

# Research on Supply Chain Inventory Management Strategies of Manufacturing Enterprises in the Context of Digitization

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**Abstract:** *Under the background of digitalization, enterprises have many development opportunities and also face great challenges. The use of digital technology can improve enterprise production efficiency, optimize supply chain management, improve customer satisfaction and so on. In view of this, this paper discusses the supply chain inventory management of manufacturing enterprises against the background of digitalization. Firstly, it combs through the current research status of supply chain inventory management in manufacturing enterprises; secondly, it explores the problems of inventory management in manufacturing enterprises under the background of digitalization; finally, it puts forward the optimization suggestions of supply chain inventory management in manufacturing enterprises under the background of digitalization, which can help to improve the competitiveness and sustainable development of enterprises.*

**Keywords:** *Manufacturing industry, Supply chain inventory management, Digitalization background*

## 1. Introduction

With the increasingly fierce competition in the market, digital technology has gradually become a key element in enhancing the competitiveness of enterprises. Cloud computing, big data, artificial intelligence, blockchain and other digital technologies can reduce the cost of enterprise information collection, improve the quality of monitoring, and then promote economic growth, and ultimately realize the sustainable development of enterprises. Digital transformation has become an important breakthrough for enterprises seeking development. The "14th Five-Year Plan" clearly puts forward the strategic plan of "accelerating the development of digitalization and developing the digital economy"; the Fifth Plenary Session of the 19th CPC Central Committee emphasized the need to digitalize the industry and the digital industry as the key point of development. Subsequently, enterprises gradually carry out digital transformation, according to the 2020 China Enterprise Digital Transformation Research Report, more than one-third of private enterprises increased investment in digital equipment, the vast majority of enterprises hope to realize the role of cost reduction and efficiency gains through digital transformation, and the scale of the digital economy in the future is expected to break through the 100 billion yuan. In the context of policy support and industrial development, enterprises should firmly grasp the opportunities brought by digital technology.

As the main body of China's real economy, the manufacturing industry plays an important role in promoting the high-quality development of China's economy, social stability, and peace and prosperity of the country. However, with the vagaries of the market environment, manufacturing enterprises suffer from problems such as material shortages, insufficient or excess inventory. Inventory as an important liquid asset of manufacturing enterprises to balance supply and demand, once affected will limit the development of enterprises. Therefore, manufacturing enterprises should emphasize and pay attention to inventory management, thus improving the efficiency of capital operation and guaranteeing the sustainable development of enterprises.

Although emerging digital technology and supply chain inventory management is imperative, but how to combine digital technology and supply chain inventory management is still a problem. First of all, the traditional manufacturing enterprise inventory management is still in the traditional stage, the management of a single way, it will focus on enterprise customer maintenance, supplier procurement, reduce production costs, etc., the supply chain inventory management is not enough attention. Secondly, the lack of digital thinking of the enterprise management and the shortage of digital management

personnel lead to the introduction of digital technology into the supply chain management process, but also can not improve its efficiency. Finally, due to the rigidity of the organizational structure of manufacturing enterprises, resulting in the imperfect construction of their information technology, leading to digitalization can not give full play to its effectiveness. Therefore, in the context of digital transformation, it is urgent to improve the supply chain inventory management of manufacturing enterprises.

## **2. Overview of inventory management in manufacturing enterprises**

### **2.1. Concept of supply chain inventory**

Inventory is all the materials that an organization has in reserve to meet future needs. Inventory in the traditional sense can be understood as all the reserve resources of the enterprise, including the raw materials used by the enterprise in the production activities of products, as well as the finished products obtained through manufacturing activities.<sup>[1]</sup> When the enterprise has sufficient inventory, it can cope with production, customer demand and other emergencies. However, excessive inventory is not beneficial to the enterprise, the backlog of inventory means that a large amount of funds is occupied by the enterprise, the return of funds is not realized, which in turn causes the problem of enterprise capital turnover, and creates a huge pressure on its production and operation.

Today's inventory management is not only to meet the enterprise production and sales and simply reserve and issue resources. Inventory management in the supply chain environment, i.e. supply chain inventory management, refers to a way of inventory management in the supply chain that realizes the goal of reducing inventory costs and improving the market responsiveness of enterprises by moving from the point to the chain and from the chain to the surface. Inventory management, as an important part of balanced supply chain, can plan, organize, control and coordinate the inventory in the whole supply chain, control the inventory at each stage to the minimum, realize the reduction of inventory management cost, reduce the idle and waste of resources, and make the whole supply chain inventory cost to the lowest target.

### **2.2. Current status of research on stockpile management**

With the continuous development of the market economy, many manufacturing enterprises in China have started to focus on the end-user's product experience and demand by focusing on their customers, suppliers and their own interests. As a result, China's supply chain management is gradually changing from the traditional stage to a new stage, in which the methodology and research on inventory management has gradually deepened, and different scholars from multiple perspectives, resulting in a series of research results.

In 1915, F.W. Harris proposed the economic order quantity model, which refers to the unit order quantity that seeks to minimize the total inventory cost. Guajardo, Mario, Rönqvist, Mikael and other scholars established seven different demand models to maximize the cost-effectiveness by controlling the inventory parameters.<sup>[2]</sup> Jakšič, M, Fransoo, JC and other scholars obtained inventory thresholds with the help of this model, which in turn maximized the benefits to the firm.<sup>[3]</sup> Some scholars found that an important management aspect of the supply chain that is prone to waste of resources and increase in costs is inventory management, where unreasonable forecasting of demand leads to the problem of an excessive gap between forecasted demand and actual demand. So a model using artificial neural network to accurately predict the demand is developed, the model is to use the machine network learning to perceive the customer demand, and then to achieve the effect of accurate prediction, and ultimately to achieve the supply and demand mismatch to minimize the goal of maximizing the profit of the enterprise.<sup>[4]</sup> Stefan argues that digital transformation and sustainable development can be combined with supply chain management, and supply chain management is more meaningful to study in this context.<sup>[5]</sup> Zhong Dingcheng and Yang Qin et al. believe that the supply chain inventory management model is the root cause of inventory backlog in China's apparel manufacturing industry, and by applying the principle of system dynamics, the supply chain management model of apparel manufacturing enterprises is optimized, and the results show that the optimized model helps to reduce the inventory problem.<sup>[6]</sup> Bo Wang elaborated on the definition of safety stock and its impact, established a basic model to calculate the most matching safety stock inventory.<sup>[7]</sup> Zhao Min pointed out that enterprises should integrate modern supply chain management concepts into inventory management, and reduce inventory management costs by adopting specialized technological means, so that the whole supply chain of

enterprises can be balanced between the various links.<sup>[8]</sup> Wu Di found that inventory optimization is the development direction of contemporary enterprise supply chain management, which helps to improve the efficiency of enterprise supply chain management.<sup>[9]</sup> Zhao Zelin argued that inventory control under the supply chain can be improved by utilizing enterprise business process reengineering. By grasping the inventory management rights of upstream and downstream distributors, it can then optimize the inventory management strategy and ultimately improve the core competitiveness of enterprises.<sup>[10]</sup>

Through the above research collation, it is found that supply chain inventory management in existing research is mainly realized through the establishment of information transfer mechanism between enterprises, which in turn realizes the coordination of inventory management between supply chains. However, due to the differences in the degree of processing and sensitivity to informatization among supply chain members, many enterprises lack the ability to manage and apply data, and cannot fully realize the collection and transmission of information; in addition, managing inventory through informatization can only improve the efficiency of the enterprise's inventory management, and cannot effectively solve the problems of the inventory management structure and business processes of supply chain inventory, based on the background of digitalization and the use of Based on the digitalization background, using digital technology, enterprises can build a digital platform to realize the unified collection, analysis and management of data and information. Discussing supply chain inventory management from the perspective of digitization helps to realize the streamlining of inventory structure and optimization of business processes.

### ***2.3. Importance of inventory management***

Inventory management is a crucial part of business operations, with far-reaching implications for keeping production and sales flowing, reducing costs, improving customer satisfaction, and responding to market changes. Effective inventory management is not only a means to improve the competitiveness of enterprises, but also a key factor to promote the realization of sustainable development. On the one hand, it helps to reduce the cost of inventory holding. Excessive or insufficient inventory brings high costs, including storage, transportation, and insurance fees. By utilizing an inventory management system, companies are able to accurately calculate optimal inventory levels based on actual demand and sales forecasts, avoiding either too much or too little inventory. This helps to reduce inventory holding costs, release enterprise funds, and improve capital utilization efficiency. On the other hand, supply chain inventory management is conducive to balancing supply and demand. Through accurate inventory management, enterprises are able to ensure the synergistic operation of production and sales. Accurate information about the demand for products, production lead time and delivery time helps to avoid production interruptions or huge inventory backlogs due to insufficient or excess inventory. This balance helps improve the efficiency and stability of the supply chain and keeps business running smoothly.

## **3. Status and problems of inventory management in manufacturing enterprises**

Manufacturing enterprises are paying more and more attention to supply chain management. Among them, supply chain inventory management, as an important part of supply chain management, is of great significance to the operational efficiency and cost control of enterprises. However, the current manufacturing enterprises in the supply chain inventory management there are some problems that need to be solved.

### ***3.1. Lack of intelligent technology application***

In the current supply chain inventory management of manufacturing enterprises, the lack of application of intelligent technology has become a key factor restricting enterprises from improving operational efficiency, reducing costs and responding to market changes. Traditional manual records and Excel-based inventory management system often cannot meet the needs of the modern complex supply chain, the traditional way of recording, easy to lead to the actual inventory levels, sales data and other important information cannot be obtained in real time, the lack of accurate data to support corporate decision-making. At the same time, traditional inventory management is inefficient, and there may be human errors and omissions. Intelligent technology can not only provide more accurate and reliable data support for inventory management through data analysis and forecasting, but also realize the monitoring and early warning of the inventory situation, which can help inventory management personnel to provide automated and intelligent decision support. However, many manufacturing enterprises lack this aspect of technology in supply chain inventory management, thus affecting the formulation and implementation

of inventory management. In addition, due to the lack of intelligent technology support, it is impossible to achieve comprehensive transparency of information in all aspects, and enterprises cannot achieve fine management of transportation and storage of raw materials, parts and finished products, increasing the risk of supply chain management.

### ***3.2. Inventory management system is not perfect***

System industry enterprise supply chain inventory management problems, its system is not perfect is a core problem. In many manufacturing enterprises, the supply chain inventory management system lacks systematic and scientific, resulting in the inventory management process is not standardized, the lack of effective monitoring and evaluation mechanism. First of all, the lack or imperfection of the inventory management system makes it impossible for enterprises to make accurate forecasts and plans for inventory. This may lead to situations of inventory backlog or inventory shortage, affecting the production schedule and product quality. Meanwhile, due to the lack of clear division of responsibilities and reward and punishment mechanisms, employees are not highly motivated in inventory management, which further aggravates the irregularity of inventory management. Secondly, the lack of effective inventory control and supervision mechanism is also an important manifestation of the imperfect system. Enterprises are unable to carry out real-time monitoring and adjustment of inventory, and are unable to discover and solve problems in inventory management in a timely manner. At the same time, due to the lack of an effective assessment mechanism, enterprises are unable to objectively evaluate and improve the effectiveness of inventory management.

### ***3.3. Lack of professional inventory management personnel***

Manufacturing and enterprises in the supply chain inventory management generally lack of professional inventory management personnel, which directly affects the operational efficiency, cost control and inventory optimization capabilities. Many enterprises have not yet established a professional inventory management team, inventory management is often handled by non-professionals or part-time staff. This results in a team that lacks expertise and experience in inventory management and is unable to plan, adjust and optimize inventory scientifically and effectively. Inventory management involves a large amount of data analysis and business decision-making, which requires professional skills and tools to support. The lack of professional inventory management personnel makes it difficult for enterprises to fully utilize advanced technological tools, such as big data analysis and artificial intelligence, to carry out inventory forecasting, demand planning and other tasks. This affects the sensitivity and responsiveness of enterprises to market changes, which in turn reduces the flexibility and effectiveness of inventory management. In addition, because companies do not have high professional requirements for inventory management, some employees may lack relevant training opportunities to update their knowledge and skills in a timely manner. This leads to the overall quality of the team is not high, and it is difficult to adapt to the increasingly complex and changing needs of supply chain management.

### ***3.4. Insufficient sense of collaboration and cooperation***

The supply chain involves multiple enterprises, and there are different goals, expectations and aspirations among them, so there are different inventory management goals. For example, suppliers may seek to reduce inventory costs, while manufacturers may seek to improve production efficiency. These different objectives may lead to incoherence in the overall inventory management of the supply chain, making it difficult to achieve efficient inventory management. In addition, enterprises in the supply chain often have different operation modes and processes, making it difficult to have a synergistic mechanism in inventory management. The lack of unified inventory management strategies and standards among enterprises leads to low inventory management efficiency in the overall supply chain. Moreover, due to the lack of a unified information sharing platform and communication mechanism, the information transfer between enterprises is not timely and accurate, leading to inaccurate inventory forecasts, which in turn affects the formulation and execution of inventory plans.

## **4. Optimization strategies for inventory management in manufacturing enterprises**

### ***4.1. Utilizing big data and artificial intelligence technologies***

In the context of digitalization, big data and artificial intelligence technologies provide powerful

optimization strategies for inventory management in manufacturing enterprises. Big data technology can help manufacturing enterprises realize comprehensive analysis and mining of inventory data. By analyzing historical databases, sales data, production data, etc., enterprises can understand the fluctuation patterns of inventory, market demand trends, and bottlenecks and problems in the supply chain, which can help them formulate more accurate inventory plans and strategies, reduce inventory costs and improve inventory turnover. In addition, artificial intelligence technology can realize automated inventory management and optimization, and by establishing inventory forecasting models based on machine learning, deep learning and other algorithms, enterprises can realize accurate forecasts of future inventory demand. At the same time, AI technology can also be applied to inventory control and scheduling, automatically adjusting inventory levels and scheduling plans based on real-time data and forecasting results to ensure supply chain stability and efficiency. Combining big data and artificial intelligence technology to build a digital inventory management system realizes the digital transformation and upgrading of inventory management in manufacturing enterprises, which in turn improves the operational efficiency of enterprises, reduces costs and enhances market competitiveness.

#### ***4.2. Establish a more perfect inventory management system***

Improving the management system is one of the important strategies for optimizing the inventory management of manufacturing enterprises in the digital background. First of all, the establishment of a perfect inventory management system, including clear inventory management responsibilities, processes and norms, to ensure the synergy of cooperation between departments. At the same time, the enterprise to establish inventory inventory system, regular inventory and reconciliation of inventory to ensure the accuracy and completeness of the inventory database. Second, the establishment of inventory early warning mechanism. Set a reasonable inventory level, safety stock and replenishment strategy and other parameters to implement real-time monitoring and early warning of inventory. When the inventory level is lower than the safety stock, the system will automatically trigger the replenishment program to ensure the continuity of the production line and the satisfaction of customer demand. In addition, a perfect inventory analysis system is established. See historical inventory data, sales data, production data and other information for analysis, enterprises can understand the fluctuation pattern of inventory, market demand trends and problems in the supply chain, which helps enterprises to formulate more accurate inventory plans and strategies, reduce inventory costs and improve inventory turnover.

#### ***4.3. Cultivate professional digital talents***

Professional digital talent is the key to optimize inventory management in manufacturing enterprises, and is a necessary condition for the realization of digital inventory management. On the one hand, manufacturing enterprises can organize internal training, external training, seminars and other activities on a regular basis to improve the staff's understanding and mastery of digital technology. In the recruitment process, companies should prioritize candidates with digital backgrounds and professional skills. On the other hand, manufacturing companies encourage employees to actively participate in the research and practice of digital inventory management by establishing a good corporate culture and incentive mechanism. Through the establishment of a sound talent training mechanism, it can train a digital talent team with professional knowledge and skills for enterprises, which provides strong support for the inventory management of enterprises.

#### ***4.4. Strengthen supply chain collaboration***

Supply chain collaboration refers to the close cooperation and coordination between manufacturing enterprises and partners such as suppliers and distributors. In the context of digitization, by strengthening supply chain collaboration, manufacturing enterprises can better integrate supply chain resources and improve the efficiency and competitiveness of the overall supply chain. Firstly, manufacturing enterprises can establish a trust mechanism with suppliers, distributors and other partners. By strengthening communication and establishing mutual trust, enterprises can better understand market demand and supply chain dynamics, so as to develop more accurate inventory management strategies. Second, manufacturing companies establish a unified digital platform and information sharing mechanism. By realizing information sharing, enterprises can grasp real-time inventory information, production plans, sales data, etc. in the supply chain, so as to better coordinate supply chain resources, reduce inventory costs and improve inventory turnover. Finally, manufacturing enterprises strengthen the collaborative work with suppliers, distributors and other partners. By jointly developing inventory management strategies, collaborating on production plans, and jointly solving problems in the supply chain,

enterprises can better respond to market changes and uncertainties, and improve the stability and efficiency of the overall supply chain.

## 5. Conclusions

Supply chain management mode is of great significance in optimizing resource allocation, improving production efficiency and enhancing enterprise competitiveness, which is an indispensable part of modern enterprise management. Under the background of digitization, the research of supply chain inventory management strategy of manufacturing enterprises is particularly important. By using advanced digital technology, enterprises can realize real-time updating and sharing of inventory information, and improve the accuracy and efficiency of inventory management. At the same time, using big data analysis, enterprises can more accurately predict market demand, optimize inventory structure and reduce inventory costs. Therefore, in the future supply chain management, enterprises should pay more attention to the use of big data and artificial intelligence technology, the cultivation of digital talents, perfect inventory management system and supply chain synergy, etc., in order to further improve the efficiency of inventory management and realize the optimization of supply chain inventory management.

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