CZU: 657.422.7:005.52
DOI: https://doi.org/10.53486/issc2023.09

АНАЛИЗ СОВРЕМЕННЫХ МЕТОДОВ ОЦЕНКИ ОПТИМАЛЬНОСТИ СТРУКТУРЫ ТОВАРНЫХ ЗАПАСОВ

ANALYSIS OF MODERN METHODS FOR ASSESSING THE OPTIMALITY OF THE STRUCTURE OF COMMODITY STOCKS

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Abstract. *The question of optimal structure and efficient use of working capital of trade enterprises is relevant at any time. The basis of the working capital of trade enterprises is its inventory. They are both the main source of cash inflows to the enterprise and a generator of profit, as well as the main investment. In this regard, the question of continuous monitoring, analysis and control is one of the most important aspects of the success of trade enterprises. The purpose of this study is to analyze modern methods of inventory analysis and determine the most optimal method or combination of methods to use. To conduct the research, the systematization and comparative analysis were used. It is determined that the use of each of the methods independently does not give a complete picture of the state of inventories, so in practice, combinations of methods should be used.*

Keywords: *Commodity stocks ABC analysis, XYZ analysis, FMR analysis, SDE analysis, QRS analysis, FSN analysis, efficiency*
JEL: M41

Introduction

In the modern world, a number of methods have been developed to analyze inventories and their structure. Their analysis is necessary to answer the question of which method brings the greatest value in terms of the resources spent on the analysis and the result obtained from its implementation. To answer this question, we will analyze the main modern methods of inventory analysis.

Basic content

First, we will consider the ABC analysis method. It allows you to identify the range of inventory that requires special attention and the range that does not require additional analysis. This method is based on the empirical principle of V. Pareto, which states that only 20% of the effort brings 80% of the result. Let's consider the algorithm of its use in the classic version for analyzing inventory. At the first stage, it is necessary to determine which criterion is used to analyze inventory. Among such criteria, as a rule, the first one to be chosen is sales revenue. Other criteria may also include margin profit from sales, the number of units sold, and the number of customers who purchased the goods. This list is not exhaustive; the peculiarity of this method is that it can be used for all of the above cases. The next step is to arrange the objects of analysis in descending order of the selected criterion and calculate the share of each object in the selected aggregate, both individually and with a cumulative effect. Then, using the Pareto principle, allocate groups A, B and C. Group A includes

those items of inventory that bring 80% of the selected parameter. Group B includes those items of inventory that bring the next 15% of the selected parameter. The remaining items of inventory bring 5% of the selected parameter and are included in Group C. Appropriate management recommendations and policies are developed for each of these groups. The next feature of this method is that it can be used simultaneously for a number of parameters and divide the assortment into groups based on the goals set. This should be done to analyze the assortment from different aspects, when a certain product can generate a large amount of revenue, but have a low margin and, accordingly, generate a small profit. In addition, there may be the opposite situation, when a product generates a large profit, but it is not significant in terms of revenue. The issue of multivariate ABC analysis is discussed in more detail in [1]. In our opinion, when using multidimensional ABC analysis, each measure should have its own letter.

Next on our list of methods is the XYZ analysis of inventory. This method allows you to analyze inventory from the point of view of the stability of demand for them. This method is mathematical and statistical and allows you to predict sales of certain types of goods. To use this method, you need to calculate the coefficient of variation for each item. This coefficient shows the deviation of the value of the analyzed parameter from its average value. As in the case of ABC analysis, this parameter can be any, depending on the purpose of the analysis. Category "X" includes products characterized by the highest stability of the selected parameter and, accordingly, with high opportunities for forecasting its values. Category "Y" includes products that have certain fluctuations in demand, but which show certain trends. For this category, the forecasting capabilities are average. All other products have almost random values of the selected parameter, it is impossible to trace any trends in its changes and, accordingly, it is also impossible to make an accurate forecast of the values of the selected parameter for these products. This method should be used in conjunction with ABC analysis, when goods are grouped both by the results of the selected parameter and by the possibility of forecasting its values. The issue of ABC-XYZ analysis is discussed in detail in [2].

In the economic literature, FMR analysis is no less common than ABC and XYZ analysis. Its essence lies in analyzing the assortment by the frequency of requests. It is used in the same way as the ABC analysis, where the frequency of requests is used as an analysis parameter. As a result of this analysis, inventory is divided into groups: "F", "M" and "R". They are distributed similarly to the letters "A", "B", and "C" in the ABC analysis. Analyzing the frequency of requests and release of goods from the warehouse allows you to estimate the demand for each product item. In addition, this method can also be used when organizing a warehouse. By dividing goods into groups according to the frequency of requests, it is possible to organize the warehouse in such a way that the most frequently requested goods are located closest to the picking areas [3].

The international scientific community also suggests using SDE analysis. This analysis is based on the delivery time of each product. Delivery time refers to the period of time that each unit of inventory takes from the time it is ordered from the supplier to the time it arrives at the point of sale. As a result of the analysis, goods that have a delivery time of more than 60 days are classified as "S" (srarce), i.e., they are scarce goods. Category "D" (difficult) includes goods with a delivery time of 31 to 60 days, i.e., goods that can be called medium and hard-to-find. Category E includes goods with a delivery time of up to 30 days. Goods belonging to this group are fashionably called easily accessible [4]. However, in our opinion, this division is not universal for every company because each company has its own specifics. Therefore, during the first iteration of the SDE analysis, a company should pay attention to the typical delivery time of its inventory. Based on this

data, divide the assortment according to this logic, but using different boundaries for each category. The next method to consider is QRS analysis. It correlates the product range, resources and investments of the enterprise with each other. This method allows you to determine the amount of investment resources invested by the customer in each supplier and in support of sales of this product. At the first stage of the QRS analysis, you should collect information about the current state of all parameters in the dynamics. Next, you should determine the investment potential of suppliers of group Q. For suppliers of group R, you should develop clear limits on inventory and be sure to monitor compliance with these limits. For suppliers of group "S", additional analysis should be carried out together with the sales department and a certain strategy of interaction should be developed [3].

Another method offered by the international scientific community is FSN analysis. This is an analysis based on the classification of inventory by the value of its turnover ratio. It shows how many times each type of inventory was sold during the period under analysis. The criteria for assigning to each group were proposed in [5]. According to the proposed scheme, category "F" includes those types of inventory that have made more than 4 turns during the analysis period. Category "S" includes goods whose turnover ratio ranges from 1 to 4 during the analysis period. Other goods with a turnover ratio of less than 1 during the analysis period should be classified as "N".

Conclusions

As part of the analysis of modern methods of inventory analysis, we considered a number of methods to determine the method that brings the greatest value in terms of the resources spent on its implementation. If we have to choose only one method, we believe that multidimensional ABC analysis provides the greatest value. We chose this method because it covers several aspects of inventory performance according to different criteria. That is, using one method, you can conduct a comprehensive assessment of inventory. However, in our opinion, the use of this method alone does not provide a complete picture of the optimal state of the company's inventory. In our opinion, in the modern world, when even extremely complex calculations can be automated, at least 3 methods should be used. These include multidimensional ABC analysis, which allows you to determine the effectiveness of inventory by various parameters, XYZ analysis, which allows you to determine the predictability of the results obtained, and FSN analysis, which allows you to divide goods into groups by turnover. In addition, SDE analysis should be added to the analysis results. It should be used in the context of checking the sufficiency of the current level of inventory of various categories for the period of replenishment of each type of inventory. The combination of all the above methods will allow you to bring the structure of the company's inventory to an optimal state.

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