

Problems and Countermeasures in Inventory Management of Home Appliance Manufacturing Enterprises

-- Ecovacs as An Example

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Abstract: The manufacturing industry is the mainstay of China's economy and plays an important role in enhancing the vitality of China's real economy. Whether manufacturing enterprises can get good development and their inventory management ability are closely related. The article takes ecovacs, a smart home appliance manufacturer, as an example. By comparing and analyzing the current situation of its inventory management system with that of its counterparts in the industry, the article summarizes the problems of ecovacs inventory management system, analyzes the causes of the problems, and tries to put forward targeted suggestions for improvement in order to benefit the improvement of the enterprise's inventory management level and make the enterprise's operation and development path smoother.

Keywords: Inventory management, Home appliance companies, Ecovacs.

1. Background of the Study

Inventory is an important resource that brings revenue to an enterprise. It refers to materials or products used in the production or provision of services, as well as finished goods or merchandise used for sale in the daily business activities of an enterprise. The inventory of appliance manufacturing enterprises mainly consists of raw materials, work-in-process products and electrical goods. Inventory liquidity is good, the optimal level of inventory can allow enterprises in the daily production and operation process to maintain a balance between supply and sales, to ensure the normal continuous production, the appropriate amount of inventory is conducive to the daily sales of enterprises, adapt to market changes. The existence of inventory will increase storage costs, and strengthening inventory management can largely improve the quantity, quality and structure of enterprise inventory, accelerate capital turnover and reduce operating costs, which is of great significance in the long-term business management of enterprises[1].

At present, China's entire home appliance industry has entered a mature period, the market tends to saturate state, 2020, due to the outbreak of the new crown pneumonia epidemic, many enterprises are affected, there is a delay in the resumption of work and production, consumer confidence in the industry and many other phenomena, home appliance manufacturing enterprises in the limited market share will face more intense competition. For manufacturing enterprises, the complete procurement, production and sales business processes have been the focus of attention. In home appliance enterprises, raw materials account for a relatively high proportion of the supply chain. If the materials are not well managed and the whole supply chain is not strictly supervised, then the inventory management in this supply chain will be problematic[2]. With the rapid development of China's free market economy, inventory management has been developed for more than 30 years. Home appliance manufacturing enterprises are also developing rapidly, and in such a fierce

industry competition, the requirements for inventory management are getting higher and higher. By studying the inventory management system of ecovacs Group, the article analyzes the defects in its current inventory management methods, explores the root causes of the problems, and puts forward specific opinions and suggestions that can improve the production inventory management methods of small and medium-sized enterprises in China[3].

2. Inventory Management Concept

Inventory management refers to the management of inventory by a company, and its main content is inventory information management and the decision analysis work based on it, and ultimately the implementation of effective control to achieve the ultimate goal of improving economic efficiency[4]. In the past, inventory management was usually studied as an individual enterprise, mainly addressing the timing and quantity of orders. Along with the increasing promotion and development of information technology construction in various industries, at the same time, the collaboration between upstream and downstream enterprises is getting closer and closer, while the enterprise itself inventory management must also expand to the whole supply chain. In this development trend, besides improving their own inventory management, it is more important for enterprises to exchange information with upstream and downstream enterprises, as well as to develop an inventory management system suitable for the supply chain as a whole[5].

3. Current Status of Inventory Management of Ecovacs Group

3.1. Ecovacs Group Introduction

Founded in 1998, ecovacs Robotics Co., Ltd. is one of the world's leading service robot manufacturers, covering the R&D, design and manufacturing of home service robots and intelligent cleaning machines and equipment. Now it has

developed into an international brand company with key core technologies, high-end brands "ECOVACS" and "TINECO", and complete product lines and industrial chain. In 2018, the company was listed on the main board of the Shanghai Stock

Exchange, becoming the "first stock of service robots" in China.

3.2. Ecovacs Inventory Status

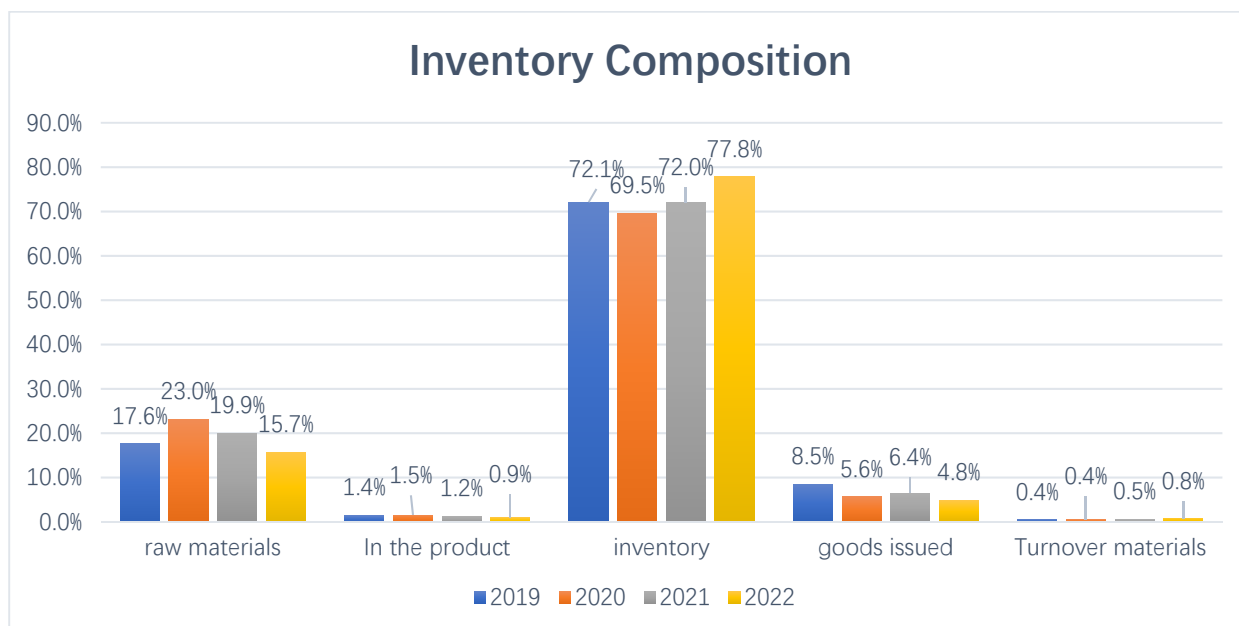


Figure 1. Inventory Composition of Ecovacs 2019-2022

As can be seen in Figure 1, ecovacs raw materials and their respective percentages of inventory in the products rise and then fall from 2019 to 2022. The highest percentage of goods issued in inventory is 8.5% in 2019 and the lowest is 4.8% in 2022. Inventory merchandise accounts for a relatively large proportion of inventory. The proportion of inventory merchandise was 72.1% in 2019, 69.5% in 2020, 72.0% in 2021 and 77.8% in 2022, with an overall increase in the proportion except for a slight decrease in the proportion in 2020. The proportion of goods issued to inventory decreases in 2020, picks up slightly in 2021, and then shows a downward trend. This shows that ecovacs' inventory is mainly inventory goods, and the proportion increases year by year from 2020, probably due to the hoarding of goods caused by the inaccurate estimation of sales volume. the overall decline in the proportion of goods issued to inventory from 2020 to 2022 indicates that the competition in the floor sweeping

robot market becomes more intense and the market demand for ecovacs decreases.

3.3. Ecovacs Financial Indicators Analysis

1. Inventory turnover rate

Inventory turnover ratio = cost of goods sold / average inventory x 100%

Inventory turnover rate is one of the main indicators to measure the operating ability of an enterprise, which can reflect the good or bad inventory management ability of an enterprise. The higher the value of inventory turnover rate, the faster the enterprise's inventory turnover and the higher the efficiency of capital utilization. If the inventory turnover rate is low, it means that the enterprise has a backlog of inventory and the efficiency of capital utilization is low, so timely measures need to be taken to adjust.

Table 1. Comparison of Inventory Turnover Ratio

| Year Enterprise | 2019 | 2020 | 2021 | 2022 |
|--------------------|------|------|------|------|
| ecovacs | 3.02 | 3.62 | 3.44 | 2.79 |
| Stone Technology | 9.35 | 6.64 | 6.17 | 5.22 |

According to Table 1, ecovacs' inventory turnover ratio for the past four years was compared with Stone Technology companies in the same industry. During the period from 2019 to 2020, ecovacs' inventory turnover ratio shows an upward trend, however, during the period from 2020 to 2022, the indicator gradually shows a downward trend. During the period from 2019 to 2022, Stone Technology's inventory turnover ratio shows a continuous downward trend, however, it has maintained a higher level than ecovacs. it decreases significantly during the period from 2019 to 2020, showing a significant downward trend. Ecovacs failed to pay sufficient attention to inventory management and failed to accurately predict the market situation, resulting in a smaller inventory

backlog in years with a better situation and more in years with a worse situation. there is still room for improvement in inventory management, which has a gap in ecovacs' inventory turnover ratio compared to Stone Technology, which implements an asset-light model, but from 2020 onwards, the profitability of the company is improved and in 2022 Again, there is a significant decline.

2. Inventory asset ratio

Inventory to assets ratio = Inventory ÷ Total current assets × 100%

Among general corporate assets, inventory occupies a rather important position as a current asset with low liquidity and weak liquidity. It is one of the most important components

that constitute the current asset structure of an enterprise. The turnover speed and short-term solvency of an enterprise's current assets directly depend on the size of the proportion of inventory assets in current assets. Therefore, it is important to reasonably determine the proportion of inventory. The business conditions and market conditions of an enterprise directly affect the size of its inventory proportion, and therefore, the size of the same enterprise's inventory proportion will also change. Too high a proportion will lead to a large amount of idle and sunken capital, thus affecting the effective use and utilization of assets.

For current assets, the analysis of the inventory-to-assets ratio focuses on assessing the reasonableness of its share in them. In order to ensure the optimal level of inventory quantities, calculations must be performed and compared with the actual level of inventory occupancy of the company in order to analyze its reasonableness. In addition, the analysis can also be performed based on factors such as sales and product mix. When conducting the analysis, several factors such as market conditions, business strategies and accounts receivable ratios must be taken into account to ensure the accuracy and reliability of the analysis results.

Table 2. Comparison of Inventory Asset Ratios

| Year Enterprise | 2019 | 2020 | 2021 | 2022 |
|--------------------|--------|--------|--------|--------|
| ecovacs | 31.57% | 25.84% | 26.66% | 26.11% |
| Stone Technology | 16.23% | 6.31% | 9.13% | 9.57% |

According to the analysis shown in Table 2, the inventory asset ratio of ecovacs for the past four years is compared with the inventory asset ratio of Stone Technology. It can be observed that ecovacs has a slightly higher inventory asset ratio in 2019, which may be due to ecovacs' misjudgment in terms of market demand leading to excessive hoarding, which not only increases the pressure of inventory management, but also takes up the amount of liquidity, thus making capital turnover extremely difficult. Stone Technology failed to reach ecovacs' inventory asset ratio because it adopted an asset-light management model, which resulted in its inventory asset ratio being consistently lower than the latter. In 2020, ecovacs launched the popular "lazy economy" products in line with, and its inventory asset ratio dropped to less than 30% for the first time, while the inventory management capability was also improved.

increases management costs. Under the in-store mode of e-commerce platform, even if the manufacturing enterprise ships the goods to the platform, the ownership of the inventory still belongs to the manufacturing enterprise until the e-commerce platform receives the invoice and reconciles the settlement with the manufacturing enterprise to transfer the inventory risk.

4. Reasons for the Problems of Ecovacs' Inventory Management

4.2. Declining sales due to quality issues

4.1. Online sales account for too large a proportion

With the outbreak of the 2020 epidemic, people began to take a keen interest in the lazy economy, and ecovacs was subsequently favored by everyone. With that, the company also receives a lot of customer feedback, not the least of which are customers who are unable to purchase products normally or are dissatisfied with the service and ask for returns because of the epidemic. However, as a company focused on the manufacturing of sweeping robots, its sales expense ratio is much higher than that of its peers, while its R&D expense ratio is relatively low, which is a result of over-emphasis on marketing at the expense of R&D efforts, leading to a decline in product quality. According to investor.com data, ecovacs-related complaint information has been recorded on several complaint platforms. There is no shortage of products with quality problems. If the quality continues to decline and negative reviews continue to climb, then sales will decline further and the return rate will rise, ultimately leading to the hoarding of raw materials and goods. In addition, a number of e-commerce platforms have stipulated a period for the storage of goods, and the platform has the right to return unsold goods within the storage period to the company. Since there is a time limit on the return period, the platform is obligated to collect from consumers if they refuse to continue consuming the goods after receiving them because they find that the quality of the product is not up to par or for other reasons. As the number of customers due to the quality of returned goods increases, the number of goods returned by the platform to the enterprise also increases, which will make it difficult to reconvert the production capital invested in advance by the enterprise from inventory to liquidity, and may even lead to unrecoverable losses.

With e-commerce consumption gradually becoming mainstream, ecovacs has positioned its marketing main body on online shopping platform users, with major sales platforms including Jingdong Mall, Tmall Mall and Pindoduo. The operating revenue of ecovacs is mainly derived from the service robot and intelligent living appliance fields. According to the revenue share, it can be seen that the revenue share of ecovacs online sales channels is 78.1% and 75% respectively.

In order to attract new and existing customers, e-commerce platforms will frequently hold promotional activities. However, in order to meet the short-term and high-volume supply demand, merchants have to produce in advance, which requires a large amount of investment capital, resulting in liquidity is "trapped", thus reducing the efficiency of the use of funds. Stockpiling finished goods in the warehouse not only increases the cost of storage, but also may lead to product stagnation or impairment of raw materials due to misjudgment of market conditions, thus bringing profit loss to the enterprise. Secondly, the goods involved in promotional activities are often sold at low prices, which will undoubtedly have a negative impact on the profitability of enterprises. Thirdly, manufacturing enterprises store goods in warehoused supermarkets through the warehousing mode, which in turn

4.3. Excessive stockpiling of goods

The company adhere to and deepen the internationalization strategy, at the same time, in response to the Sino-US trade friction for early stocking, as well as the inaccuracy of the enterprise's prediction of market demand, the enterprise

believes that the market is not yet saturated, service robots are in short supply. Resulting in ecovacs inventory goods accounted for all about 70% of the inventory and reached 77.8% in 2022. Under the trend of such fierce competition in smart home appliances, all kinds of products are updated extremely fast, ecovacs' excessive hoarding, to increase the risk of inventory to the enterprise, the light market conditions become worse resulting in the impairment of inventory goods, heavy technology updates lead to the direct elimination of hoarded inventory goods.

4.4. The information construction of inventory management is weak

At present, most of China's manufacturing enterprises in inventory management information construction is still relatively weak, manifested by the timely introduction of information management system and neglect of staff training and other issues, seriously restricting the overall development of enterprises. In addition, the lack of professional training for inventory management personnel, inventory management staff expertise is limited, do not have a proactive learning awareness, when the enterprise implementation of management innovation may refuse to cooperate, which also hinders the enterprise information management level to improve.

5. Measures to Improve Ecovacs' Inventory Management Problems

5.1. Increase offline channel construction

ecovacs e-commerce platform of the two major revenue ratio of more than 75%, over-reliance on online sales means that the concentration of business risks, once the e-commerce industry changes, will certainly affect ecovacs. Therefore, ecovacs should make full use of online resources to diversify risks, and constantly open up online and offline sales channels, and constantly increase the proportion of online and offline sales revenue, so as to avoid online sales channels "a single show".

5.2. Improve product quality

The annual report shows that the annual sales expense to total operating revenue ratio of ecovacs for the period from 2019 to 2022 is about 25%, which is mainly applied to Internet advertising, advertising implantation of various TV programs and marketing activities of inviting popular celebrities as brand spokespersons. In comparison, it invests much less in R&D, with R&D expenses accounting for no more than 5% of total operating revenue in both 2019 and 2022. ecovacs is the leading sweeper robot company, its emphasis on marketing, light on R & D decisions coupled with online has generated a lot of quality problems complaints, which means that the investment in R & D at that stage has a negative impact on the enterprise inventory management, but also can not adapt to its future development needs, the only way to reduce marketing costs, increase R & D costs, improve product quality to reduce the return rate and alleviate the current inventory management problems.

5.3. Reasonable forecast of merchandise sales

As ecovacs is currently highly dependent on online sales channels, it will take time to consolidate and expand offline sales channels. In today's shift from online sales to offline sales, companies need to conduct sufficient market research

on the premise of accurate prediction of the economic situation, take into account equipment maintenance and raw material consumption, and make adjustments to production plans to avoid overcapacity or oversupply. From the perspective of the methods used, the actual situation of the enterprise can be combined with the construction of relevant mathematical models to more accurately estimate the raw materials required for its production and downstream customer goods to minimize inventory costs, and then the introduction of information management platform to enhance the connection with the upstream and downstream to ensure the smooth operation of the supply chain and efficient production and operation.

5.4. Improve inventory management system and monitoring system

First, an inventory control system applicable to the manufacturing industry is established, taking into account the actual situation of the manufacturing industry, and standardizing the control of each step of the inventory control process to ensure that each position has a clear responsibility and can monitor each other. Based on this principle, periodic evaluations of employees in the relevant departments are implemented to ensure that they are doing their jobs according to the system's requirements. In addition, the system should also provide a detailed explanation of the approval authority and review requirements of each department in the process of inventory entry, receipt, storage and scrapping, so as to avoid a situation where there are no rules to follow and nothing to base on in the subsequent management.

6. Conclusion

Taking ecovacs as the actual situation of the research case, this paper firstly explains the current situation of ecovacs' inventory management, and compares the relevant data of ecovacs and Stone Technology's financial statements from 2019 to 2022, explores the problems of ecovacs' inventory management, analyzes the causes of inventory problems, and finally, puts forward targeted optimization suggestions. The main findings of this paper are as follows:

First, by comparing the inventory management information and development status with other companies in the same industry, we can see that the biggest problem in ecovacs' inventory management is the low inventory turnover rate and the high ratio of inventory to current assets.

Second, the root causes of these problems were analyzed. First, ecovacs relies heavily on online sales, which account for a low proportion of the company, leading to inventory risk. Second, ecovacs focused only on product marketing and innovation, and did not pay enough attention to quality, thus resulting in a large number of returns. Finally, the failure to accurately estimate market demand and the poor professional quality of warehouse managers resulted in a large backlog of ecovacs' inventory, which led to a large loss of liquidity and thus slow cash flow. At the same time, the lack of an effective information platform for inventory led to a decrease in the effectiveness of inventory management.

Third, according to ecovacs inventory management improvement advice. Offline sales channels must be opened and compacted; inventory costs should be controlled and inventory managers should be trained regularly; marketing expenses should be reduced and more funds should be spent

on research in order to improve product quality; a proper inventory management model should be constructed to make reasonable forecasts for merchandise sales according to the actual situation; and a more robust inventory management system should be established and supervisory responsibilities should be fulfilled.

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