MODERN MATHEMATICAL METHODS, MODELS AND INFORMATION TECHNOLOGIES IN THE ECONOMY

Nataliia Dobrovolska, PhD in Pedagogic, Docent
Svitlana Merinova, PhD in Economics, Docent
Vinnytsia Institute of Trade and Economics
of State University of Trade and Economics
Vinnytsia, Ukraine

THE MODEL OF ENTERPRISE LOGISTICS COSTS MANAGEMENT TAKING INTO ACCOUNT THE TIME FACTOR

One of the most important tasks in the field of logistics management at Ukrainian enterprises is the management of logistics costs as one of the subsystems of logistics management. In the management of logistics costs, the time factor acquires a decisive importance, which in turn is related to the well-known concept of the value of money in time [1].

Investigating the causes of logistics costs, we note that their value is largely determined not by the volume of production, but by other production factors.

Among the cost-forming (factors), it is worth highlighting the time raw materials and goods stay in the warehouse, time for setting up equipment, time of the production process, the number and time of receiving and placing orders, time for financial transactions, etc. Thus, the time factor is the most important component of flow processes [3].

Logistics management should be guided by the rule that logistics investments are primarily financial resources and according to the principle of the time value of money, today's income is more valuable than future income. At least two important consequences follow from this:

– the need to take into account the time factor when conducting logistics operations;

– incorrectness (from the point of view of the analysis of long-term logistics operations) summation of monetary amounts belonging to different time periods.

It is worth noting that the methodological basis of the approach to the management of logistics costs is the provision that any flow process to be optimized according to the "costs" parameter can be represented not only as a set of relevant logistics substances in motion (for example, material volumes objects), but also as a moving set of time parameters of the flow of the logistics process, both inside the system and outside it.

Let's consider the practical aspects of logistics cost management from the standpoint of the proposed methodology.

The simplest type of logistics financial transaction is a one-time investment in logistics with the condition that after some time t a larger amount will be returned, that is, logistics measures will have an economic effect.

The period of operation of the logistics flow process is taken as the time during which the capital invested in logistics will make a full turnover and bring profit [3]. If at the same time the indicator of expected profitability (planned profitability of logistics) is calculated per year, then this formula will look like this:

$$Мв = Пв \times \left(1 + \frac{n}{365} \times r\right), \qquad (1)$$

where 365 is the number of days in a year;

r – planned profitability of logistics activities.

At the same time, the management of the enterprise evaluates not so much the level of profitability in the future, but the possibility of maximizing a certain amount of profit on the volume of logistics costs, based on the estimated (prospective) profitability [2].

Therefore, the cost of future logistics flows is determined by the formula:

$$Мв = Пв \times \frac{1}{(1+r)^n} \; або \; Пв = Ьв \times F_3 , \qquad (2)$$

where r – the planned level of profitability of the logistics operation;

F_3 profitability ratio.

Formula (2) allows you to bring the income received in the future to the present time and compare the amount of investment in logistics with the income received after a certain period of time from the logistics operation.

At the same time, it should be taken into account that logistics costs, as a rule, have a long-term nature, their reimbursement can take years, due to which the actual problem of managing logistics costs is taking into account the inflation factor.

In the general case, the rule applies: in the conditions of inflation, logistics costs are justified only if the return on investments exceeds the rate of inflation.

There are two approaches to accounting for the inflation factor:

1) the rate of inflation is different for individual components of resources (input and output);

2) the rate of inflation is the same for different components of costs.

As part of the approach to taking into account the inflation factor, where the inflation rate is different for individual components of resources (input and output), which is more in line with the real situation in Ukraine, especially in unstable economic conditions, the method of estimating logistics costs is used in its standard form, but all components costs and revenues, as well as profitability indicators are adjusted in accordance with the expected rate of inflation for years.

This approach assumes the use of the nominal price of logistics costs to estimate nominal logistics flows:

$$\Pi e = \sum \frac{H \mu}{(1 + r_n)^t} \, , \tag{3}$$

where $H \mu$ – expected nominal flow of funds from logistics operations.

The most effective way to overcome the distorting effect of inflation when forming the logistics budget is to adjust the component logistics costs.

Thus, the management of logistics costs is inextricably linked with financial analysis, while this technique involves reimbursement of costs from extended reproduction mainly at the expense of own sources of net profit [4].

This means that in order to make decisions in the field of logistics cost management, it is necessary to have not only a clear classification of income and expenses, profit and loss, but also a strategic plan for the development of logistics in the future period [2].

Therefore, the management of logistics costs according to the proposed method has the following advantages:

– production of competitive products due to the ability to control costs and form the price of products based on forecast indicators;

– availability of high-quality and real information on logistics costs for individual periods and divisions;

– availability of reliable, objective information for management decision-making.

In addition, using this method, it is possible to determine the economic feasibility of investments in logistics at different stages of the logistics

cycle, in different directions of logistics activity, in different logistics divisions, etc. This approach also allows you to look at planning logistics costs in a new way , when the basis of logistics cost management is not a traditional analysis scheme related to them (formal classification), but a predictive approach that allows you to realistically and comprehensively assess the effectiveness of logistics activities not only in the current period, but also in future periods, to realistically assess the effectiveness logistics activities, to forecast and determine the amount of logistics costs in the long term.

References:

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