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SUPPORTING ECONOMIC EFFICIENCY BY OPTIMIZING THE STOCKS MANAGEMENT

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Abstract:
Stocks management is an important component in accounting and the research in this field can be developed in many directions considering the multitude of practical situations that may occur in different areas of the economic activity. Making the stocks so as to ensure the effectiveness of the economic entity entire activity involves accelerating the rotation speed of the material resources, optimizing transport, eliminating material losses while holding the resources in stock, intensive use of the production capacity, general reduction of the storage and the release of materials for productive consumption costs. Making and holding stocks are important activities because of the economic and financial implications that these have on the entity's management efficiency.

Key words: *stocks* management, economic efficiency, the optimal level of stocks, stocks speed of rotation, storage costs.

JEL classification: M41, M11.

1. INTRODUCTION

The need to modernize the accounting stocks derives from the fact that it provides a significant amount of information used by management in the decision making process. Organizing and managing stocks is based increasingly on actual knowledge of the means and resources, on the operative tracking of stock movements, on the close examination of structure and dynamics elements but especially on decoding the future development trends regarding the phenomena occurring in the entity and in its external environment.

Worldwide, the concept of storage has emerged around the 30s of the twentieth – century by developing a stock management system that favoured not only the process of supply and sale length, but the whole economic activity. The first major paper which promoted the study of issues related to stocks is that of F.E. Raymond, published in 1931 and entitled "Quantity and Economy in Manufacture"(Fundătură, 1999, 253).

In the study „Etude et practique des modeles des stocks" (*The study and practice of stocks models*), published in Paris in 1966, economists G. Hadley and T.M. Whitin mention as the first formula in determining the stocks the one offered by Harris Ford in 1915. Subsequently, R.H. Wilson takes it over and uses it in the management systems, which is why it is known as the "Wilson formula". Wilson defines as "optimal order quantity that amount which gives place to the lowest management costs for stock holding and issuing commands"(Fundătură, 1999, 288). In Wilson's view, the purpose of any economic model in determining the economic size of stocks is to balance the costs of making stocks with the ones associated with the supply of stock for the next period. This means that the size of an order is that amount whose total cost is minimized, being equal to the cost of supply for the next period, plus the cost of the order.

Currently the stock issue is very comprehensive, including both sizing, optimizing deployment in space, reducing storage costs issues and storage, assortment structure, preservation and use of stocks issues.

2. THE EFFICIENCY ROLE IN THE ECONOMIC ACTIVITY

The author of the article (Gruian, 2010, 248) "What do we mean by the performance of the company?" quotes the Swedish researcher Stefan Tangen who presents efficiency as "the ratio

between the minimum level of necessary theoretical resources needed to perform desired activities in a given system (company) and actual consumed resources". In this way, the efficiency can be determined as the ratio between costs estimated to be achieved through the budget and actual expenditure system. Following the presentation of this definition it can be understood that efficiency can only refer to how well resources are assigned and consumed compared with optimum consumption known for such an activity. In this case, the efficiency does not take into consideration the results of the economic activity, but only refers to how well the consumed resources are being used. However, the most known definition considers establishing a certain level of expected results with minimal resources consumed.

Although the Explanatory Dictionary of the Romanian Language presents "efficiency" and "effectiveness" as synonymous, in the economic practice the two concepts have different meanings. Effectiveness issues targets achieving the aimed objectives and the obtained result. Effectiveness requires establishing the objectives and the possibility of targeting exactly and measuring with approximation the result. If in the case of effectiveness we deal with an accentuation of the purpose size and the oversight of efforts, in the case of efficiency the situation is reversed. Although it is important to quantify the achieved objectives, the costs involved in achieving the aimed objectives should not be neglected. While effectiveness reflects the degree of fulfilment regarding the external environment expectations, efficiency is measured by the degree of fulfilment of the company internal environment expectations. (Buşe, 2005, 133)

Although in most specialized papers, economy is essential in ensuring the efficiency, there are also different views. Julia Jianu (Jianu, 2007, 41), in the book "Evaluation, presentation and analysis of enterprise performance" states that "we can be efficient without being economically if the market position or financial resources allow us".

Efficiency plays an important role in business because along with effectiveness and economy, it is one of the indicators that describe the performance of an enterprise. Users of financial statements are interested in the company performance and when making decisions they face a number of risks. Practice has shown that an assumed high risk estimates a higher return as compensation. (Berheci, 2010, 476)

We must take into consideration that improving the company performance involves an operative and more precisely measuring for the efforts and effects, an efficient use of the entity resources but also identifying ways to reduce consumption, category in which stocks occupy a significant place.

3. STOCK SIZE OPTIMIZATION

The optimal level of stocks takes into account achieving the highest effect in order for each economic entity to be able to conduct an economic activity with lower production expenses and bigger benefits and therefore with lower storage costs.

Optimizing the inventories size should be done by taking into consideration the continuous increase of the economic efficiency by reducing material costs. The optimum stock is one that ensures a continuous production process in the established rhythm and proportions, under complete and intensive use of production capacities. To maintain economic efficiency, stocks volume and structure should be adapted to the changes that occur in the production structure and consumption, in manufacturing technologies and continuous improvement of product quality. The optimal size of stocks is "the one that minimizes the total costs of making the stock simultaneous with the maximization of the operating activity profitability ".(Troancă, 2010 ,171)

An optimal balance between the stocks level and the profit dynamics creates conditions for economic efficiency growth. The optimal size of stocks must allow the acceleration of the circulating material assets rotation speed, the restoring of low movement or no movement stocks into the economic cycle, the elimination of unnecessary stocks, losses and damages during storage.

For analytical calculations meant to optimize stocks levels it is necessary to know the storage process in the following "management types"(Băşanu and Pricop, 1996, 107): management

with constant demand at equal intervals; management with variable demand at equal intervals; management with variable demand at unequal intervals and management of type (S, s) or with two warehouses.

Management of type (S, s) or with two warehouses is characterized by the fact that intervals and requests are variable and the batch supply is constant. The name of management type "S, s" expresses the essence of the working procedure, "s" being the level of replenishment, and the "S" the amount to be replenished. Optimizing management of this kind involves establishing two levels "S" and "s" in order to obtain a work effort as lower as possible for establishing and maintaining the production stock.

The optimal size of stocks is the one that harmonizes the adversarial relationship between supplying expenses (Se) that vary according to the number of supplies and the storage costs (Sc) that vary according to the size of stocks. To establish the optimum stock of raw materials and materials it must be find a mathematical solution between frequent renewal of stocks and renewal at large intervals. If they choose frequent renewal of stocks, costs in transportation - supply would increase and the depositing - storage would be reduced. A renewal of stocks at longer time intervals would lead to the reduction of costs in transport - supply and to the increased in costs of depositing - storage.

In the case of a constant demand at regular intervals management it can be applied the Wilson - Whitin model which optimizes the size of the stock based on the total cost of making the stocks. This cost should be minimal in terms of maximizing the operating activities. The reasoning in determining the optimal stock according to the Wilson - Whitin model is: (Jobard, 1997, 1537):

$$Ct = \text{acquisition cost} + Se + Sc$$

$$\text{Acquisition cost} = S \times u$$

$$Se = \frac{S}{q} \times a$$

$$Sc = \frac{q \times u}{2} \times i$$

$$Ct = S \times u + \frac{S}{q} \times a + \frac{q \times u}{2} \times i$$

where : Ct = total cost of making stocks;

Se = supply expenses

Sc=storage costs

a = fixed unitary cost for preparing a new supply

u = unitary cost of supply;

i = cost of storage per unit of stock

q = the optimum size of the stock; S = the annual demand of stocks

The point where the first derivative of the total cost in relation to stock size is zero reflects the minimum total cost.

The optimal size of the stock is: $q = \sqrt{\frac{2 S \times a}{u \times i}}$

Knowing the optimum stock can determine the number of supply orders (No. supplies) and the average interval between two supplies (i_m):

$$\text{No. supplies} = \frac{S}{q}; \qquad i_m = \frac{qxT}{S}$$

T = number of days in the period considered (T = 360 days).

Further, we will illustrate the Wilson-Whitin model for an economic entity ALFA which supplies itself with raw materials, knowing the following data: the amount of raw materials needed for one year (S) is 10 000 m^3, the cost of preparing a new command (a) is 1500 m.u., the unitary price of supply (u) is 1000 m.u. / m^3 and the storage cost is 0.5 m.u. for 1000 m.u. stock.

- The optimal stock to command is:

$$q = \sqrt{\frac{2x10000x1500}{1000x0,5}} = 244,95 \text{ m}^3$$

- The number of supply orders:

$$\text{No. supplies} = \frac{10000}{244,95} = 40,82 \text{ supplies}$$

- The average interval between two supplies:

$$i_m = \frac{244,95x360}{10000} = 8,81 \text{ days}$$

In order to obtain total minimum expenses for making stocks for one year, it will be needed for the economic entity ALFA to supply every 9 days, and for the amounts that will be included in contracts to be of 245 um for each order.

The Wilson – Whitin model can be expanded in order to optimize the stocks for products in process of manufacture and for finished products. In this case "Se" refers to the supply expenses for batches of products in progress and to expenses for launching a new delivery order for finished products and "Sc" includes expenses for holding stocks of products in process of manufacture and finished products.

The presented mathematical model of stocks size optimization was based on a particular case of supply according to which intervals between supplies are considered constant, so the supply is carried out rhythmically and stocks are made and gradually given to the consumer until total exhaustion. Optimizing the stocks size starts in the phase of supply which is part of the business strategy and accounts for the most expensive activities. Because a significant part of the company's income is destined for financing activities related to the supply chain, formulating an effective strategy is absolutely necessary. The supply chain provides a major opportunity to reduce costs and increase earnings margins. Gaining a competitive advantage may depend on a close long-term strategic relationship with certain important suppliers. A company must make sure that the supply chain supports its strategy implementation. For example, a strategy based on low costs requires that for providers to be selected primarily on the cost criteria. Such providers must have the required ability to design low-cost products that meet functional requirements, to operate with small stocks and to reduce the delivery time. An effective stock management must ensure continuity in consumption. This objective can be achieved by eliminating or reducing uncertainty in supply and by ensuring a balance between the provider's supply potential and the demand for resources. Uncertainty in ensuring consumption may be determined by: lack of knowledge regarding the resources demand, delivery potential, failure to comply with delivery deadlines. In all these cases, dysfunctions are taken by security or emergency stocks.

The costs of launching the purchase orders, as well as the storage ones, require making stocks based on economic criteria. The first criteria refers to the correlation between the stocks volume and the industrial unit's profit because it finances the stocks growth. A positive economic and financial situation is characterized by a ratio between the continuously decreasing stocks volume and the industrial company income. This means that from one financial year to another, a smaller share of their income is allocated on stocks formation and a larger one on developing the unit.

A second economic criteria concerns the correlation between the stock of materials and the production volume. This correlation highlights the potential of the production achieved based on material stocks that exists in the economic unit at a given time. The volume of production is conditioning, through the necessary to fulfil the daily medium consumption, the level and structure of stocks that must be made.

For goods and services obtained from external sources, the company must decide on the supply chain strategy. In the literature (Militaru, 2008, 118) related with de subject, there are known

the following supply chain strategies: negotiating with several suppliers; developing long-term partnerships with a limited number of suppliers; vertical integration; "keiretsu" - a combination of vertical integration and operating with a reduced number of suppliers.

Long-term suppliers understand and get more involved in achieving the clients major objectives. Working with a reduced number of suppliers, but with a strong commitment to the buyer, is an important asset in order to participate in the JIT production systems. The "Just in Time (JIT) system was conceived in Japan between 1950 and 1960 due to the international competition growth and the increased globalization. This system was created in terms of total quality management. By this method, "a short term, based on prediction, programming and control, management logic was replaced with another logic based on a real-time response to the customer requests". (Baranger and Chen, 1997, 1727).The "Just in Time" system is defined "as a company management philosophy based on the desire to satisfy the customer (through quality by a short waiting time), to avoid waste and to involve the staff".(Baranger and Chen, 1994, 192)

To achieve the reduction of stocks, factors that can lead to the increasing of the stocks, such as quality defects, equipment malfunctions, adjustment time, must be removed. To prevent the appearance of quality defects in products and of malfunctions of the equipment, the JIT system allows the creation of "the flexible work cells". (Needles et al 2001, 1178). In this way it is achieved a reduction of the time needed to manufacture a product from a few days to a few hours or from a few weeks to a few days. This group of equipment form a flexible work cell, an independent line of production that can perform all necessary operations effectively and continuously. The flexible work cell achieves the processing of similar size or shape products.

Vertical integration involves the following alternatives: downstream and upstream integration or by combining these strategic alternatives. Downstream integration suggests that a components manufacturer decides to make finished products destined for final or productive consumption or to purchase a distributor. Upstream integration suggests that a company buys its suppliers.

"Keiretsu" is a Japanese term used to describe suppliers that become members of a company coalition. Manufacturers often financially support providers through loans or by taking over some of their facilities. The supplier becomes a member of the company coalition and is considered a "keiretsu". Members of the "keiretsu" build long-term relationships and expect to act as partners, to provide technical expertise, to ensure quality production.

The virtual company is based on a variety of relationships with suppliers in order to benefit from on-demand services. Virtual companies are often found in the clothing industry. Designers authorize certain producers to capitalize their creations. These clothing producers rent spaces, sewing machines and acquire workforce to achieve production. The result of this form of organization consists in a significantly reduction of indirect costs, in the increasing of flexibility and of the speed of reaction to market demands, the final result being materialized in efficiency. Another example is the one of the companies from the electronic computer industry that subcontract almost everything.

4. THE EFFICIENCY OF USING STOCKS

Efficiency, economy and effectiveness may be considered necessary attributes to ensure performance. Efficiency must be considered from both a quantitative and a qualitative point of view. From a quantitative perspective, economy is considered, by this it means obtaining indirect effects by saving money. From a qualitative point of view, it is compared the result obtained with the proposed effect, emphasising on the notion of effectiveness.

The efficiency of using stocks is analyzed by the method of the rotation rate that can be expressed by the number of rotations, respectively the length of a rotation. The stocks speed of rotation or the stocks conversion period are determined as a ratio in which the numerator is the multiplication of the average stock and the number of days in a year or semester, and the denominator is the annual or quarterly turnover volume:

$$\text{Stocks speed of rotation} = \frac{\text{Average stock value x 365}}{\text{Turnover}}$$

The coefficient of the speed rotation or the number of circuits crossed by stocks in a period of time are calculated as the ratio between turnover and the average stock: (Toma, 1996, 128)

$$\text{The stocks speed rotation coefficient} = \frac{\text{Turnover}}{\text{Average stock value}}$$

We observe that the two indicators involved in quantifying the efficiency of using stocks are not expressed in the same unit of measurement: turnover is valued at the sale price and the average stock value at the acquisition cost or production cost. Therefore, to calculate the efficiency of the commercial entity goods stocks the following indicators are taken into account: (Jianu, 2007, 46)

$$\text{Stocks rotation} = \frac{\text{Purchased products acquisition cost}}{\text{Average stock}}$$

$$\text{Stocks period of conversion} = \frac{365}{\text{Stocks rotation}}$$

So, if the average stock of goods was 1000 m.u. and the acquisition cost of the sold good was 5000 m.u, one can deduce that the stock has suffered 5 turns during the financial year. Dividing 365 to 5, we obtain an average number of days during which the goods remain in stock to be sold. The number of days is 73. A low rate of stocks rotation generates an extended period of goods storage, which is a warning for the economic entity.

The speed of stocks rotation should be compared, in time, in order to draw conclusions and to act on the stocks level according to the economic entity interests. Accelerating the speed of rotation has positive effects on the profit and on the rate of profitability. Accelerating the stocks speed of rotation can be ensured by technical, organizational and financial measures that should be applied in each phase of the exploitation process: supply, production and marketing.

In phase of supply there are needed decisions and actions to ensure the elimination of the period of inactivity due to insufficient supply. Conducting a continuous production process requires a permanent stock of raw materials. Improving the supply activity can be done by increasing the efficiency, adapting quickly to market conditions, selecting suppliers by certain criteria, timely completion and compliance of contracts. In this stage it is necessary to reduce losses during transport, handling and storage. A reason for the slower speed of rotation in this stage is the appearance of overneeded stocks as a result of incorrect contracting or interruption of certain products manufacture.

In the production phase the volume of stocks depends mostly on costs and length of the manufacturing cycle. Any way to reduce them represents also a method to accelerate the stocks rotation speed. This objective can be achieved by proper organization of production, establishing rational manufacturing flows and by choosing the most efficient manufacturing technologies.

In the marketing phase, rapid sales and cashing the counter value produce the liquidity completion. The company degree of liquidity is determined by reporting total current assets to total short term assets. Accelerating the rotation speed in the marketing phase can be achieved by reducing the period of settlement, rhythmic obtaining of products and by reducing the sorting and packaging time.

5. SIZING INVENTORIES IN CONNECTION WITH DETERMINING THE NECESSARY TO FINANCE THE OPERATING CYCLE – A REQUIREMENT FOR SUPPORTING ECONOMIC EFFICIENCY

Sizing stocks is a matter of determining the necessary to finance the operating cycle, in general, and stocks in particular. The operating cycle consists of all supply, production and

marketing operations conducted by the enterprise to achieve its object of activity. During exploitation there is always a gap between supply, production, sale operations and their conversion in money.

Schematically, the operating cycle structure is as follows:

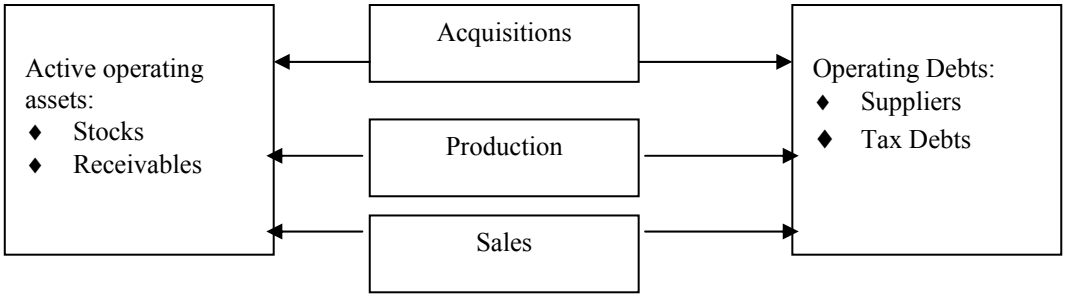

Figure no. 1 Exploitation cycle operations

Source: Bareau and Delabaye, 1991, 28

From the information presented above it can be concluded that an operating cycle begins with supplying for stocks and ends with cashing from customers the value of the delivered finished products. The operating cycle is a sequence of stocks in various stages of operation, with different physical sizes and increasing values per unit. The value of a stock unit is ascending, with the advancement in the exploitation cycle, at the initial value adding storage and processing costs or costs regarding its movement until collecting its receivables from customers. Purchasing, storing, processing and circulation of these stocks generate cash expenses, which give content of the concept of "the necessary to finance the operating cycle "(NFOC).

Financing stocks necessary is determined by total expenses with forming and storing current material assets, throughout all the exploitation cycle phases, so as to ensure continuous and rhythmic production.

Literature in the field (Vintilă, 2010, 335) presents three methods for determining the necessary to finance the operating cycle, as follows: standard method (payment deadlines method), the analytical method and the synthetic method (global).

If the standard method is used, stocks efficiency expressed through speed of the stocks may be considered a first step for determining the necessary to finance the operating cycle. In this phase, along with the stocks conversion period it is determined the clients and providers loan period. During the second phase the operating cycle necessary is determined based on a unique indicator of activity that can be the turnover or the sales volume. Each period of rotation is converted into days / turnover, the conversion ratio depending on the cost structure share.

The analytical and synthetic methods used in determining the necessary to finance the operating cycle have as supporting indicators either operating costs or turnover projected for the next period. NFOC determination based on the cost of exploitation is justified by the fact that the need for capital to purchase and hold stocks is driven by costs of acquisition, handling and transport of raw materials and products. NFOC determination on the basis of the turnover is motivated by the need to recover operatively the advanced capital for purchasing and holding stocks.

6. CONCLUSIONS

We began this article by emphasizing the concept of economic efficiency, in general, and subsequently we insisted on the stocks efficiency, in particular. The storage process analysis allowed us to establish the ways, means and forms of formation, use and operation of the stocks mechanism that becomes a mechanism increasingly important for the entity economic efficiency. The stocks necessary must be established in order to stimulate the economic entity to use stocks efficiently, to mobilize all factors to accelerate their speed of rotation, to absolute or relative reduce stocks. The stocks necessary must express the consumer real needs.

We believe that the supply with material resources must be organized based on two correlations: the first refers to the ratio between the stock and the firm's profit, and the second correlation between the stock of materials and the production volume.

Among the methods of sizing the necessary to finance the operating cycle, we consider that companies should choose the analytical method because it creates a favorable framework for a thorough analysis and a rigorous control on how material and financial resources of the company are managed.

In order to optimize the stocks size we propose that most companies practice a management with variable demand at unequal intervals. The justification for this choice derives from the fact that most of the production runs based on the orders received from customers and consequently restocking with raw materials and materials is done in amounts required by the projected volume of production at unequal intervals.

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