PROVISION OF INNOVATIVE DEVELOPMENT BASED ON IMITATIVE VARIATIONS OF FINANCIAL SUSTAINABILITY

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Abstract

Purpose: In order to strengthen the financial sustainability of an economic entity, it is necessary to optimize the balance sheet structure based on relative values, most of which have generally accepted regulatory restrictions. The coefficients that do not have such standard values are estimated by the dynamics relative to previous periods, as well as similar enterprises of the relevant sector of the economy.

Methodology: To achieve the study objectives, specific methods were used in the work: a comparative analysis of approaches to the algorithms for calculating relative indicators of financial sustainability, a simulation methodology for the optimal balance sheet structure, taking into account the objective function - the financial sustainability coefficient under the established regulatory limitations of the key features of financial development. The main provisions of the study are presented in the form of analytical tables, algorithms, and figures.

Result: The research results showed that, on the basis of the objective function and the limitations of the main financial indicators, it is possible to optimize the balance sheet structure, depending on the planned value of the financial sustainability coefficient established by the business entity, taking into account industry features and a specific reporting period.

Applications: This research can be used for universities, teachers, and students.

Novelty/Originality: In this research, the model of the Provision of Innovative Development Based on Imitative Variations of Financial Sustainability is presented in a comprehensive and complete manner.

Keywords: *Financial Sustainability, Innovative Development, Modeling Algorithm, Comparative Analysis.*

INTRODUCTION

The innovative development of any business entity depends on the effective management of the financial condition of its human capital. Knowledge, experience, qualifications and innovative activity of the staff affect the enterprise's performance and contribute to its competitiveness.

The theoretical basis of this research was the scientific works of domestic and foreign scientists on the problem of assessing, analyzing and forecasting the financial condition of the enterprise.

A significant contribution to research in the field of financial and economic analysis was made by domestic scientists: Chechevitsyna L. N., Chechevitsyn K. V. (Chechevitsyna and Chechevitsyn, 2013). Evaluation of the financial condition of the business is reflected in the scientific works of Dontsova L.V. and Nikiforova N.A. (Dontsova and Nikiforova, 2015). A significant contribution to the study of methodological approaches to the assessment and management of the financial condition of the enterprise was made by domestic scientists: Savitskaya G. V. (Savitskaya, 2016) and Selezneva N.N. (Selezneva, 2012). Special attention should be paid to the methods of assessing the financial condition of the business, which is reflected in the scientific works of Markaryan E.A., Gerasimenko G.P., Markaryan S.E. (Markaryan, et al. 2017).

A significant contribution to the study of methodological approaches to the assessment and management of the financial condition of the enterprise was made by foreign scientists: Bragg S. M. (Bragg, 2012), Brauer M. F. (Brauer, 2013), Carlin., T. P., Mc Meen, A. R. (Carlin and Mc Meen, 2006), Lippman S. (Lippman and Mc Call, 1986), Ohlson J. A. (Ohlson, 1980), Wilcox, J. W. (Wilcox, 1984), et al.

In order to strengthen the financial sustainability of an economic entity, it is necessary to optimize the balance sheet structure based on relative values, most of which have generally accepted regulatory restrictions. The coefficients that do not have such standard values are estimated by the dynamics relative to previous periods, as well as similar enterprises of the relevant sector of the economy.

METHODS

To achieve the study objectives, specific methods were used in the work: a comparative analysis of approaches to the algorithms for calculating relative indicators of financial sustainability, a simulation methodology for the optimal balance sheet structure, taking into account the objective function - the financial sustainability coefficient under the established regulatory limitations of the key features of financial development. The main provisions of the study are presented in the form of analytical tables, algorithms, and figures.

The empirical base of the study was formed on the basis of legislative and regulatory acts of the Russian Federation, analysis, accounting and management accounting, periodical materials, scientific publications, as well as methods for assessing financial sustainability based on data from the accounting (financial) statements of commercial organizations.

RESULTS AND ITS DISCUSSION

The analysis of the financial condition of the enterprise is based on the assessment of financial sustainability, solvency, liquidity of the balance sheet, business, and innovation activity.

The process of analyzing and modeling the financial state of an economic entity involves the solution of certain tasks: choice of methods, criteria, indicators and evaluation algorithms (Grankin, et al. 2017). The sequence of assessing the type of financial sustainability of the enterprise is shown in Figure 1.
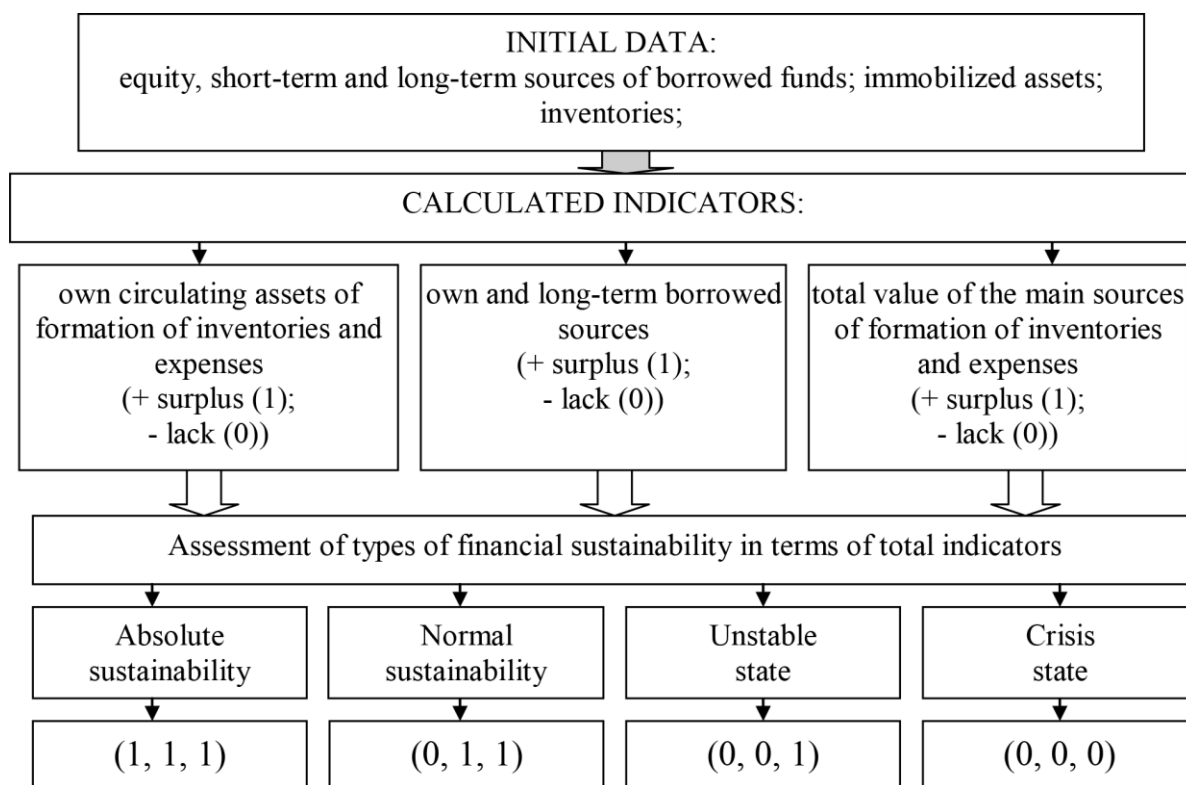

Figure 1: Assessment of the type of financial sustainability of the enterprise

Modern analysts do not have an unambiguous approach when calculating the relative indicators of the financial sustainability of an economic entity; therefore we have conducted a comparative analysis of the existing approaches given in Table 1.

Table 1: Comparative analysis of the algorithms for calculating the relative indicators of financial sustainability

Indicators		Modern approaches of analysts to algorithms for calculating relative indicators of financial sustainability				
		Savitskaya G.V.	Markaryan E.A., Gerasimenko G.P., Markaryan S.E.	Chechevitsyna L.N., Chechevitsyn V.	Dontsova L.V., K.Nikiforova N.A.	Selezneva N.N.
Financial autonomy coefficient	Calculation algorithm	Balance sheet (BS) 1300/ 1700	BS (1300+1530+ 1540+ 1430) / 1700	BS 1300/ 1700		
Financial dependence coefficient	Calculation algorithm	BS (1400+ 1500)/ 1700	BS (1400+1500- 1530-1540-1430)/ 1700	BS (1400+ 1500)/ 1300		

Financial sustainability coefficient	Calculation algorithm	BS (1300+1400)/ 1700	BS (1300+1400+1530+1540+1430)/ 1700		BS (1300+1400)/ 1700	
Financial coefficient	riskCalculation algorithm	BS (1400+1510)/ 1300			BS (1400+ +1500)/ 1300	BS (1410+ 1450+1410+1510+1520+ +1550)/ 1300
Maneuverability coefficient	Calculation algorithm	BS (1300+1530+1540+1430-1210)/ 1300	BS (1300+1530+1540+1430-1210)/ (1300+1530+1540+1430)	BS (1300-1210)/ (1300+1400)		BS (1210+1220+1230+1240+1250)-(1510+1520+1550)/ 1300

The deciphering of the row codes of the balance sheet is given in Table 2.

Table 2: Deciphering of the row codes of the balance sheet

Indicators	Row codes
Total non-current assets	1100
Intangible assets	1110
Research and development results	1120
Intangible search assets	1130
Tangible search assets	1140
Fixed assets	1150
Profitable investments in material values	1160
Financial investments	1170
Deferred tax assets	1180
Other non-current assets	1190
Total current assets	1200
Inventories	1210
Value added tax on acquired values	1220
Receivables	1230
Financial investments (excluding cash equivalents)	1240
Cash and cash equivalents	1250
Other current assets	1260
BALANCE (asset)	1600
TOTAL capital	1300
Share capital (share capital, authorized capital, contributions of partners)	1310
Own shares purchased from the shareholders	1320
Revaluation of non-current assets	1340
Additional capital (without revaluation)	1350
Reserve capital	1360
Retained earnings (uncovered loss)	1370
Long-term borrowed funds	1410
Deferred tax liabilities	1420
Estimated liabilities	1430
Other long-term liabilities	1450
TOTAL long-term liabilities	1400
Short-term loan obligations	1510
Short-term payables	1520
Deferred revenues	1530
Estimated liabilities	1540
Other short-term liabilities	1550

TOTAL short-term liabilities	1500
BALANCE (liability)	1700

Comparison of approaches revealed significant differences in the indicators under consideration:

− From the point of view of the analysis of financial statements, a more justified is the method of determining the coefficients of the market sustainability of the enterprise proposed by Savitskaya G.V. (2016) and Chechevitsyna L.N. and Chechevitsyn K. V. (2013). So when assessing the financial independence of an economic entity, one should rely more on the amount of actual equity capital (Section III "Capital and reserves");

− From the point of view of achieving strategic goals, it is advisable to use the method proposed by Markaryan E.A., Gerasimenko G.P., Markaryan S.E. (2017), which offers to take into account the calculation of the balance sheet item 1530 "Deferred income" and 1540 "Estimated liabilities";

− Simpler, but giving almost the same result of determining the flexibility coefficient of equity capital, in our opinion, propose Chechevitsyna L.N. and Chechevitsyn K.V. (2013).

Assessment of the financial condition for the long term involves the definition of the structure of sources of economic assets, the degree of dependence of the organization on external investors and creditors, i.e. market sustainability indicators of the enterprise. The key role in determining financial sustainability is played by the security of an economic entity with material circulating assets (inventories and expenses) and the sources of their formation (own and borrowed funds).

Determining the type of financial sustainability is to compare the cost of inventories and expenses with the value of own and borrowed sources of funds for their formation.

The traditional method of assessing the type of financial sustainability is a three-component indicator of coverage of inventories and expenses, which involves the calculation of three effective indicators based on the accounting statement form OKUD 0710001 "Balance sheet":

1. Comparison of the amount of own current assets with the number of inventories and expenses (S(D)1) (+ surplus; - lack).

2. Comparison of the amount of current assets and long-term borrowed funds with the number of inventories and expenses (S (D) 2) (+ surplus; - lack).

3. Comparison of the total value of the main sources of funds with the number of inventories and expenses (S(D)3) (+ surplus; - lack).

These indicators allow determining the type of financial sustainability of an economic entity.

The opinions of scientists-economists in determining the type of financial sustainability are not straightforward. Table 3 presents a comparative analysis of the algorithms for determining the three-component indicator.

Table 3: Comparative analysis of the algorithms for calculating the absolute indicators of financial sustainability

Indicator	Markaryan S.E., Gerasimenko G.P., Markaryan E.A. (5)	Chechevitsyna L.N., Chechevitsyn, K. V. (1), Dontsova L.V., Nikiforova N.A. (2)
Calculation technique S(D)1	BS (1300+1530+1430+1540-1100-(1210+1220))	BS (1300-1100-(1210+1220))
Calculation technique S(D)2	BS (1300+1400+1530+1430+1540-1100-(1210+1220))	BS (1300+1400-1100-(1210+1220))
Calculation technique S(D)3	BS (1300+1400+1510+1530+1430+1540-1100-(1210+1220))	BS (1300+1400+1510-1100-(1210+1220))

The algorithm proposed by Dontsova L.V., Nikiforova N.A, Chechevitsyna L.N., Chechevitsyn, K.V. is simpler in practical application and not devoid of economic sense.

Financial sustainability is a fairly dynamic feature of the financial condition of an economic entity. On this basis, we propose an innovative approach to assessing and managing financial sustainability through the control of various types of business transactions. This method allows stabilizing and improving the type of financial stability of the enterprise (Table 4).

Table 4: Algorithm for assessing and managing the financial sustainability of the enterprise through the control of various types of committed business transactions

Type of financial	Types of business transactions and meanings of their optimal values							
	First type	Optimal	Second type	Optimal	Third type	Optimal	Fourth type	Optimal

sustainability	transaction	values	transactions	values	transactions	values	transactions	values
1. Absolute Preservation	- acquisition of objects of fixed and intangible assets;	- not more than the indicator value S(D)1;	- use of cash from funds and capitals;	- not more than the indicator value S(D)1;	- inventory acquisition;	- not more than the indicator value S(D)1;	- any transactions	- without limitations
	- other transactions	- without limitations	- other transactions	- without limitations	- other transactions	- without limitations		
2. Normal Preservation	- any transactions	- without limitations	- any transactions	- without limitations	- receipt of material values from the suppliers;	- less than the indicator value S(D)2;	- repayment of short-term loans and borrowings;	- not more than the indicator value S(D)2;
					- other transactions	- without limitations	- other transactions	- without limitations
Improvement	- sale of non-current assets;	- not less than the indicator value S(D)1;	- any transactions	- without limitations	- receipt of material values from the suppliers;	- unacceptable	- any transactions	- without limitations
	- main materials are directed to manufacture;	- not less than the indicator value S(D)1;			- other transactions	- without limitations		
	- other transactions	- without limitations						
3. Unstable Improvement	- acquisition of non-current assets;	- unacceptable;	- use of cash from funds and capitals;	- unacceptable	- getting long-term loans;	- not less than the indicator amount S(D)2;	- any transactions	- without limitations
	- transfer of non-current assets to current assets;	- not less than the indicator value S(D)1;	- other transactions	- without limitations	- other transactions	- without limitations		
	- inventory direction to manufacture;	- not less than the indicator S(D)1;						
	- collection of receivables;	- in full;						
	- other transactions	- without limitations						
4. Crisis Improvement	- - transfer of non-current assets to current assets;	- without limitations	- use of cash from funds and capitals;	- unacceptable	- getting long-term loans and borrowings;	- not less than the indicator amount S(D)3;	- any transactions	- without limitations
	- acquisition of non-current assets;	- unacceptable	- other transactions	- without limitations	- other transactions	- without limitations		
	- sale of inventory;	- without limitations						
	- - collection of payables;	- in full						
	- - other transactions	- without limitations						

Thus, the above-presented algorithm for assessing and managing the financial sustainability of the enterprise through monitoring various types of business transactions performed will allow maintaining stability of the financial sustainability of the enterprise, and, if necessary, improving it by monitoring the valuation of the enterprise's economic transactions.

The actual result does not always correspond to the target planned features; therefore, the complex of interrelated targeted

analytical measures shall be aimed at adjusting both individual financial indicators and the overall financial condition of the enterprise. At the same time, the innovative approaches to analytical studies involve, mainly, the development and use of such techniques and methods for analyzing the financial condition of an economic entity that would be preventive in nature.

To characterize the financial sustainability of the enterprise, a system of relative indicators having standard values is used. Taking into account these limitations and the existing relationship between the relative values of financial stability (all coefficients are determined based on the indicators of the accounting firm OKUD 0710001 "Balance sheet"), it is possible to model the optimal balance sheet structure based on the established standards (Figure 2) (Methodological Recommendations on the Analysis of Financial and Economic Activities of Organizations, 2002).
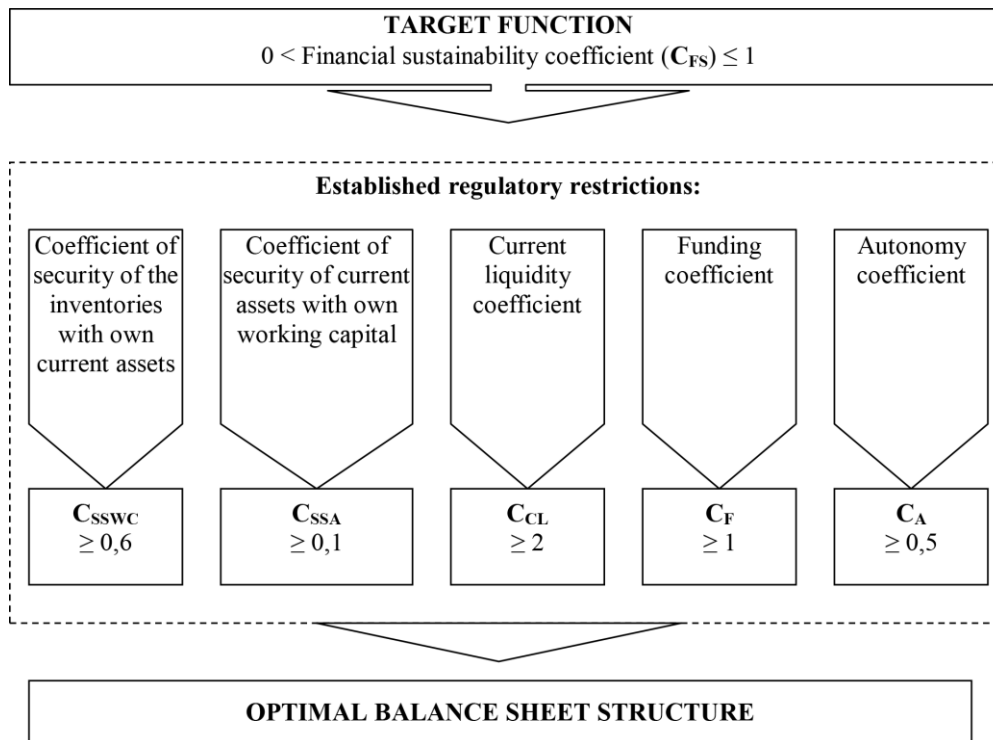

Figure 2: ion of the balance sheet structure

Consider the procedure for determining the system of relative indicators used in the construction of the optimal balance sheet structure.

    1. Coefficient of security of the inventories with own current assets (C_{SSWC}):

$$C_{SSWC} = \frac{line1300BS - line1100BS}{line1210BS} \quad (1)$$

    2. Coefficient of security of current assets with own working capital (C_{SSA}):

$$C_{SSA} = \frac{line1300BS - line1100BS}{line1210BS} \quad (2)$$

    3. Current liquidity coefficient (C_{CL}):

$$C_{CL} = \frac{line1200BS}{line510BS + line1520BS + line550BS} \quad (3)$$

    4. Funding coefficient (C_F):

$$C_F = \frac{line1300BS + line1530BS + line1430BS + line1540BS}{line1400BS + line1500BS - line1530BS - 1430BS + line1540BS} \quad (4)$$

    5. Autonomy coefficient (C_A):

$$C_A = \frac{line1300BS + line15360BS + line1430BS + line1540BS}{line1100BS + line1200BS} \quad (5)$$

To determine financial stability and assess the market value of the enterprise, one should calculate the value of net assets (NA):

$$NA = (line\,1110BS + line\,1220BS) - (line\,1400BS + line\,1510BS + line\,1520BS +$$
$$line\,1430BS + line\,1540BS + line\,1550BS)$$

(6)

In the asset structure of the enterprise, the largest species is the value of immobilized funds, which affects the value of net assets. This indicator is used in assessing the financial sustainability of the enterprise.

At the same time, the risk level of the enterprise's activity is characterized by three relative indicators of financial sustainability:

− Financing coefficient (CF);

− Autonomy coefficient (CA);

− Financial stability coefficient (CFS):

Summarizing the above algorithm for calculating the business value using the method of net assets and a system of relative values, it seems possible to develop a methodology to strengthen the financial sustainability of an economic entity. This method is rightly called the method of optimal estimates.

Optimization of the balance sheet structure implies that the C_{CL} value should be equal to or more than 2, the C_{SSWC} value should be equal to or more than 0.1. It is necessary to add C_{SSA} to these coefficients, whose value should not be less than 0.6; C_F should be equal to or greater than 1; C_A should be at least 0.5 and C_{FS} should strive for 1.

The relationship between these quantities is due to the fact that all of them are determined on the basis of a single system of analytical indicators of the balance sheet.

The functional relationship between the considered values allows the formation of an economic-mathematical model linking the indicators (lines) of the balance sheet to determine the value of the objective function under the established regulatory restrictions.

C_{FS} is taken as the target function, and the task is set to find its value for given values of the other coefficients under consideration. C_{FS} value ranges from 0 to 1. It can become equal to 1 only under the assumption of the complete absence of long-term and short-term obligations of the organization, which is theoretically possible, but not in real balance.

Find the value of the target function:

$$C_{FS} = \frac{(line.1200..BS + line.1100..BS) - (line.1400..BS + line.1510..BS + line.1520..BS + line.1430..BS + line.1540..BS + line.1550..BS}{line.1100..BS + line.1200..BS}$$

(7)

with the terms:

$$C_{SSWA} = \frac{line\,1300BS + line\,1530BS + line\,1430BS + line\,1540BS - (line\,1100BS + DE)}{line\,1210BS} \geq 0{,}6$$

, (8)

where DE - deferred expenses.

$$C_{SSA} = \frac{line\,1300BS + line\,1530BS + line\,1430BS + line\,1540BS - (line\,1100BS + DE)}{line\,1210BS} \geq 0{,}1$$

, (9)

$$C_{CL} = \frac{line\,1200BS}{line\,1510BS + line\,1520BS + line\,1550BS} \geq 2$$

, (10)

$$C_F = \frac{line\,1300BS + line\,1530BS + line\,1430BS + line\,1540BS}{line\,1400BS + line\,1500BS - line\,1530BS - line\,1430BS + line\,1540BS} \geq 1$$

, (11)

$$C_A = \frac{line\,1300BS + line\,15360BS + line\,1430BS + line\,1540BS}{line\,1100BS + line\,1200BS} \geq 0{,}5$$

. (12)

After transformations, the task takes the following form.

Find the value:

$$C_{FS} = \frac{(line1200BS + line1100BS) - (line1400BS + line1500BS)}{line1100BS + line1200BS} \qquad , (13)$$

with the terms:

$$C_{SSWA} = \frac{line1300BS - line1100BS}{line1210BS} \geq 0,6 \qquad , (14)$$

$$C_{SSA} = \frac{line1300BS - line1100BS}{line1200BS} \geq 0,1 \qquad , (15)$$

$$C_{CL} = \frac{line1200BS}{line1500BS} \geq 2 \qquad , (16)$$

$$C_{F} = \frac{line1300BS}{line1400BS + line1500BS} \geq 1 \qquad , (17)$$

$$C_{A} = \frac{line1300BS}{line1100BS + line1200BS} \geq 0,5 \qquad . (18)$$

On this algorithm, it is possible to model the optimal structure of the balance sheet in order to achieve a certain (planned) level of financial sustainability of the enterprise.

CONCLUSION

Comparative analysis of existing approaches to assessing the relative magnitudes of financial sustainability showed that there is no unambiguous approach to the methods for determining the considered indicators among analysts. Thus, for example, from the point of view of a long-term perspective, the option of calculating the financial sustainability coefficient proposed by Markaryan E. A., Gerasimenko G. P., Markaryan S. E. are the most justified.

The presented algorithm for assessing and managing the financial sustainability of the enterprise will allow maintaining the stability of financial sustainability through monitoring various types of business transactions performed, and, if necessary, improving it by monitoring the valuation of business transaction of an economic entity.

The research results showed that, on the basis of the objective function and the limitations of the main financial indicators, it is possible to optimize the balance sheet structure, depending on the planned value of the financial sustainability coefficient established by the business entity, taking into account industry features and a specific reporting period.

The proposed optimization of the balance sheet structure is based on the financial sustainability coefficient, which is the target function, and the established limitations of the system of basic financial features.

Thus, the theoretical positions and analytical procedures recommended in the article will allow forming the best option for managing the financial sustainability of an economic entity, regardless of industry specificity, type of activity and ownership.

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