

Application Research on Zero Inventory Model

-- Taking Haier as an Example

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Abstract: The zero inventory model is a new type of management model that has become the goal of many enterprises in their future efforts. China's market changes are becoming more and more intense, the requirements for enterprises are getting higher and higher, and inventory management problems have become a roadblock on the road to the growth of each enterprise. The article first expounds the basic concepts and main forms of zero inventory management, summarizes the literature on zero inventory mode at home and abroad, and then takes Haier Company as an example to specifically analyze the current situation of zero inventory management of the company, puts forward countermeasures for existing problems, and finally summarizes the inspiration and suggestions brought by the zero inventory model from small and large. In summary, this paper takes Haier Company, which comprehensively practices zero inventory management, as an example, analyzes Haier's zero inventory management model, and studies the advantages and disadvantages of this model in order to provide relevant enlightenment to various enterprises in other fields.

Keywords: Inventory management, Zero inventory, Haier Corporation.

1. An Overview of the Theory of Zero Inventory Patterns

(1) Concept of zero inventory

The concept of zero inventory management originated from Japanese management ideas, which has been widely adopted in the Japanese manufacturing industry in the 80s of the 20th century. Zero inventory is a special inventory concept, which does not mean that the storage quantity of some or some items in the form of warehouse storage is really zero, but refers to the materials (including raw materials, semi-finished products and finished products, etc.) in one or several business links such as procurement, production, sales, distribution, etc., through the implementation of specific inventory control strategies, so that it does not exist in the form of inventory, but is in a state of circulation, so as to achieve the minimization of inventory. Turn the static "reservoir" of the former enterprise warehouse into a flowing "ditch" to reduce inventory levels and inventory costs as much as possible [1]. Therefore, it can be said that zero inventory management is a supply strategy different from traditional supply based on the condition of sufficient and complete material social reserves.

(2) Main forms of zero inventory

There are seven main forms of zero inventory, namely: entrusted storage, collaborative subcontracting, rotation, just-in-time supply, Kanban, faucet and delivery [2]. However, the most commonly used forms by enterprises in practice are only the first three forms.

1. Entrusted storage method: This method refers to accepting the user's entrustment, and the entrusted party stores and manages the materials belonging to the user, so that the user no longer retains inventory, or even insurance reserve inventory, so as to achieve zero inventory. The advantage of this form of zero inventory is that the entrusted party can use its professional advantages to achieve higher level and lower cost inventory management, users no longer set up inventory, and at the same time reduce a large number of affairs of

warehouse and inventory management, and concentrate on production and operation. However, this zero-inventory method is mainly achieved by inventory transfer, and cannot reduce the total inventory.

2. Cooperative subcontracting mode: It is mainly an industrial structure form of manufacturing enterprises, which can be supplied on time with the flexible production of several enterprises, so that the supply inventory of the main enterprise is zero. The main enterprise is mainly responsible for assembly and product market development, and the subcontracting enterprises subcontract labor, subcontract parts manufacturing, subcontract supply and subcontract sales. The subcontracting enterprise and the main enterprise maintain the uninterrupted operation of the "assembly line" by establishing a timely and effective communication mechanism, so that the inventory is always in dynamic balance to achieve the goal of zero inventory management.

3. Rotation mode: This method is a form of zero inventory and zero reserve under the premise of careful design of the system, so that the rate of each link is fully coordinated and the temporary stagnation between stations is fundamentally canceled. This method is a form of synchronous production and material supply based on conveyor belt production, which is formed by extending on a larger scale, and achieving zero inventory through the supply of conveyor systems.

2. Zero Inventory Research Status

(1) Current status of foreign research

Overseas, Ronald[3] (2008) studied the problem of zero-inventory production and distribution, considering how to maximize the satisfaction of total demand without being constrained by the delivery time window while allowing customers to receive deliveries from a given sequence. Nils[4] (2010) introduces a new truck scheduling problem that synchronizes the inbound and outbound flow of goods on zero-inventory cross-docking terminals in the food industry. Mao et al. [5] (2009) based on the concept of zero inventory and the operation mechanism of zero inventory, put forward

the problem of how to conduct zero inventory feasibility analysis, and put forward how to achieve zero inventory, which has certain significance for enterprise zero inventory management. Wang et al.[6] (2010) based on the inventory management of key spare parts of manufacturing equipment, constructed an inventory optimization model for key spare parts of manufacturing equipment under the constraint of zero stock-out, gave an algorithm to solve the optimal relationship in the concept of backward sensing, and used the algorithm to solve the optimal acquisition strategy. Zhang[7] (2017) developed a novel heuristic algorithm to solve the single-warehouse multi-retailer problem and adopt a modified all-unit discount cost structure with a near-optimal solution.

(2) Current status of domestic research

Domestically, Shi Li et al.[8] (2003) proposed and in-depth study the concept of zero inventory for innovative products, and established an e-commerce supply chain model suitable for enterprise production and inventory forecasting, so as to realize the seamless link between product life cycle and zero inventory. Zhou Jianheng et al.[9](2006) proposed a zero-inventory management model for garment production raw materials based on the supply chain partnership, and based on this, numerical simulation was carried out to verify that the zero-inventory management model of garment raw materials can compress the inventory cost of enterprises and quickly respond to the market. Song Yuhou et al. [10] (2014) proposed a new management system around the realization of the "zero inventory" management goal of experimental materials and the agreed supply procurement method, which realized the zero inventory management goal of experimental materials, improved procurement efficiency, reduced procurement costs, and eliminated the safety hazards of traditional material warehouse management. Chen Hongjia[11] (2016) analyzed the situation that Chinese enterprises blindly copied the practice of Toyota Motor Corporation, which affected the authenticity and accuracy of cost accounting, and found the causes of inventory management problems, and proposed optimization countermeasures. Xue Lei[12](2021) made a useful exploration on the application of the zero inventory model in the inventory of auto spare parts in mining transportation enterprises, providing thinking for people who are concerned about this type of topic. Wang Fang et al.[13](2021) discussed the refined management model of zero inventory of high-value consumables in orthopedics in secondary hospitals, and concluded that the management mode through the refined management mode of zero inventory can reduce related management problems, promote the improvement of orthopedic management capabilities, and have high promotion value. Tang Hui [14] (2021) analyzes the concept, application premise and application significance of zero inventory management of hospital materials, and explores its application methods on this basis, in order to improve the efficiency of hospital material control and reduce the cost of hospital materials. Li Qichao et al. [15] (2021) analyzed the impact of SPD zero inventory scheme on the quality management of hospital drug warehouses, and believed that SPD zero inventory scheme can effectively improve the quality of hospital drug warehouse management, reduce hospital operating costs, and reduce patients' medication errors. In summary, compared with foreign research, although domestic research started late, the research scope for zero inventory is wider and involves many fields, and there are still many scholars who carry out research on zero inventory, indicating that this model still has research

value.

3. Haier's Zero Inventory Management Model

(1) The current situation of Haier's zero inventory management model

Haier Group combines China's national conditions with the concept of zero inventory, and builds an internal supply chain system, ERP system, logistics and distribution system, capital flow management and settlement system, distribution management system and customer service response system throughout the country, forming a connection and integration between subsystems with order information flow as the core. Haier's CIMS system enables the production line to achieve mixed flow production of different types of products. Haier has also developed six auxiliary systems, including EOS (business system), ERP system, and JIT three-fixed distribution system. Haier's CRM system achieves zero-distance sales, ERP system and CRM system remove obstacles to synchronous communication and accurate transmission of information, and the synergy of these systems enables Haier Group to deliver products in a timely manner and quickly meet customer needs, thus ultimately achieving zero inventory.

(2) Problems in Haier's zero inventory management

1. Insufficient market analysis and forecast: Haier's estimate of sudden orders in the market is not accurate enough, resulting in the excess demand in orders cannot be met in a timely manner. Haier's zero inventory management involves the whole process including raw material procurement, distribution and final sales, order-oriented can enable Haier to achieve the goal of reducing inventory, reducing warehousing and logistics costs, but also can accelerate the return of funds, although order-led brings Haier a lot of benefits, but Haier's pursuit of demand and supply also causes the company to lack flexibility in the market, so that the resistance of enterprises is weakened, once the market forecast is insufficient, it will lead to insufficient supply of the company, and the loss of corresponding passenger flow in the market.

2. No reserved safety stock restrictions: Haier's ultimate pursuit of zero inventory makes Haier have no excess inventory as a support, and will be very passive when encountering sudden demand in the market, if the market has a rapid rise in demand or encounters sudden situations such as natural disasters, at this time, if the company does not have buffer inventory or the inventory is seriously insufficient, it may lead to a complete stagnation of production, disrupt the original regular production rhythm, cause tension in the entire supply chain, and bring huge economic losses to the enterprise. Although the zero inventory model has brought Haier a great optimization in terms of capital structure and cost structure, if it overly pursues extreme zero inventory without reserving safety stock restrictions, it will bring great risks in the future.

3. The dependence on suppliers is large, but the assessment standards are too single: the zero inventory management model makes the cooperative relationship between enterprises and suppliers closer, and a stable and reliable supplier is an important prerequisite for enterprises to implement zero inventory goals[16]. Suppliers in the enterprise received the order, put forward the demand to achieve fast supply, to ensure that the enterprise can be in accordance with the planned time for production, distribution,

delivery and other processes, because of this, enterprises have a great dependence on suppliers, once the cooperative supplier can not achieve timely delivery, then the subsequent links of the enterprise will be affected, whether it is customer satisfaction or the company's market profitability, so in the screening and follow-up assessment of suppliers need to set up different dimensions of standards, more comprehensive completion of the work. However, at present, Haier's assessment standards for suppliers mainly focus on quality, cost, delivery time, etc., and there is a punishment mechanism for suppliers, and if the performance is unqualified for three months, it will be eliminated[17]. This too single assessment standard may cause suppliers to continue to cooperate and cost information, or because these criteria limit "potential stock" suppliers to be eliminated in the preliminary screening and miss out on excellent suppliers.

(3) Measures that Haier can take

After the previous understanding, it can be seen that the zero inventory management model brings advantages in supply chain, logistics and capital flow to Haier, so that Haier occupies part of the market, but due to the demand-and-supply model and a single assessment model, Haier will also lose part of the passenger flow and supplier resources, in order to expand the enterprise advantages on the basis of maintenance in the future, Haier can start from the following points to optimize the enterprise model.

1. Market-led optimization of enterprise processes: The best areas for the use of the zero inventory model are those areas where the market is stable, but the electrical appliance industry where Haier is located is difficult to maintain a stable state for a long time according to factors such as temperature and preferential treatment, and the number of competitors of the same type is increasing year by year, so Haier's continued implementation of zero inventory management needs to strengthen a more comprehensive demand forecast for the market, and cannot continue to implement the previous single "demand and supply" model. Haier company can establish a special department to focus on market forecasting, make full use of the big data of online and offline platforms and enterprises that cooperate with Haier, make predictions and analysis of potential demand fluctuation windows, and choose appropriate inventory reserves according to different situations, if the actual situation is different from the forecast, you can use this part of the inventory for social welfare, which can not only reduce enterprise inventory, but also establish a good corporate image in the society and obtain positive attention from consumers.

2. Set a minimum limit on safety stock: Zero inventory cannot completely replace safety stock, and use the previous market forecast to establish minimum safety stock, so that you can be prepared for demand fluctuations caused by market emergencies, and will not miss business opportunities again and lose customers. In addition, this part of the safety stock can be handed over to third-party logistics companies for safekeeping, which can not only ensure that Haier does not miss the opportunity in the face of demand fluctuations, but also avoid increasing Haier's original logistics workload, do not need to invest additional human and material resources, improve operational efficiency and economic benefits, and reduce logistics operating costs.

3. Increase the assessment form of suppliers: Haier can adopt hierarchical assessment for suppliers, divide different suppliers into first-level direct suppliers and second-level alternative suppliers, give them different permissions

according to different supplier levels, and regularly evaluate and re-divide all suppliers. On the one hand, this enables Tier 1 direct suppliers to provide quality and quantity supply in order to maintain their own level, and continuously optimize the production process, ensure quality and improve efficiency, on the other hand, for Tier 2 alternative suppliers, they will establish stricter production standards for themselves to improve their own strength, and can get the opportunity to upgrade in the later stage. By increasing the assessment form of suppliers and layering the assessment management of suppliers, it can not only optimize Haier's supplier group and provide more and better choices for Haier, but also widely promote the standardized development of manufacturing enterprises in other fields with small views and make China's manufacturing market more benign.

4. Inspiration and Advice for Zero-inventory Models

The problems of Haier using the zero inventory model may not be unique, and Haier, as a well-known industry leader in China, has certain reference value, so after analyzing Haier, the following inspirations and suggestions are put forward to provide support for other enterprises when using the zero inventory model in the future.

1. Companies need to establish the right and suitable zero inventory management: zero inventory management is based on a stable market environment and accurate future market forecasts, and requires interdependent partnerships with suppliers and buyers[18]. Enterprises need to have a clear understanding and understanding of the internal and external environment of the enterprise, determine whether the industry market situation of the enterprise is stable, whether the supplier is reliable and long-term, and whether the information management level of the enterprise can obtain and process all kinds of information in a timely manner. If you choose the zero inventory model, in specific practice, you must classify the inventory according to the previous accurate forecast, and reserve safety stock, and you cannot blindly pursue the ultimate zero inventory and cause enterprises to miss business opportunities. Enterprises can learn from other excellent enterprise cases, but they cannot copy them according to the same way, and need to make strategic adjustments according to the industry where the enterprise is located and the company's own capabilities, and find the zero inventory model that is most suitable for itself. Any success is not achieved overnight, enterprises need to continue to experience and polish in the market, so that enterprises in the implementation of zero inventory mode of each link of continuous optimization, innovation and improvement.

2. Establish a rapid response system for the market: In the face of an increasingly changing and stimulating competitive market, adapting to sudden fluctuations in demand and quickly responding to customer needs are the keys to the survival and development of various enterprises[19]. Establish a rapid response system for the market, including the establishment of an online order management platform to accelerate the speed and efficiency of information transmission, the establishment of an online payment system to provide guarantees for enterprises to quickly respond to customer needs, the establishment of a real-time information sharing platform, the use of information instead of inventory, reduce the cost increase caused by poor information communication, and help enterprises establish long-term and

stable strategic cooperative relations.

3. Strengthen the cooperation between other enterprises: Enterprises should establish healthy long-term cooperative relationships with suppliers and customers, and enhance the efficiency of communication between each other[20], so as to minimize their own inventory and store inventory "on the road" as much as possible. Enterprises should strictly control the screening and assessment of suppliers to form a strong supply chain. For the enterprises themselves, it is more necessary to strictly control various processes, ensure product quality and continuously optimize logistics to increase the speed of supply. For example, enterprises similar to Haier, huge self-operated logistics will consume too much manpower, material and financial resources of enterprises, but some links are not necessary for enterprises, so they can help enterprises operate logistics through outsourcing and seek professional third-party logistics, helping Haier reduce workload and improve Haier's overall operational efficiency and economic benefits.

5. Conclusion

Taking Haier as a specific example to analyze its zero inventory management model, put forward existing problems and give corresponding countermeasures, it provides reference for other enterprises in China to better and better use the zero inventory model. Effectively improving inventory turnover and reducing storage costs has always been the management goal of each enterprise, from reducing inventory to the final zero inventory, to achieve this goal, each enterprise needs to continue to explore in the specific reality, combined with the actual situation, deeply understand the core essence of the zero inventory model, and constantly innovate to open up a sustainable path suitable for national conditions and the development of the enterprise's own capabilities.

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