Research on Supply Chain Inventory Replenishment and Pricing Model Based on Time in Big Data Environment

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Abstract. Inventory management is an important link in the whole supply chain. Raw materials, semi-finished products and finished products in the supply chain may form inventory. Generally speaking, the inventory cost will reach about 20%-40% of the value of these goods. Therefore, it is very important to control the inventory quantity of goods in the supply chain to reduce the inventory cost and capital occupation. With the development of supply chain in big data, people begin to seek the minimization of total cost of supply chain and the maximization of customer service level. In the big data environment, the connotation of inventory management has also changed dramatically, which requires enterprises to shift from the traditional focus on their own inventory management to the inventory control of the whole supply chain. There are many inventory management schemes in the supply chain environment. In recent years, the more advanced one is vendor managed inventor (VMI). However, due to the limited level of cooperation between suppliers and retailers in VMI, it has its own limitations. Big data Internet can break this limitation. The joint inventory management model can achieve this win-win partnership, which provides a breakthrough in traditional management methods for supply chain inventory management.

Keywords: Supply Chain, Stock, Replenish, Pricing model, Big Data

1. Overview of replenishment and pricing model of supply chain inventory

Based on the characteristics of supply chain inventory management and the problems existing in supply chain inventory management, (shows in figure 1) the supply chain inventory management should be improved from the following aspects:

1.1. First of all, we should correctly introduce the concept of supply chain

In order to realize the cooperation between the members of the company in the inventory management process and to ensure the performance of the company. It is necessary for us to simulate and analyze various types of internal and external factors. For example, the protection of common goals, the limited value of common interests of enterprises and the values of enterprise members. In fact, in the
process of full information sharing, the company can coordinate the benefits of various departments and relevant methods of evaluation, which will enable the members of the company to reach a common point of view on goods management. This is the result of considering the overall situation. This concept can establish the management concept of common progress and consciously coordinate the benefit needs of both parties. In order to establish a complete inventory management system, so that all members of the supply chain inventory management can evaluate the content and method of its implementation, we must ensure that the company's internal inventory management information can be fully shared.

1.2. According to economic theory, the supply chain structure should be mainly reduced

Supply chain structure has a very important management value for enterprise's goods management. However, if the cycle of the supply chain is too long, the relationship among its internal nodes is very complex, which will lead to poor information transmission and high cost of goods management in the supply chain. Of course, we can only think that this is the basic reason for them. Therefore, I think that optimizing the structure of the supply chain is the key step to ensure the information transmission and mutual coordination of each node in the supply chain. It is the internal basic condition of inventory management. According to the theory of economics, in the application of the company, we should try our best to make the supply chain structure flat, we should simplify the number of nodes in the supply chain and the relationship between nodes. Finally, the supply chain links are effectively integrated.

The integration of all links in the supply chain is to form a "virtual organization" based on the common goal, and optimize the organization's goal and overall performance through information sharing, fund and material coordination among members of the organization(such as stores and distribution in figure 2). By integrating all links in the supply chain, we can overcome the influence of too complex supply chain inventory management system on the efficiency of supply chain inventory management to a certain extent, so that supply chain inventory management data can be transmitted to all nodes in real time and quickly, thus greatly reducing supply chain inventory cost, making rapid response to customer demand, and improving the overall performance of supply chain inventory management Effectiveness[3].

![Figure 1. Supply chain management.](image1)

![Figure 2. Supply chain workflow.](image2)

2. Research on inventory pricing model of supply chain

2.1. Overall pricing model

Under the inventory management mode, this paper discusses the optimal decision of supply chain members under the pure wholesale price contract, analyzes the recovery contract generated on this basis, and introduces the target order quantity to further optimize the recovery contract, so that the recovery contract can coordinate the supply chain and achieve the Pareto improvement of the expected profits of suppliers and retailers. This paper discusses the Vendor Managed Inventory (VMI) model[4],
discusses its basic decision-making model, analyzes a VMI Model Based on revenue sharing contract in detail, studies the Shelf-stacker game between suppliers and retailers, and further optimizes the revenue sharing contract by introducing surplus subsidy.

2.2. Definite order

The inventory decision-making model when there are many retailers, considers the decision-making situation when the random demand of each retailer is independent or correlated, and studies the influence of inventory transfer strategy on the decision-making of inventory managers[5]. This paper studies the pricing and inventory decision-making problem of two-level supply chain when demand and price are related. The decision-making situation of single supplier to single retailer, single supplier to two retailers and single supplier to multiple retailers is considered respectively. The game model between supplier and retailer is established and its equilibrium solution is obtained. As an important supplement to the single order and replenishment mode, this paper analyzes the influence of the two order modes on the supply chain decision-making. Firstly, based on the traditional order mode, the influence of the mid season order opportunity on the retailer and supplier decision-making is considered, and the Pareto optimal set of supply chain is sought. We discuss the influence of early ordering strategy on the supply chain inventory decision-making in the traditional ordering mode of mid season ordering and mid season replenishment, analyzes the decision-making situation when there are multiple retailers competing, the existence of early ordering opportunity changes the competitive structure of the supply chain, and then has an impact on the expected profits of the supply chain members. For the suppliers, through the In this paper, we assume that only one retailer has the ability to order in advance. We analyze the game model of single order opportunity and two order opportunities, and find the equilibrium solution[6]. For the above model, several examples are used to illustrate the results, which proves our conclusion well. This study provides a new theoretical framework and practical model for the inventory decision-making of supply chain, which has important theoretical significance and practical value for the supply chain management in actual production activities.

3. Conclusion

With the development of Internet economy, supply chain has been playing more and more advantages in the development of enterprises. But we don't think that the supply chain will achieve the ideal effect for us. It requires all enterprises to form a strong supply chain as a whole according to their own characteristics and market requirements, and build a lean and safe supply chain.

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