehouses in special customs supervision areas (or places), user enterprises and their suppliers have set up VMI transit warehouses in special customs supervision areas (or places). User enterprises save inventory costs and labor costs by not setting up warehouse in the factory area. Suppliers first place inventory in VMI transit warehouse, centrally customs declaration in advance, enjoy bonded policy advantage, and set safety stock, order cycle and order quantity according to the actual needs of enterprises of various ChangDian, ensure 24-hour uninterrupted supply, meet the demand of the user enterprise JIT production, improve the user enterprise production cycle, reduce the user enterprise inventory cost, and improve the international competitiveness.

4.2 Current Operation Mode of Bonded Logistics VMI

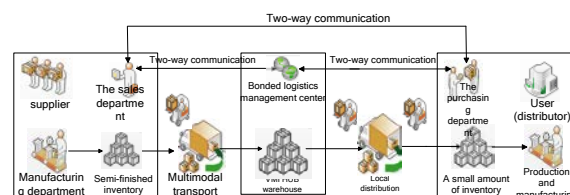


Figure 1 Current VMI operation mode in bonded logistics

As shown in figure 1, when the supplier stores the goods in the special customs supervision area (or place), it enjoys the bonded policy and makes the centralized declaration in the VMI transit warehouse. When the supplier receives a purchase order from the user, it immediately sends the purchase information to the receiving system of VMI transit warehouse through the fixed electronic format, so as to make the VMI transit warehouse to receive the goods.

The goods are in bonded condition in transit warehouse. After the completion of production, the supplier will transport the goods to the transit warehouse by means of multi-modal transport. The transit warehouse will receive the goods according to the warehousing notice, and quickly apply for centralized customs declaration to the customs. When the user send the requirement of material, the supplier will deliver the goods to the user in time according to the status of the transit warehouse.

4.3 Optimization of Operation Mode of Bonded Logistics VMI

4.3.1 Establishing a public information platform for customs, suppliers, users and VMI transit warehouses

It needs to develop the information system solutions of bonded logistics VMI supply chain integration and bonded logistics VMI service oriented, including cross-border electricity supply chain public information platform (platform) or a single window, as shown in figure 2, and then to realize the real-time information sharing between upstream and downstream enterprises and flow

temporary allocation is sent to the supplier. If a user enterprise wants to realize JIT production, it can't allow any delay of any link. Otherwise, the shortcoming effect of one link will endanger the efficiency of the whole enterprise and even the supply chain.

5. Suggestions on the Application of Bonded Logistics Vmi Operation Mode

(1) Cooperation with supply chain enterprises in inventory management

In the past, enterprises sought to maximize their own interests. There was a lack of information communication between related enterprises. In order to make the VMI operation mode to maximize utility, and all the interests of the whole enterprise cooperation being greater than their own interests, it requires enterprise change ideas, to upgrade the enterprise internal and external process, to strengthen the information communication between the various departments, to realize the effective cooperation between departments and enterprises, and to improve overall operating efficiency.

(2) Developing third-party logistics and VMI integration services

It needs to promote the non-core business outsourcing of production and business enterprises, develop the integrated service of third-party logistics and VMI, and truly realize the bonded logistics VMI service integrating logistics, capital flow and information flow. The integration of third-party logistics and VMI can realize the economy of medium and small batch inventory of the supply chain, and also provide convenient logistics services to both the upstream and downstream suppliers and suppliers of the supply chain. During this period, the role of third party logistics in integrated services should be clarified and scientific operation process should be designed.

(3) Strengthening the research and development of the bonded logistics VMI intelligent system

Intelligent technologies, such as bar code technology, RFID technology and automatic sorting technology, can not only improve the operational efficiency of logistics business, but also reduce the frequent mistakes of manual work. In the operation mode of bonded logistics VMI, attention should be paid to the development of intelligent technologies, equipment and platform systems. When warehousing enterprises use these intelligent technologies, the system should be configured and adjusted.

(4) Defining customs clearance rules and establishing customs management platform

It needs to establish effective rules for "centralized customs declaration" and introduce the management system for centralized customs declaration; The customs information network should be realized as soon as possible, and a unified customs network monitoring platform should be established to update the customs declaration information in a timely manner. The platform can connect the supplier's customs declaration data and customs clearance data seamlessly, and support online application and online inquiry and other convenient services.

(5) Strengthening support for the bonded logistics VMI model

It needs to increase support for the operation mode of the bonded logistics VMI, promote the understanding of enterprises on the application of VMI strategy and supply chain management in the bonded logistics, and promote enterprises to strengthen the cooperation between each other and improve the degree of trust between them. Industry associations or intermediary platforms provide information support, trust supervision and guarantee for upstream and downstream enterprises, and provides preferential land policy support for suppliers to establish VMI transit warehouses. We will increase investment in transportation, communications, power, etc., and provide preferential tax policies to enterprises that build VMI transit warehouses, so as to improve customs clearance efficiency.

6. Conclusion

VMI is inventory management's transcendence of enterprise boundary. It aims at gaining the

extra value by strengthening coordination, communication, understanding and trust between enterprises on the premise of pursuing enterprise professional division of labor benefits. Based on the introduction of VMI and bonded logistics, this work summarizes the present situation of the bonded logistics VMI operation problem. Through the analysis of the application of VMI in bonded logistics cases we propose the bonded logistics VMI mode optimization of information Internet content based on the four sides (customs, suppliers, users, and VMI transit warehouse), and application suggestions, such as the cooperation between enterprises of supply chain inventory management, the development of the third logistics and VMI integration services, strengthening the research, and the development of intelligent systems and platforms. In order to implement and promote the operation mode of the bonded logistics VMI, it is necessary to study the cooperation mechanism and operation process of the bonded logistics VMI.

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