

Research and Optimization Strategy of SAIC Anji Logistics

VMI Model Based on Lean Supply Chain

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Abstract. According to relevant statistics, in the value-added process of the supply chain, only 10% of the activity time is value-added, and 90% of the time is wasted. Through a series of analysis, an important reason for these problems lies in the backward distribution and inventory management methods. Traditionally, each link of the supply chain has its own inventory control objectives and corresponding strategies, and there is a lack of information communication between each other. Monopolizing inventory information with each other inevitably produces "bullwhip effect", which makes suppliers unable to meet users' demands quickly and accurately. Gradually, a new supply chain inventory management method - VMI came into being, which broke the traditional separate inventory management mode, embodies the integrated supply chain management thought, and is a new representative inventory management thought. Aiming at the concepts of lean supply chain, inventory management, VMI and third-party logistics, this paper mainly tries to systematically study the implementation mode of VMI and analyze the comprehensive benefits of VMI mode, thus laying a foundation for establishing an open and transparent inventory management and supervision mode.

Keywords: lean supply chain, inventory management, VMI model

1. Introduction

After decades of continuous exploration, China's automobile manufacturing industry has become an important base for global whole parts and vehicle production. With the increasing maturity of China's automobile market and the increasingly fierce price competition, China's automobile manufacturers must try every means to find a way out and reduce production costs, while improving efficiency through management is the key to the survival and development of enterprises. According to Standard & Poor's research report, how to reduce production costs remains a major challenge for automobile manufacturers in the next few years. Although the first consideration of automobile manufacturers is to reduce procurement costs, it is no more than the transfer of costs from the downstream to the upstream of the supply chain, and the total cost of the supply chain will not decrease significantly. In addition, the procurement cost is

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affected by many uncertainties, which leads to more and more rigidity. Therefore, lowering logistics costs is increasingly favored by enterprises in many ways to reduce costs and increase efficiency. However, it is impossible to coordinate the relationship between different enterprises at each node of the supply chain in the actual operation process without the powerful information sharing platform. In the traditional procurement process of auto industry parts, both suppliers and demanders often manage their own affairs and monopolize inventory information. Moreover, they lack the necessary communication, leading to the lag and distortion of demand information. Suppliers in the upstream of the supply chain tend to maintain better inventory levels than those downstream, creating a so-called bullwhip effect.

Therefore, the automobile industry has chosen the third-party logistics for JIT production. Some well-known third-party parts supply logistics enterprises in China, such as SAIC Anji Logistics Co., Ltd. (hereinafter referred to as Wuxi SAIC), have successfully reduced logistics costs from lean supply chain, bringing considerable economic benefits to automobile manufacturers and automobile parts manufacturers. Among them, Wuxi SAIC adopts the advanced inventory management mode - Vendor Managed Inventory (VMI) mode in order to achieve a higher customer service quality with a more reasonable inventory level.

2. An Overview of VMI Model Based on Lean Supply Chain

2.1 An Overview of Lean Supply Chain

Lean Supply Chains derive from Lean management. From product design to customer acquisition, it integrates the steps necessary for the entire process with partners to quickly respond to the changing needs of customers. Its core lies in logistics balance and the pursuit of zero inventory, creating more value driven by customers themselves, and maximizing customer needs with as few resources as possible. The emergence of lean supply chain has become an effective method to reduce waste, reduce cost, shorten operation cycle and provide enhanced customer value so as to enhance the competitive advantage of enterprises. Lean supply chain has also gradually derived a set of unique production management and logistics system in the exploration of automobile manufacturing.

2.2 An Overview of VMI

The alleged VMI (Vendor Managed Inventory) refers to a cooperative strategy that aims to achieve the lowest cost for both the manufacturer/retailer and the supplier, and manages the inventory by the supplier under a common agreement so as to continuously improve the Inventory management. This inventory management strategy breaks the traditional inventory management mode in which the supply and demand parties act independently and embodies the integrated management idea of supply chain. At the same time, it adapts to the requirements of market changes and is a new and representative thought of inventory management.

With regard to Vendor Managed Inventory (VMI), timely delivery can be measured by relative inventory levels due to the lowest and highest inventory points. In theory, VMI management model is developed from QR (Quick Response) and ECR (Efficient Customer Response). Both sides of the transaction have changed the traditional independent forecasting model, and effectively overcome the "bullwhip effect" under the traditional inventory

management model. It minimizes the waste of logistics, capital flow and information flow caused by independently predicted uncertainty, thus improving the overall operational efficiency and competitiveness of the supply chain and reducing the total cost of the supply chain.

VMI features: on the one hand, information sharing. Based on the production/sales point data, the supplier can make a forecast of the demand, so as to determine the passenger and goods volume more accurately. It can reduce the uncertainty of prediction, thus reducing the safety inventory and making the storage and supply cost less. At the same time, suppliers will think more about inventory and manage it as efficiently as possible, further reducing total costs by coordinating production and distribution across multiple retail outlets. On the other hand, given that the supplier has inventory, it is possible for the manufacturer/retailer to eliminate unnecessary ordering departments, automate human tasks, remove unnecessary control steps from the process, and lower inventory costs and higher service levels. Suppliers can respond to user demand more quickly and improve service level, so that the inventory level of manufacturers/retailers is also reduced. However, the manufacturer/retailer has an obligation to take care of the stock and is responsible for any damage or damage to the stock.

3. Analysis of VMI Model Based on SAIC Anji Logistics Co., Ltd.

3.1 Brief Introduction of SAIC Anji Logistics Co., Ltd.

Founded on June 12, 2002, SAIC Anji Logistics Co., Ltd. is the first Sino-foreign joint venture automobile logistics company in China. At present, it has 6 joint ventures and 16 companies nationwide. The object of this paper is SAIC Anji Logistics Co., Ltd. (hereinafter referred to as "Wuxi Anji"). Wuxi Anji, founded in June 2011, is located in Huishan Economic Development Zone, the hinterland of the Yangtze River Delta, the most developed region in China. With a storage area of nearly 200,000 square meters, it is engaged in automobile, parts logistics and related logistics planning, logistics technical consultation, planning, management, training and other integrated logistics. Based on the core values of "customer-centered, active, enthusiastic, innovative, teamwork, honest and trustworthy, efficient execution, and achieving dreams", Wuxi Anji provides SAIC and other manufacturers with unique supply chain services of logistics integration, technology, networking, transparency and reliability.

Wuxi Anji's core business mainly involves VMI logistics, inbound logistics, vehicle logistics, SKD export logistics and after-sales logistics. In order to get the greatest benefit with the smallest investment, cost management has become a top priority in Anji, Wuxi. In order to solve this problem, Wuxi Anji began to implement VMI mode in 2015 in order to understand the current situation of its logistics operation from a global perspective, clarify the current key issues and breakthroughs, and find solutions to improve the overall operational efficiency of enterprises.

3.2 Feasibility Analysis of VMI Implementation in SAIC Anji Logistics Co., Ltd.

From the classification, the auto parts supply chain is a typical VMI model with manufacturer as the core. In this VMI model, whether for manufacturers or suppliers, its core competitiveness is mainly reflected in its production and manufacturing, rather than logistics

and distribution. In other words, its core business lies in the design and production of cars rather than logistics. In this context, Wuxi Anji, as a third-party logistics service provider, is the most suitable to manage warehouses for Saic. In view of this, Wuxi Anji must meet the following feasible conditions when participating in VMI:

- 1) Economic feasibility. The smooth implementation of VMI is mainly due to the formation of cooperative alliance of node enterprises. Businesses share benefits through cooperation. Through the establishment of strategic partners, manufacturers, suppliers and railway Wuxi Anji can greatly improve the operation efficiency, so as to maximize the logistics efficiency. At the same time, the logistics cost of the whole supply chain can be reduced to the minimum, which is economically feasible.
- 2) Technical feasibility. It can be said that the participation of third-party logistics in VMI can enable the service party to use the network to achieve the sharing of information resources, so it needs the support of powerful information technology. The implementation of VMI requires a large amount of infrastructure investment, and all parties need to constantly update information to improve the system. However, the core competitiveness of a single auto manufacturer or auto parts manufacturer is not here, so it is difficult to update their resources and skills in a short time. Wuxi Anji has obvious advantages in this respect. Through scientific and technological innovation, it establishes an IT platform with complete functions, covering suppliers and distributors, resource sharing and unified norms, which supports logistics operation and realizes real-time information sharing, thus promoting the scientificization of logistics management and greatly improving logistics efficiency and goods flow efficiency.
- 3) Feasibility of trust mechanism. In the operation of VMI, there is a problem of insufficient trust between the supplier and the demander. As a third-party logistics participant, Wuxi Anji can effectively eliminate the doubts of both sides, help to improve the obligations and rights of all parties in the alliance, and establish a more sound trust mechanism with both suppliers and demanders. In terms of material management, Wuxi Anji is responsible for material inspection according to the tripartite cooperation agreement, who supervises and controls the supplier's inventory according to the manufacturer's requirements. This not only improves the service quality, but also strengthens the trust between the two sides.

3.3 Analysis of VMI Operation Mode of SAIC Anji Logistics Co., Ltd.

3.3.1 VMI Operation Mode of SAIC Anji Logistics Co., Ltd.

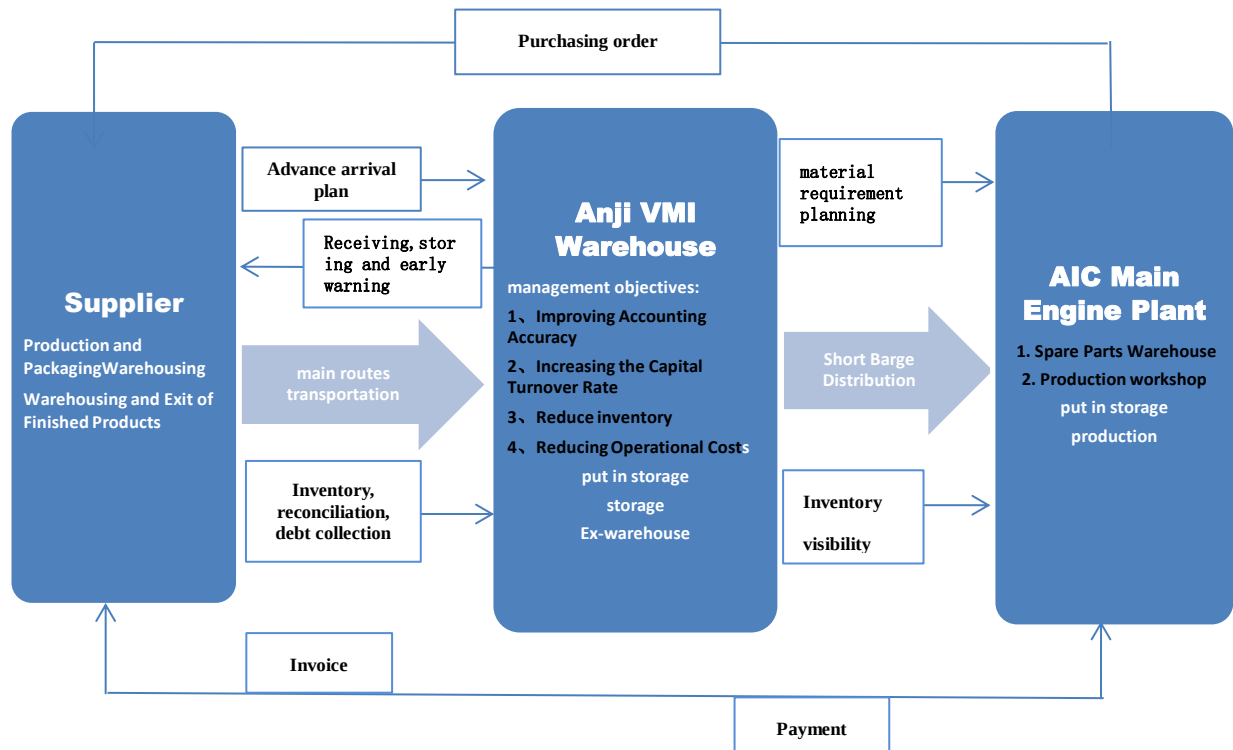


Figure 1: VMI operation mode of SAIC Anji Logistics Co., Ltd.

Note:

(1) The supplier's orders for customers in the main plant are based on order-to-order production mode (MTO). After the purchase order is issued by the main engine factory, the supplier arranges and executes the production plan, and the products are packaged into the logistics process.

(2) Logistics mode: supporting VMI management. The product is distributed to the factory by the supporting warehouse and accepted by the host factory as the transfer point of property rights, but whether the node is used as settlement depends on the settlement method agreed by the supplier and the host factory in the procurement contract.

3.3.2 System Operation Mode of SAIC Anji Logistics Co., Ltd.

It can be said that VMI warehouse is not independent, but it is an important key point of contact in each link of lean supply chain. VMI warehouse plays an important role in the optimization of inventory in the logistics chain. The operation of VMI warehouse involves

warehousing, shelving, sorting, warehousing, package turning, inventory, warehousing, replenishment, dull material management, break-point parts management and other aspects. Therefore, it is undeniable that the use of information technology throughout the supply chain is crucial. Through radio frequency technology, data communication technology, bar code technology, scanning technology and so on, product storage, in-store and out-of-store management can be realized, so that the collected data can be automatically imported into standardized and networked databases. The data is stored in the database of the system, which makes the system track the location of goods effectively, and makes it easy for operators to quickly locate the physical location of the target goods location in the warehouse according to the number of goods. At the same time, it also ensures that enterprises timely and accurately grasp the real data of inventory, maintain and control enterprise inventory reasonably, improve the rationality of inventory, and enhance the competitiveness of Wuxi Anji enterprises.

3.4 The Value of VMI Implementation

The promotion of VMI optimizes the partnership between manufacturer and supplier, and also solves the normal material demand control and raw material entry control, as shown in Figure2.

Figure 2: Value of VMI Implementation

Functions of VMI	Value of VMI
VMI HUB	Input, Sales and Inventory Management
MIN/MAX Huub-Down	No zero inventory, save storage costs and reduce inventory losses
Daily Report	Appropriate inventory, stock as required, production as required, material as required; material allocation among various institutions within the manufacturer; flexible order production; saving procurement, material control, warehouse manpower.
EDI Web Site	Use after the payment, reduce the funds occupied interest expense
Feeding to Line Side Warehouse	Save material preparation equipment and manpower
The process of customs affairs	Save Customs Logistics Cost and Manpower
ASN (Advanced Shipping Notice Shipment Notice)	On-the-way Material Control Connecting with Customs Declaration System to Accelerate Customs Clearance and Warehousing
IQC Showrooming	Reduce RMA
EOL Product Ending Material Management	Reducing EOL Material Loss
FIFO	Ensuring Fresh Quality for ECN Control
Finished product Distribution	Reducing the Manpower of Secondary Logistics Management of Finished Products

Purchase list closing	Reduce the manpower of purchasing settlement and payment management
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4. Analysis of Existing Problems and Solutions

4.1 Analysis on the Problems of SAIC Anji Logistics Co., Ltd. under VMI Mode

The members of the supply chain have been suffering from the "bullwhip effect" for a long time, although in order to ensure the core competitiveness of enterprises in marketing and enhance the degree of cooperation between enterprises. At the same time, it reduces costs, restrains the "bullwhip effect" and re-integrates enterprise resources, thus introducing the VMI model. However, because the new management concept of VMI has not been introduced into China for a long time, the problems exposed by Wuxi Anji in the implementation of VMI are indeed worth reflecting.

4.1.1 Risk of Logistics Outsourcing under VMI Environment

In order to reduce cost and improve service quality, Wuxi Anji chooses to outsource some functions to other enterprises. Among them, outsourcing warehousing and distribution (including reverse transportation) has become Wuxi Anji's first choice. From the perspective of the whole supply chain, this outsourcing mode is the most reasonable and the lowest cost. At the same time, this is the core content of enterprise logistics outsourcing. As long as Wuxi Anji is responsible for order processing, supervision and management, all the subsequent work can be handed over to the outsourcer. In the form of outsourcing, special personnel are set up in the warehouse of third-party logistics and logistics outsourcing positions, responsible for coordinating related matters and abnormal problems of the outsourcer and monitoring the outsourcer's operation, including the recovery of payment, as the interface between the enterprise and the outsourcer.

It should be noted that there are also many problems when logistics outsourcing gains business advantages, cost advantages and customer service advantages. The outsourcing of logistics activities belongs to service trade. The main reason for the formation of market transaction cost is credit risk caused by information asymmetry. Enterprises generally lack a good credit guarantee system. Credit crisis leads to delays in delivery and short-term behavior of logistics enterprises, which increases the transaction cost of logistics services. This kind of cost increase is often manifested in two forms, that is, the increase of logistics outsourcing expenditure and the decline of enterprise reputation.

4.1.2 The system needs to be optimized, and the information level of SAIC Anji Logistics Co., Ltd. needs to be improved urgently.

With the support of policies, preferential treatment of enterprises and advantages of environment and resources, China's third-party logistics enterprises are now in a stage of rapid development. Nevertheless, they are still limited by experience and technology and can not exert their maximum economic value. No matter what industry is stubbornly self-proclaimed, it will eventually be eliminated by the market. Only by integrating emerging technologies with

itself and meeting the growing needs of society through innovation can they win a place in the market competition.

Concerning the third-party logistics enterprises, it is also true that the traditional logistics warehousing management model can no longer meet the fast, accurate and good requirements of today's rapid commodity circulation for the logistics industry. To learn from the experience of foreign logistics warehousing, the transformation of third-party logistics is bound to require an effective combination of "soft" and "hard", that is, the management software needed in the logistics warehousing link and corresponding advanced hardware facilities.

Of course, Wuxi Anji is also aware of this aspect. It invests a lot of money to create its own platform. However, due to the limited level of information technology, it often fails to connect with the system of its partners, and fails to transmit the interface, which leads to the problem of unable to settle accounts.

4.1.3 Information sharing with suppliers and producers needs to be accelerated.

It is obvious that a prominent problem among the members of the supply chain is insufficient information sharing. One party is unwilling to share its market information, inventory level, forecast results and other information, which makes the other party unable to optimize inventory. As we all know, inventory is the regulator of contradiction in quantity, time, space and variety of upstream and downstream members. Reasonable inventory can balance the contradiction of quantity, time and space between upstream and downstream enterprises in the supply chain, which is often caused by the uncertainty of the relationship between the members of the supply chain and the uncertainty of the external environment. Through the internship, it can be found that this problem also exists among manufacturers, suppliers and Wuxi Anji. In some aspects, they choose to keep information to themselves, which seems to be a kind of self-protection, but actually it is a kind of self-seclusion.

4.1.4 VMI Inventory Water Level Errors

It is well known that safe inventory is the core element of VMI. Due to the uncertainty of demand, the forecast of product demand is unreliable, and the actual demand may exceed the forecast demand, which will lead to out-of-stock and loss of profit opportunities. Incorrect predictions can lead to deviations, or higher or lower than actual demand. If the actual demand is used as a benchmark, then the forecast is a line around the fluctuation of the benchmark. If the forecast is always lower than the actual demand or higher than the actual demand, it shows that the forecast model has problems and needs to be improved. So, it's easy to solve the problem that the forecast is higher than the demand, and it's enough to save a few more days. What if the forecast is lower than the demand? The supply can only be guaranteed by a safe stock. In the process of production and operation, there are often errors in MIN values. The system MIN value is not updated in time, which leads to the deviation of the system early warning, thus leading to the problem of missing parts stopping.

4.2 Optimization Strategy of SAIC Anji Logistics Co., Ltd. under VMI Mode

4.2.1 Efforts to Improve the Process Quality of VMI Operations Management

1) Monitoring and assessment of contractors

Through the external contractor monitoring and assessment, monitoring means can take the initiative to call or send an email to the customer to understand the distributor's operation status? The problems of the distributor can be monitored through feedback from other departments of the company, through KPI indicators, and through on-site observation. We can communicate with the distributor once a week to timely coordinate the problems in operation. At the same time, a problem response mechanism should be established to solve the problem as soon as it appears. If the problem cannot be solved, it should be reported immediately until the problem is finally solved.

2) Establishing strategic alliance relationship with outsourcers

For example, outsourcers can offer appropriate incentives to reduce logistics costs, encourage their innovation, involve outsourcers in the formulation of company's logistics plan, establish new business or new mode import mechanism, so that outsourcers' logistics management can constantly adapt to and meet the needs of enterprise's own development.

3) Proper Information communication

It can be said that the success of outsourcing information communication and sharing is very important. Enterprises need to inform outsourcers in time if they have problems in demand. They should tell outsourcers where they are not doing well, where they are doing well and where they need improvement. They should also be notified of the outsourcers' early preparation in delivery forecast. If the volume of goods increases suddenly during the promotion period, outsourcers will surely be caught unprepared if they do not prepare in advance, which will lead to the logistics service can not meet the demand.

4.2.2 Improving the company's VMI information system

1) Developing new system functions according to the characteristics of its own development.

In a sense, the key of informationization is to improve the speed of information collection, processing, dissemination and the accuracy of information, and effectively reduce the transmission of redundant information. It is undeniable that SAIC Anji Logistics has done a good job in information technology, which can be used for reference. However, there is still much room for improvement. For example, on the one hand, Angel can consider adding the function bar of picking path to the WMS system of VMI warehouse to optimize the path. When dividing the operation process, according to the characteristics of commodity warehousing, we should make the stored commodities go straight ahead in the production process and avoid the round trip layout. The operation teams should be set up mainly according to factors such as the size of warehouse throughput, the type of goods stored and the characteristics of production process. Generally, the operation teams should be set up according to the specialized form. On the other hand, the establishment of docking regional logistics system platform is conducive to the rapid collection, processing and feedback of information, to solve the speed problem. At the same time, it can also reduce logistics costs.

2) Introducing more talents for the technical team

Whether the technical support platform is specifically designed to elaborate and develop the VMI system or to transform the existing information technology, the special design requires additional investment but can not only reduce the inventory level of the supply chain, but also enable users to obtain a high level of service. To this end the primary task is to do a good job of talent absorption. Major cities have been engaged in a "talent war" recently, but few cities have proposed to attract special talents in logistics. Therefore, Anji should devote itself to building the bridgehead of automobile logistics industry by introducing more high-end logistics talents.

4.2.3 Constructing Information Synchronization and Sharing Mechanism in Supply Chain

To some degree, the information synchronization sharing mechanism of supply chain is conducive to seamless business cooperation and synchronous operation between upstream and downstream, shortening the time of each link, eliminating bullwhip effect, effectively reducing various uncertainties, replacing inventory with information, and realizing inventory optimization.

Through the construction of the synchronous sharing mechanism of supply chain information, all links in the supply chain must break enterprise boundaries, realize cross-enterprise collaboration, and share inventory and sales information through various information technologies and supply chain information platforms, so as to achieve efficient procurement, production, and efficient distribution and distribution. Information sharing and communication between upstream and downstream members is conducive to timely and accurate understanding of downstream needs and to reduce or avoid the occurrence of bullwhip effect. This is conducive to JIT management in the supply chain implementation, and also to achieve business collaboration and synchronous concurrent engineering among members, so as to reduce the waste of time. Exchanging information for inventory and time for inventory can enhance the ability of the supply chain to quickly respond to customer demand. If we can grasp the information of customer demand changes in real time and synchronously, and then organize production when customers need it, we will replace inventory with information and realize the "virtualization" of inventory.

4.2.4 Establishing the Strategic Alliance of Mutual Benefit and Cooperation

It is necessary to understand that the long-term, extensive and deep strategic alliance relationship of mutual benefit and cooperation among members should be established based on the identity and consistency of objectives, values and benefit distribution, which is conducive to reducing the uncertainty of link-up relationship among members, cooperative cooperation among members in business, reduction of transaction cost and management cost of supply chain, so as to realize the speed and cost of supply chain and maximize the benefit goal.

The key point that VMI can reduce the supply cost is to share information quickly between the upstream and downstream of the supply chain, and respond to demand changes quickly with fewer safe stocks. This reduction in inventory should be reflected in the reduction in inventory of both suppliers and demanders, rather than the reduction in inventory of only the

demanders. To achieve this, the following basic conditions should be met when implementing VMI:

1. The supplier has a stable and short lead time;
2. Materials have relatively high shipping frequency;
3. Materials have relatively simple requirements calculation method;
4. Supply, demand and storage have fast and accurate data sharing channels;

In this regard, based on the VMI model, who should set demand forecasts, minimum and maximum inventory targets? Integrated practice: whoever is in the best position to do this. It can be said that this is also a basic principle of task division in the supply chain. For example, if you are a manufacturer, VMI materials are for your specific use, and their demand depends on your production and sales plans, these planning tasks should naturally be done by you, because your supplier is further away from the demand, cannot be more accurate. However, if you are a large equipment supplier and know more about equipment operation and spare parts requirements than the customer, you are mainly responsible for demand prediction and inventory planning, and the customer is responsible for assisting the work. That is to say, the data analysis is done by the supplier, such as demand history, installation volume, etc. Professional judgment is assisted by customers, such as capacity utilization changes, equipment upgrades, etc. Combine the two to complete the "start with data, end with judgment" planning process. The third-party logistics can evaluate the reasonability of the safety inventory through daily receipt and storage, the quantity of breakpoint parts in the warehouse, the quantity of materials in the HOLD area, and the quantity of packaging purchased from the incoming materials, so as to send alarm emails to the supplier.

5. Conclusion

To sum up, VMI, as a representative integrated supply chain management mode, can optimize the inventory management of the whole supply chain, and is an effective inventory management mode. The application of VMI mode promotes the supply chain collaboration of manufacturing industry to a high degree of collaboration. The VMI mode based on automatic replenishment protocol will not only help to weaken the "bullwhip effect", but also reduce the circulation time of supply chain, thus reducing the inventory level, reducing the total cost of supply chain and reducing the operation cost of each node enterprise.

Nowadays, logistics has gradually become the "third source of profit". Logistics is an important link in the supply chain to realize customer service. It is even considered that "customer service is a task that logistics activities need to complete when enterprises carry out marketing". The introduction of the third party logistics can reduce the logistics cost of the served enterprise, make the served enterprise commit to the core business and help the served enterprise to integrate the supply chain. Applying the lean supply chain concept to the implementation strategy of VMI can help suppliers to solve the problems in the implementation of VMI, such as insufficient logistics ability and information ability.

Therefore, it is necessary for third-party logistics enterprises to seize the opportunity, constantly improve their service level from information technology and lean supply chain management, and play an active role in lean supply chain and VMI, so as to continuously expand their business, cultivate their core competitiveness, and win a position in lean supply chain management. In addition, VMI has another, more core value -- increasing the competitiveness of the project leader and creating long-term business dependencies. In the era of increasingly fierce competition and homogenization, it is not difficult to find a new supplier, but to find a supplier or customer who can cooperate with you, or even help you make plans, is not a problem that can be solved by sourcing. It is, after all, a soft power, and one that has been honed over the years, an ability that is hard to be replaced, namely, Planning Collaboration Capability across Companies.