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DEVELOPMENT OF THE DISTRIBUTION MODEL OF FINANCIAL RESOURCES BASED ON EVA INDICATOR

Об'єктом дослідження є управлінський контроль витрат машинобудівних підприємств. Найбільш проблемними місцями є застарілі інструменти управлінського контролю витрат, відсутність ефективної інформаційно-аналітичної системи управління витратами та застарілі інструменти управління витратами. Необхідно проаналізувати основні етапи управлінського контролю витратами та виділити основні аспекти існуючих обмежень системи управлінського контролю витратами. В якості інструменту, на основі якого в даному дослідженні розробляється механізм управління витратами для підвищення ефективності підприємства, обирається показник EVA (від англ. *economic value added* – економічна додана вартість). Цей показник використовується для оцінки вартості бізнесу як показник ефективності діяльності господарюючого суб'єкта, проте, його почали використовувати як інструмент управління витратами. Це дозволяє не тільки скоротити витрати, а також виявити непродуктивні витрати, що не приносять доданої вартості споживачу (брак, робота з безнадійними боржниками тощо). Завдяки фінансовому механізму управління витратами на основі методу EVA можливо моделювати, проводити та оцінювати прийняті рішення в аспекті доданої вартості. В ході дослідження проведено модифікацію основних показників методу EVA для вирішення завдання управлінського контролю витрат шляхом ефективного розподілу фінансових ресурсів в рамках реалізації фінансового механізму управління витратами. Застосування показника EVA дозволить зосередити увагу на пріоритетних напрямках розвитку та побудувати ефективний фінансовий механізм управління витратами. Для даного підходу є характерним застосування принципу ресурсозбереження в процесі зниження витрат, а також принципу скорочення інвестицій, що не створюють доданої вартості. Досліджено, що показник EVA дозволяє відповісти на питання інвесторів компанії про те, який вид фінансування і який розмір капіталу необхідний для отримання певного розміру прибутку. Проаналізовано, що даний підхід робить новий акцент на оптимізації величини і структури капіталу, тому компаніям, які усвідомили необхідність зниження витрат, необхідно приділяти належну увагу даному факту.

Ключові слова: управління витратами, машинобудівна галузь, оптимізація витрат, фінансове управління підприємством, показник EVA.

1. Introduction

In market conditions, the cost management is inextricably linked with the financial management of the enterprise. Increasing the stability and reliability of activities based on the development and implementation of a financial mechanism for managing costs, as part of the overall management system of a machine-building enterprise, can ensure the competitiveness and profitability of the enterprise. A financial management mechanism can be defined as a set of financial actions that involve the organization, planning and stimulation of the use of financial resources of an enterprise. The financial mechanism of cost management serves the task of optimizing costs and, accordingly, maximizing profits, acts as the main objective of the enterprise's commercial (entrepreneurial) activities.

The introduction of a financial mechanism for managing costs is determined by the specific features of machine-building enterprises, namely:

- long production cycle;
- large amount of work in progress;
- diversion of cash from circulation for a long period, as a result of which there is a lack of own working capital and the enterprise must attract credit funds.

Therefore, it is important to study the EVA (Economic Value Added) indicator, since this indicator will allow

focusing attention on priority areas of development and on their basis to build an effective financial mechanism for cost management.

2. The object of research and its technological audit

The object of research is the management control of the costs of machine-building enterprises.

Large machine-building enterprises need to introduce modern tools of management cost control to improve the effectiveness of the financial mechanism of their management. This, in turn, requires the formation of an information and analytical management system, a change in cost management tools based on new approaches.

Fig. 1 presents a system of managerial control over the costs of machine-building enterprises through the linkage of its elements, between which there are direct and reverse links through the exchange of information flows.

To form a system of managerial cost control (Fig. 2), it is necessary to determine its subject and object. Subjects of managerial control of costs (the subsystem that manages) are employees of the enterprise who in some way control costs. The object of management control within the framework of this study is monitoring of the level and sources of cost financing.

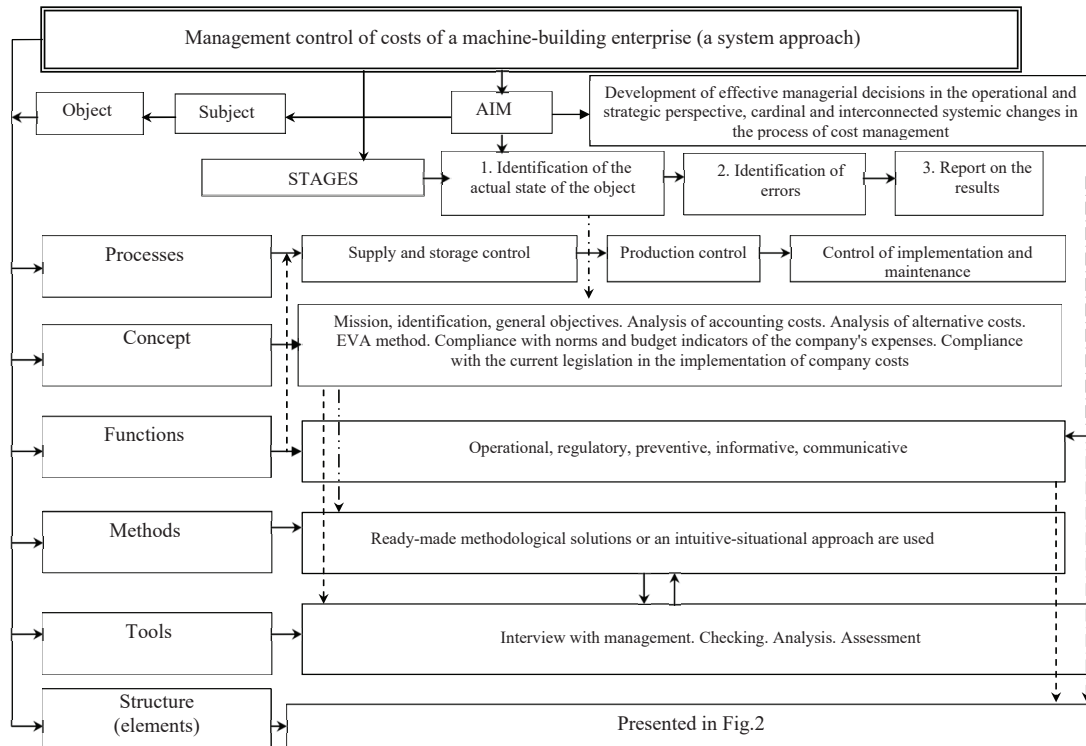


Fig. 1. Organizational-methodical model of management control of costs of machine-building enterprises

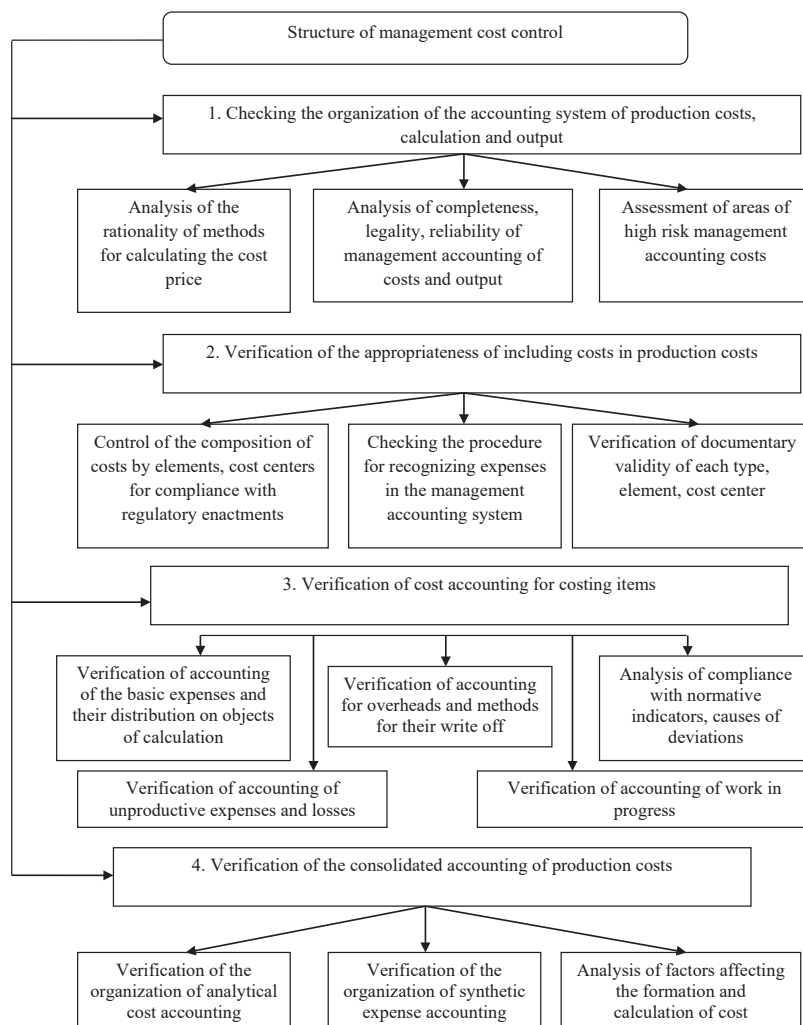


Fig. 2. Structure (elements) of administrative control of costs

Analyzing the stage of control as a process, it is possible to distinguish its main stages:

1. Identification of the actual state of the object of control after the implementation of control procedures sufficient to achieve the objectives of control.

2. Comparison and identification of deviations of the actual state of the object of control from the normative or planned. The next step is registration, summary, analysis and *EVALUATION* of deviations to identify the causes of their occurrence. Important in the management control of costs is the shift in emphasis from the process of eliminating deviations to eliminate the causes of deviations. At the same time it is supposed to eliminate deviations directly during the audit or after the end of the control procedures.

3. Preparation of the report with options for management decisions and search for alternative corrective actions.

An important aspect of the process is the understanding by the enterprise manager of the existing limitations of the management cost control system as a model. Like any model based on professional judgments of management and made calculations (business plans, budgets), a system of restrictions that can be caused by the following circumstances:

- change in the economic conjuncture or legislation, the emergence of

new circumstances outside the sphere of influence of the management of the economic entity;

- erroneous judgments;
- wrong interpretations and subsequent decisions;
- occurrence of errors in the decision-making process;
- force majeure circumstances;
- initial guesses caused by false initial goals;
- human factor;
- neglect of the management and employees of the enterprise control rules;
- abuse of authority by management or other personnel of the economic entity, including conspiracy of personnel.

Thus, the complexity and need for effective management cost control requires a more detailed familiarization of managers at all levels involved in organizing the control system of each business process, related to costs, with the capabilities of this system.

3. The aim and objectives of research

The aim of research is development of an organizational-methodical model of management cost control based on the *EVA* indicator.

To achieve this aim, it is necessary to perform the following tasks:

1. Modify the main indicators of the *EVA* method.
2. Build a model for the allocation of financial resources based on *EVA*.

4. Research of existing solutions of the problem

The procedures for solving cost management problems and the methods underlying them are quite diverse. Among modern technologies of cost management, as a rule, include [1, 2]:

- targeted cost planning;
- continuous improvement of efficiency;
- reference testing;
- accounting costs by type of activity;
- functional and cost analysis;
- reengineering of business processes.

Analyzing various sources, which describe the existing concepts of managing the production costs of the enterprise [3, 4], it should be noted that all of them are formed based on the composition of costs included in the management:

- cost-effectiveness concept;
- transaction costs concept.

And also the factors that form them – the concept of cost-creating factors, or objects that form:

- value add concept;
- value chain concept;
- ABC concept;
- strategic positioning concept.

Effective management or efficient management of costs is impossible without the automation of problem-solving processes and the introduction of hardware, software and information technology [5, 6].

For the last decades a certain philosophy of management of production enterprises (including its costs) has been formed, standard formats of management and organization of business have developed. One of the groups

of standards that are most widely used is called MRP (Material Requirement Planning) [7]. These systems are based on the technology of business process description and integrated use of computers in all areas of the enterprise, directly or indirectly associated with certain types of management process [8].

EVA as an indicator of organizational performance was introduced in the 1990s. This metric measures the efficiency of the organization's activities on the spot or the net operating profit after taxation. The authors of [9] note that this is an economic profit, and not an added value central for *EVA* explanation.

And in [10], the author argues that some *EVA* researchers base their external productivity on financial analysts and continue to focus on profits as a performance measure. Thus, the market does not always recognize the benefits of *EVA* reporting. Weak prospects for *EVA* may be due to additional disclosure of *EVA* information in annual reports, as well as lack of detailed financial data.

In work [11] it is considered that according to the traditional indicators of profit indicators of the lag of productivity of the company *EVA* because the measures based on profits ignore the cost of equity only illustrate the costs of the company's interest. Thus, it becomes difficult to find out whether the firm provides value-added to shareholders.

5. Methods of research

The author's model is built on the basis of a financial approach, unlike the following existing models:

- on the centers of responsibility [12];
- formation of accounting flows of multi-level cost management and a system of budgets [13];
- on the basis of modeling of its organizational systems [14];
- using process-oriented cost accounting by combining ABC-costing technology and functional-cost analysis [15];
- internal control of costs [16].

EVA indicator is chosen as the tool on the basis of which the mechanism of cost management is developed in this study to increase the efficiency of the enterprise [17]. The *EVA* method is used to estimate the value of a business as an indicator of the efficiency of an economic entity, however, it has been used as a cost management tool. This allows not only to cut costs, but also to identify unproductive expenses, do not bring added value to the consumer (rejection, work with hopeless debtors, etc.).

Thus, it is possible to talk about the financial mechanism of cost management based on the *EVA* method, which sets a single basis for decision-making and allows to model, conduct and *EVA*luate the decisions made in the value-added key.

6. Research results

In the course of the research, let's perform a modification of the main indicators of the *EVA* method for solving the task of management cost control by effectively allocating financial resources within the framework of the implementation of the financial mechanism for managing costs. This will allow to trace the process of transferring resources from the category «capital» to the «expenses» category. *EVA* is a very important financial indicator that

allows to focus on the priority areas of development and on this basis to build a financial mechanism for managing costs. This approach is characterized by the application of the principle of resource-saving in the process of reducing costs, as well as the principle of reducing investment, do not create added value.

In the study, let's use the following definitions:

– explicit costs – «...actual costs incurred in accordance with the current accounting system and reflected in the relEVAnt planning and accounting records of the enterprise;

– implicit costs – characterize the unrealized income from the alternative use of limited resources» [18, P. 12].

That is, the apparent costs are the actual costs of the enterprise to pay for raw materials and supplies from suppliers, to pay for transport services, as well as financial and legal services (labor costs, taxes, and other expenses).

In general, *EVA* is defined as the difference between operating profit, net of tax, but before interest, and the product of the weighted average cost of capital and the value of investments made before the beginning of the period. In general, the formula for calculating the *EVA* indicator is as follows:

$$EVA = NOPAT - C \cdot 1 \cdot WACC = NOPAT - CC, \quad (1)$$

where *NOPAT* (Net Orting Prof after Tax) – net profit; *C* (Capital) – operational capital of the company; *WACC* (Weighted Average cost of Capital) – weighted average cost of capital; *CC* (cost of capital) – the cost of capital use [19, 20].

Operating capital is the amount owed to the founders, which is used to purchase the company's net operating assets, which are the sum of net operating current assets and the residual value of fixed assets. That is, the operating assets are equal to the capital used to acquire them.

Based on the minimum expected rate of return, the cost of using capital is determined. Value always has an element of subjectivity, which in this case is expressed in the *WACC*, in terms of determining the requirements for the return on equity.

In turn, *NOPAT* is calculated by the formula:

$$NOPAT = EBIT \cdot (1 - T), \quad (2)$$

where *EBIT* – profit before interest and taxes generated from own and borrowed capital simultaneously; *T* – the income tax rate.

The classical formula for the *WACC* indicator is as follows:

$$WACC = k_d \cdot (1 - T) \cdot \frac{D}{E + D} + k_e \cdot \frac{E}{E + D}, \quad (3)$$

where *k_d* – the market rate for borrowed capital used by the company, %; *T* – income tax rate, share units; *D* – the amount of the company's borrowed capital, m. u.; *E* – the amount of the company's equity, m. u.; *k_e* – market (necessary) rate of return on the company's own capital, %.

In the case where the company is financed only at the expense of own and borrowed funds, the weighted average cost of capital is calculated as follows:

$$WACC = k_e \cdot w_e + k_d \cdot w_d, \quad (4)$$

where *k_e* – the cost of equity, %; *w_e* – share of own capital, % (on balance sheet); *k_d* – cost of borrowed capital, %; *w_d* – share of borrowed capital, % (on balance sheet).

From the formula (4) it follows that the structure and cost of the sources of the financial resources of the enterprise play an important role in the calculation of the *EVA* indicator. Thus, the *EVA* indicator allows to answer the question of the company's investors about what kind of financing (own or borrowed) and the amount of capital necessary to obtain a certain amount of profit. This approach makes a new emphasis on optimizing the size and structure of capital, so companies that have realized the need to reduce costs, it is necessary to pay due attention to this fact.

EVA calculation can be carried out through the return on invested capital (*ROIC*) – the ratio of the company's net profit to the amount of invested capital:

$$ROIC = \frac{NOPAT}{C}. \quad (5)$$

Then the formula for calculating *EVA* (1), if take the capital indicator (*C*) as brackets:

$$EVA = \left(\frac{NOPAN}{C} - WACC \right) \cdot C, \quad (6)$$

will be:

$$EVA = (ROIC - WACC) \cdot C. \quad (7)$$

Obviously, the company creates a positive economic value added if the return on invested capital is greater than its weighted average cost. If the weighted average cost of capital exceeds its profitability, then new investments reduce the value of the enterprise. Thus, the necessary condition for the breakeven activity of the enterprise is:

$$EVA = (ROIC - WACC) \cdot C \geq 0, \quad (8)$$

so

$$ROIC > WACC > 0.$$

As it is possible to see, *EVA* method is based on accounting categories, which simplifies further analysis and allows transforming accounting figures into financials by performing adjustments to net profit after tax and invested capital.

(*ROIC* – *WACC*) value makes it possible to estimate the relative effectiveness of the use of capital, that is, to determine whether the company's capital is used efficiently or inefficiently in comparison with the existing practice of financial and economic activity. Thus, the assessment of the company's economic activity is conducted in terms of lost profits, which is lost in the process of choosing an alternative use of capital in conditions of limited resources. An adequate analytical model should take into account lost profits as an implicit component of costs, not reflected in the calculation of accounting profit.

Thus, the management of economic value added is ensuring the sustainably integral value of the *EVA* indicator.

Based on the nature of the behavior of the *EVA* indicator, as a vector of behavior of the owners of the company

in relation to investing in this enterprise, there are probably three situations:

a) $EVA=0$, $WACC=ROI$, the market value of the enterprise is equal to the carrying value of net assets. The owner wins both from the direction of funds for the development of this enterprise, and from investing them, for example, in bank deposits;

b) $EVA>0$, there is an increase in the market value of the enterprise compared to the carrying value of net assets, suggests that the owner is profitable to continue investing in the enterprise;

c) $EVA<0$, there is a decrease in the market value of the enterprise, the owner loses the alternative yield and, accordingly, the capital invested in the enterprise.

So, if the EVA is zero, this should be regarded as a kind of achievement, as shareholders have earned a return that covers the risk. The inefficient use of capital is evidenced by the negative value of EVA , while the positive indicates that the company creates value, receiving return on invested capital, is characterized by an excess of costs to attract it. High EVA means lower costs and, on this basis, high profitability of the enterprise. The high rate of growth of the enterprise, on the contrary, means large volumes of expenses and directions of the received profit for expansion of activity. The faster the business grows, the lower the EVA . To solve this problem, it is necessary to calculate the admissible limits of the EVA indicator. When adopting a growth strategy for a certain time, a negative EVA may be observed, however, during this period, the loss of the enterprise's competitiveness should not be allowed.

To build a model for monitoring the allocation of financial resources, one must take into account that the basis for the classification of expenditures by elements is the principle of economic homogeneity of costs, which provides for the absence of dependence of costs on the place of their origin and the direction of use when referring to an element.

It should be noted that each element of costs of an enterprise has its own intrinsic value. Thus, labor costs are accompanied by compulsory contributions of SSCs (single social contribution) to the Wage Fund and the cost of funding sources is increased by the amount of payment for their use. In this regard, the manager's task is distribution of financial resources of the enterprise in such way as to maximize the value of the EVA indicator for each cost element.

A schematic model of the distribution of financial resources on the basis of EVA in the context of expenditures is shown in Fig. 3.

The model shows (Fig. 3) that the use of different sources of financing for

each element of costs (material costs, labor costs (including SSCs), depreciation charges, other expenses) brings its added value. Expenses for elements are formed at the expense of own and borrowed, therefore financial resources must be allocated in such a way that the share of each source of financing gives a positive value of the EVA indicator for each cost element. In practice, when obtaining loans, often the weighted average cost of capital exceeds the profitability of the resources expended, and the value of the EVA indicator in this case will be negative. Therefore, a balanced distribution of funding sources by cost elements affects the efficiency of the use of enterprise resources.

Like any other tool, EVA approach has its advantages and disadvantages (Table 1).

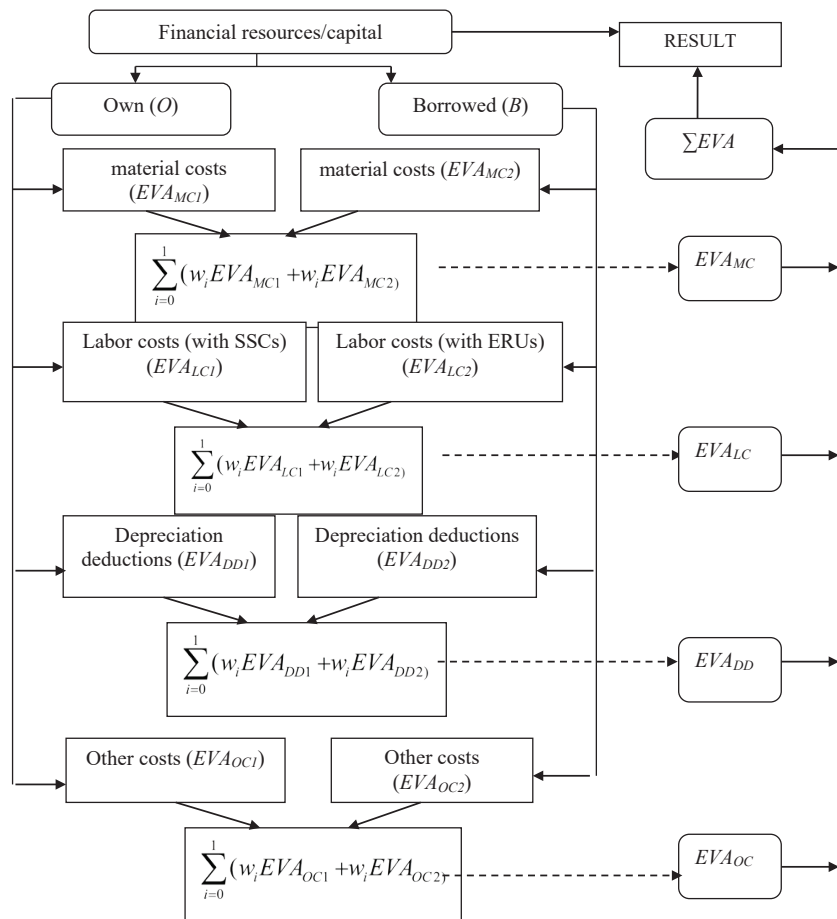


Fig. 3. Model of distribution of financial resources on the basis of EVA

Table 1
Advantages and disadvantages of the EVA indicator in the financial mechanism for controlling the cost management

Advantages	Disadvantages
a) is based on a quantitative assessment of the efficiency of the allocation of financial resources by cost element	a) the system uses only financial indicators, which leads to an underestimation of the knowledge of employees, information technology, etc.
b) calculation procedure takes into account implicit costs, allowing to identify the operational and financial risks of the enterprise	b) complex calculations
c) adjustment avoids disagreements between financial statements and the actual state of affairs	c) it is difficult to make a decision without performing intermediate calculations, stimulates the use of EVA in conjunction with other cost management tools
d) is a financial indicator that allows the manager to make decisions both at the planning stage, the formation of costs, and in the process of the enterprise	d) is carried out in the short term
	e) the value of the indicator is significantly dependent on the initial assessment of the invested capital

These shortcomings do not reduce the value of the *EVA* indicator in the financial mechanism of cost management. This approach allows to focus on the priority areas of management, clearly formulate goals, make informed financial decisions at the beginning of the production cycle, as well as in the process of its implementation.

Thus, *EVA* is an important financial indicator allowing to focus attention on priority areas of development and on this basis to build a financial mechanism for managing costs.

7. SWOT analysis of research results

Strengths. *EVA* calculation takes into account the available costs. *EVA* indicator is flexible to adjustments and allows decision making at all stages of cost formation.

Compared to analogues, this indicator:

- allows operatively to identify and avoid operational and financial risks;
- corrects in time, which avoids disagreements between the financial statements and the actual state of the enterprise.

Weaknesses. The study has the following weaknesses:

- only financial indicators are used;
- there is an underestimation of the qualifications of employees and information technology;
- significant time spent on calculations and their complexity.

Opportunities. *EVA* indicator allows to clearly focus on priority areas of cost management for further optimization and increase profitability at all stages of production.

Threats. It can bring additional subjectivism into calculations and not reflect the real market situation, therefore, in order to remove certain subjectivity, it is necessary to estimate the annual increase in *EVA* indicator, and not its absolute value.

8. Conclusions

1. The main indicators of the *EVA* method have been modified to solve the problem of management cost control by effectively allocating financial resources within the framework of the implementation of the financial mechanism for managing costs. This will allow to trace the process of transferring resources from the category «capital» to the «expenses» category.

2. It is defined that each element of expenses of the enterprise has the internal cost. In this regard, the distribution of financial resources of the enterprise should be carried out in such way as to maximize the value of the *EVA* indicator for each element of costs. Based on this,

a schematic model of the distribution of financial resources based on *EVA* is constructed in the context of costs.

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