

## VALUE-BASED APPROACH TO CONSTRUCTION ENTERPRISE INVENTORY MANAGEMENT IN STRATEGIC PERSPECTIVE

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Under market conditions, economic development of enterprises depends on the design and implementation of developed strategies. Taking into account the fact that inventories are key elements of the production process for the most companies and the cost of their purchase, transportation and storage significantly affect the performance of the company, it is expedient to use modern methods of inventory management that most fully allow considering strategic aspects of the company. The experience of the developed countries demonstrates the effectiveness of management strategies based on value-oriented approach.

Value-based inventory management is an element of value-based system of enterprise corporate management. Being a part of enterprise cash flows, costs for inventory purchase and saving influence on net cash flows and enterprise value. Value-based inventory management methodic should be devised to increase enterprise cash flows and thereafter – its value.

A lot of scientists have studied the issues of strategic and value-oriented management. In particular, A. Thompson [1] studies the question of value-based management. Blank I. A. [6] Brodetski G. L., [7] G. Michalski [8], Semenov G. A. [9] and others research the issues of inventory management.

The issue of inventory management is not solved in strategic aspects of enterprise management, specifically in correlation with the enterprise value. Thus, the purpose of this paper is to elucidate inventory management issue in correlation with the enterprise value and to treat the system of value-based inventory management from strategic perspectives of enterprise development.

Literature analysis on inventory management issues showed that EOQ (Economic Order Quantity) model is recommended to be widely used for inventory optimization. Giving the possibility to minimize total inventory storage costs and ordering costs the model is successfully used for inventory optimization at many enterprises. Nevertheless, there are some restrictions for its use depending on the type of enterprise activity. That is why the model cannot be widely used for inventory optimization.

Scientists transformed EOQ model to correspond to economic conditions and requirements. Thus, such criterion as money value, which changes in time, was added by Russian economist G. L. Brodetskyj for the model transformation. Transformed models give the possibility to increase revenues, by taking into account money value in time, but being based on EOQ model, they have the same restrictions for use as EOQ model has.

Requirements of value-based management were taken into account in VBEOQ (Value Based Economic Order Quantity) model, which was treated by Polish economist G. Michalski by transformation of EOQ model. VBEOQ model enables

total inventory storage costs and ordering costs minimization and enterprise value maximization, though the restrictions for its use are the same as for EOQ model [8].

EOQ model can be used only for the optimization of those inventories, which are constantly used and have fixed value of holding costs and ordering costs.

Just in time, system is also widely used for inventory optimization nowadays. It gives the possibility to reduce holding costs to minimal level, though it includes additional costs for timely delivery premium. However, just in time system can be effectively used mainly for those inventories management, which are used in production process very seldom or periodically.

The proposed system of value-based inventory management includes four main steps:

- 1) Supplier selection.
- 2) Determining ways for inventories use optimization.
- 3) Needs assessment in certain group of inventory at current stage of production process.
- 4) Enterprise value management.

Determining the ways for inventories use optimization includes the following processes: inventories groups' assessment, inventories use effectiveness assessment and assessment of the places of holding goods.

The process of inventories groups' assessment includes the following steps:

1) Inventories classification on groups. At this stage, it is recommended to classify inventories of an enterprise in groups according to the frequency of their use in the production process.

Considering special features of the process, it is proposed to divide inventories of the enterprises on three groups, which may be called *a*, *b* and *c* groups that is similar to three groups of inventory control system [6]. Division of the enterprises inventories into groups for their effective management is presented in the table below.

Table 1 – Enterprise inventories classification by the intensity of their use in production

Group of inventories	Group characteristics	Ways of management
A	Inventories, which are used in the production process seldom, in specific periods	JIT planning system
B	Inventories, which are constantly used in production process, they may be cheaper; they are the background of the production process	Multi-item models of inventory management, transformed to the requirements of firms value maximization
C	Inventories, which are constantly used in the production process, but do not refer to basic materials	EOQ model of inventory optimization

Classification of inventories is based on frequency of raw materials use in the production process. This criterion of classification was chosen based on the enterprise inventories analysis by the following reasons:

a) The “most expensive” does not mean the “most required”. It means that some inventories of the enterprise may cost a lot, but they are not used in the process every day and enterprise does not need reserve stock for these inventories, so it can be managed accordingly.

b) The reserve is needed but not in all cases. Instead of investing money to reserve stock for inventories formation, which may be needed in a month or two, and thus freezing enterprise money, enterprise would better invest them and gain additional profit.

Received information is given to next stage of inventories use assessment, where the necessity in certain group of inventory at a current stage of production process is evaluated.

2) Expert assessment of inventory group. At this step, inventories are classified according to the requirements to their storage, into three groups: inventories, which should be hold in own stock rooms, in leased stock rooms and inventories, which can be hold at production places. Information received at this stage is given to the stage of evaluating place and conditions of inventories storage.

3) Forming of unitary list of inventory groups according to rating. At this stage, the list of inventories is composed grounding on their classification according to needs parameters under constant monitoring. It means that inventories with the most problematic characteristics (special requirements to storage, inventories with high level of brittleness and other inventories with high risk of losses) are to be most carefully monitored, and their size should be minimized.

The effectiveness of inventories use assessment includes three stages:

1) Analysis of inventories supply and use over the previous reporting period. Analysis is carried out based on financial reports data over the previous reporting periods. The goals of this stage are:

- to determine groups of inventories according to their value: the most expensive groups of inventories, inventories with an average cost and inventories with the lowest cost;

- to analyze the frequency of inventories supply and their use in order to extract groups of inventories used ineffectively (exceptionally high level of inventories storage, the volume of the supplied inventories in certain periods was much higher, then the volume of used inventories).

2) Calculation indices of the effectiveness of inventories’ use. At this stage, the coefficient of the effectiveness of inventories use is analyzed. Such indices as turnover and profitability are calculated and evaluated.

3) Determination of ineffective inventories use by groups and periods. This stage is devoted to the determination of inventories groups, which are used ineffectively based on the analysis of previous stages. Concerning the peculiarities of production

enterprises activity, the effectiveness of inventories use is also assessed by the periods of production process [7; 9].

The processes of assessing place and conditions of inventories' storage are devoted to the determination of stock rooms effectiveness, which is based on information, received at the second stage. At this step, profitable amount of inventories is determined depending on space needed for inventories' storage. Profitable amount of inventories depends on the available space in own stock rooms, available space in leased stock rooms and amount of inventories, which can be stored at production process places. The main restriction of profitable amount of inventories calculation is that its size should be smaller or equal to the size, available for storage. The recommendation for optimization can be expressed by the following equation (1):

$$\sum_n S_n \leq \uparrow \sum_\beta S_\beta + \downarrow \sum_\gamma S_\gamma + \downarrow \sum_\varepsilon S_\varepsilon \quad (1)$$

where  $S_n$  is a space needed for the groups of inventories storage;

$S_\beta$  –profitable space of own stock rooms (symbol “↑” means that this space should be used at maximum);

$S_\gamma$  –profitable space of leased stock rooms (symbol “↓” means that minimal amount of this space should be used in order to minimize costs concerning lease payments);

$S_\varepsilon$  –profitable space of inventories storage out of stock rooms (symbol “↓” means that minimal amount of this space should be used in order to minimize costs concerning possible loose of inventories).

The process of assessing the necessity in a certain group of inventory at current stage of production has the purpose to calculate the demanded amount of inventories for each cycle of production process in order to determine the minimum of the demanded inventories and optimal supply scheme. It is necessary to follow some steps to achieve this aim:

- 1) Analysis of production process.
- 2) Assessment of the demands in inventories at a certain stage of production process.

The requirements for size of inventories demanded at a certain stage of production process are shown in the following equation (2):

$$\sum_n Q_n \cdot P_n \cdot \left( 1 - \frac{\sum D_{mn}}{100} \right) \geq \sum_s Q_s \cdot k_s \cdot P_s \quad (2)$$

where  $Q_n$ ,  $Q_s$  is an amount of inventories in a group;

$P_n$ ,  $P_s$  – the price of inventories unit in a group;

$k_s$  – insurance coefficient, which equals 1, if insuring amount of inventories is not needed, but it can't be less than 1);

$D_{mn}$  – the possible amount of discounts (%);

$1 \leq n \leq N$ , where  $N$  is a general amount of inventories groups;

$1 \leq m \leq M$ , where  $M$  is a general amount of discounts;

$1 \leq s \leq S$ , where  $S$  is minimum of inventory groups required for the provision of production process;

The process of the enterprise value management includes the following steps:

- 1) Enterprise value calculation before inventories optimization ( $V_1$ ).
- 2) Enterprise value calculation after inventories optimization ( $V_2$ ).
- 3) Comparative analysis of values  $V_1$  and  $V_2$ .

Enterprise value calculation and comparative analysis show the effectiveness of value-based system of enterprise inventory management application.

If the enterprise value after inventories optimization is higher than the enterprise value before inventories optimization, it means that recommendations on inventories use optimization can be applied at any enterprise. If the enterprise value after inventories optimization is lower than the enterprise value before inventories optimization, it means that information must be analyzed again, and the other ways of inventories optimization should be found.

Thus, influencing on inventory storage costs and ordering costs, an enterprise can increase cash flows and relatively – enterprise value. The same goal can be achieved by stock rooms optimization, and ensuring reliable relations with suppliers.

Implementation of the developed system of value-based inventory management will contribute to the achievement of enterprise strategic goals by reducing expenses and increasing enterprise value.

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