

The results reported in this paper proved the need to develop strategic measures of the financial security management of enterprises. Approaches to understanding the essence of "management" and "financial security of an enterprise" concepts were analyzed; the author's vision of the essence of "management of the financial security of an enterprise" concept was generalized. Trends in the development of industrial enterprises were studied in order to identify the main indicators that determine the safety level of enterprises in the industry. Strategic directions in the financial security management of industrial enterprises were investigated. It was established that the construction of a regression model would allow an enterprise management to track the effect of deterministic factors on a change in the level of financial security of the enterprise and adjust the process of making managerial decisions related to the financial security of the enterprise. Given this, it became possible to build a tree of goals, which grouped and divided the strategic measures to manage the financial security of an enterprise. A strategic map was built, which reflected the relationship of all the processes at an enterprise and contributes to improving the level of management of the financial security of the enterprise. An expert study into the search for an optimal approach ensuring the financial security of an enterprise was conducted. It is confirmed that in order to improve the level of financial security management of an enterprise, it is necessary to optimize the trade and technological process in order to obtain maximum profit in the future, which could improve the state of all elements of the financial security management system of an enterprise. Thus, there is reason to assert that it is appropriate to define the strategic directions for managing the financial security of industrial enterprises by using regression and hierarchy models

Keywords: financial security management of the enterprise, regression model, hierarchy method, strategic map

IMPLEMENTATION OF STRATEGIC TOOLS IN THE PROCESS OF FINANCIAL SECURITY MANAGEMENT OF INDUSTRIAL ENTERPRISES IN UKRAINE

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1. Introduction

The current realities of economic development are due to the exacerbation of crises, the emergence of new threats and the inability of the company to adapt quickly to these challenges. Despite the gradual improvement of macroeconomic indicators since 2016, the problem of bankruptcy of domestic enterprises remains relevant. After all, despite the positive dynamics of the number of bankruptcy cases, their level remains high. Thus, a set of negative factors, the presence of problems causes a rather difficult situation as regards ensuring the financial security of an enterprise. The state currently lacks support in this matter. Therefore, within the management of financial security of enterprises, the construction of an effective system of its evaluation and monitoring becomes relevant, which creates the preconditions for timely and adequate response, as well as for leveling the emerging threats. The use of the system of financial security of an enterprise will ensure not only its progressive development but also the growth of the domestic economy as a whole. These processes are reflected in the new version of the National Security Strategy [1], which contains a

fundamentally new list of threats based on modern realities of financial security management of an enterprise and the economy in general.

However, existing approaches to financial security management need to be significantly updated. In this context, the relevance of issues related to the use of strategic tools at enterprises and the development of strategic directions for the financial security of an enterprise is growing. This is the key to ensuring the financial stability and sustainable development of both enterprises and the country as a whole.

2. Literature review and problem statement.

In paper [2], the methodological issues of organization and implementation of the process of financial security management within the functioning of economic systems of different levels are considered. The elements of ensuring financial security at the micro and macro levels are systematized; the conceptual principles of a systematic approach to the management of financial security of the economic system are presented. However, the development of strate-

gic measures to ensure the financial security of enterprises was ignored. In work [3], the authors developed a system toolkit for diagnosing the financial security of an enterprise based on the influence of elements of the process of managing financial stability. However, the issues of applying the strategic tools of financial security management of an enterprise remain unresolved. In paper [4], external and internal threats were studied, the result being the rapid adaptation to possible changes, neutralization of negative influences in order to maintain the required level of financial security of an enterprise. The essence and importance of the role of financial strategy for enterprise development were considered. In [5], financial security is considered as a factor influencing the effectiveness of the financial strategy of an enterprise. The introduction of financial security assessment at an enterprise is proposed; the main approaches to financial security assessment are investigated. However, the strategic prospects of these measures have not been considered. In work [6], a functional approach to the integrated assessment of the level of financial security of a banking institution is considered; in [7], the prerequisites and significance of the formation of the system of financial security of the banking sector are determined. At the same time, scientists pay attention to financial security only to the financial sector of the economy, leaving out the real sector. The authors of [8] prove the effectiveness of the results of modification of approaches to financial security management of the state using a polynomial algorithm for extrapolation of parameters of stochastic systems. However, they do not pay attention to ensuring financial security at the micro level. The authors of [9] emphasize the importance of liquidity of commercial banks for ensuring the financial security of banking institutions.

Thus, our review of works [2–9] revealed that the issues related to the long-term prospects of financial security of an enterprise remained unresolved.

All this suggests that it is appropriate to conduct a study on the implementation of strategic tools in the process of managing the financial security of industrial enterprises.

Current scientific literature has several definitions of the concept of financial security of an enterprise, among which we can mention the most comprehensive ones.

In [10], a methodical approach to the assessment of financial security of machine-building enterprises is formed, which could be the basis for the application of a certain type of crisis management and incentives at machine-building enterprises.

In work [11], the financial security of an enterprise is considered as a state of protection of financial interests of the enterprise at all levels of its financial relations against the impact of internal and external threats.

Paper [12] defines the financial security of an enterprise, focusing on the ability of an enterprise to withstand threats from the external and internal environment.

According to another opinion, scientists define the financial security of an enterprise as a set of interconnected elements (special structures, tools, methods, and measures) that can ensure the security of business from internal and external threats [13].

Financial security is considered as a dynamic financial condition of an enterprise, characterized by stable protection of its priority financial interests [14]. It should be noted that the concept of “financial security of an enterprise” and its essence is interpreted differently but, in general, as a state

of protection of the interests of an enterprise from potential threats or as a state of efficient use of enterprise resources. Thus, it can be argued that the financial security of an enterprise is one of the most important components of its activities, which characterizes the degree of protection of financial interests at all levels of financial relations.

The multifaceted approaches to the essence of the concept of “management” were also considered. Thus, [15] states that management is a set of measures aimed at resolving contradictions in the business system that arise as a result of innovative changes, to compensate for them through the construction of feedback between the control and managed systems. Another view is given in [16], which states that management is a concept of interconnected and interdependent parts: scientific knowledge and practical skills in managing different objects to ensure their competitiveness.

Thus, as a result of analyzing the concepts of “management” and “financial security of an enterprise”, the author’s vision of the essence of the concept of “management of financial security of an enterprise” is generalized and presented. This is a set of measures aimed at resolving conflicts to ensure the protection of an enterprise from the negative effects of internal and external threats, which ensures financial independence and sustainable development of an enterprise.

Particular attention is paid to the study of theoretical and methodological foundations of the concept of “compliance security” and the development of methodological principles for using its potential in modern economy to increase the level of sustainable enterprises’ development of the real economy sector [17–19]].

It should be noted that works [2–9] did not take into consideration the strategic aspects of financial security management of an enterprise. This means that the main directions of strategic support of the financial security of an enterprise are not defined. To overcome this problem, one should propose using the elements of strategic management to prevent dangers and threats, for ensuring the appropriate level of financial security of an enterprise in the long run. Despite the practical significance of such results, many unresolved issues remain related to the strategic approach to managing the financial security of domestic enterprises.

Therefore, there is reason to believe that the construction of a regression model will allow an enterprise’s management to track the impact of determinants on changes in the level of financial security of an enterprise and make adjustments in the process of making management decisions on financial security. This is extremely important in today’s dynamic development; this necessitates research in this area.

3. The aim and objectives of the study

The study aims to improve the elements of application of tools for strategic management of financial security of an enterprise, taking into consideration the increasing aggressiveness of the economic environment, as well as to identify the factors that affect these processes most. This will enable companies to prevent crises, ensure financial security and avoid bankruptcy in the strategic period.

To achieve this goal, the following tasks were solved:

– based on the analysis of a financial state of the branch enterprises, to prove the necessity of introduction of strategic tools in the process of managing the financial safety of an enterprise;

- to analyze the impact of factors on the level of profitability of an enterprise as the main factor influencing the level of financial security of the enterprise;
- based on the analysis, to form strategic directions of financial security management of an enterprise.

4. The study materials and methods

The object of this study is the process of ensuring the implementation of strategic tools in the process of managing the financial security of industrial enterprises in Ukraine.

Restricting the use of strategic tools in the process of managing the financial security of industrial enterprises in Ukraine leads to a deterioration of its level.

The research was conducted on the basis of statistical information using the methods of scientific enterprise. Methods of system approach, analysis, synthesis, scientific abstraction, generalization were used for research and specification of the conceptual apparatus of financial security management of an enterprise. Methods of financial analysis were applied to assess the financial condition of enterprises in the industrial sector of Ukraine. Economic-mathematical modeling was employed in the work to build a regression model of the profitability of enterprises in the industry. Characteristics of the state of industrial development of Ukraine are provided by statistical analysis.

5. Results of studying the implementation of strategic tools into the financial security management of an enterprises

5.1. Analysis of the financial state of enterprises in the industry

An enterprise that wants to work and make a profit for a long time in a certain market must function stably, use funds efficiently, maintain its potential for the future and be prepared for any unforeseen losses [1]. This situation is ensured by the Department of Financial Security of an enterprise (FSE) – a complex social and political phenomenon that covers many aspects of enterprise life. It can be described as a state when there is no danger or there is some resistance to danger. But at an enterprise it does not happen that during all period of functioning it did not face certain difficulties.

It should be noted that the key to shaping the GDP of any country is its industrial complex. Under the conditions of the destructive influence of the external environment and the emergence of a large number of threats, enterprises of the industrial complex suffer economic losses and cannot outperform the achieved levels of basic financial and economic indicators. Therefore, monitoring trends in the development of industrial enterprises should be carried out periodically to determine the main indicators that define the level of financial security of enterprises in the industry.

As a result of our analysis (Table 1), it was determined that many enterprises that produce ceramic tiles and slabs suffer losses in the process of their activities. Thus, in 2014–2017, the total level of profit/loss of Ukrainian industrial enterprises was negative. Even though the share of companies

that made a profit is greater than those that made a loss, the amount of profits did not cover the losses of other companies. This is a negative result and is the reason for the closure of some enterprises.

Table 1

Net profit/loss of enterprises that produce ceramic tiles and slabs for 2010–2020

Year	Net profit (loss), UAH million	Specific share of enterprises in the total volume of profits, %	Specific share of enterprises in the total volume of loss, %
2010	54.9	58.8	41.2
2011	79.88	75.9	24.1
2012	143.9	66.7	33.3
2013	195.02	65.5	34.5
2014	-1114.44	65.2	34.8
2015	-652	63.6	36.4
2016	-54.93	54.5	45.5
2017	-138.85	56.8	43.2
2018	612.06	57.4	42.6
2019	1296.96	62.2	37.8
2020	-617.3	51.3	48.7

Note: compiled on the basis of [18]

The dynamics of change in net profit are shown in Fig. 1.

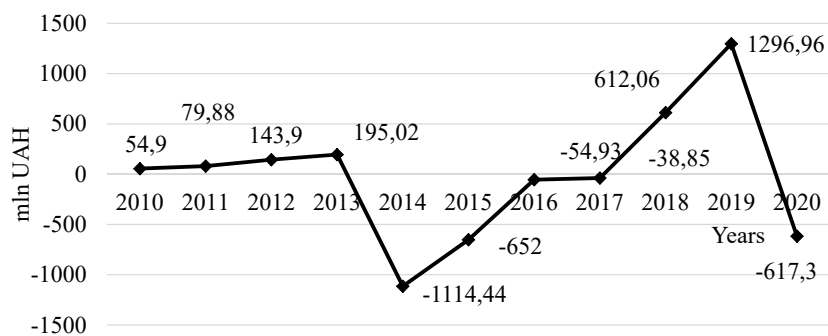


Fig. 1. Dynamics of change in the level of net profit/loss of enterprises that produce ceramic tiles and slabs for 2010–2020

Note: compiled on the basis of [18]

In 2014, during the crisis, businesses suffered very significant losses. The amount of this loss is almost equal to the amount of profit in 2019, which is the maximum volume for 2010–2019. Fig. 2 shows the dynamics of changes in the level of profitability. After receiving significant losses in the crisis of 2014, that figure increased over the years, which is a positive result in the industry.

Thus, we can conclude that most enterprises that produce ceramic tiles and slabs suffered losses in 2014–2017. Enterprises also suffered significant losses from all activities in 2020 during the crisis, quarantine, and COVID-19. Unstable enterprises suffered the most. Unstable enterprises suffered the most. In general, this area of activity is quite specific and not all businesses can continue their activities. The number of enterprises decreased over the years. The main reason was the incurred losses and inability to cover losses at an enterprise. Also, over the years, there have been fluctuations in production in physical terms but growth in monetary terms. This situation developed mostly due to rising prices for articles.

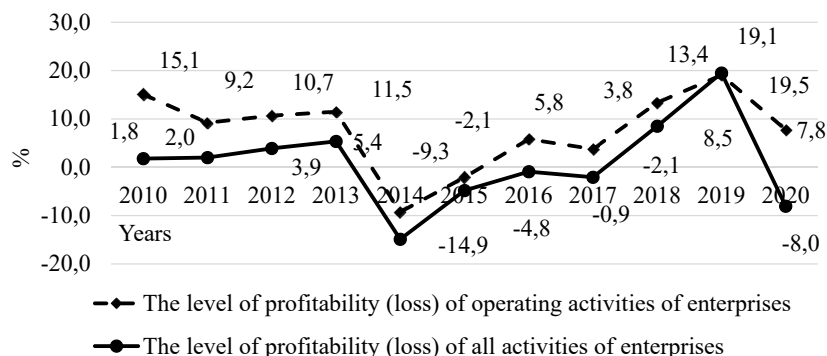


Fig. 2. Dynamics of change in the level of profitability of enterprises that produce ceramic tiles and slabs for 2010–2020

Note: compiled on the basis of [18]

To form an effective financial security management system, it is necessary to identify potential threats to the stability of an enterprise. To this end, we used the method of constructing a multifactor linear regression model of the dependence of the level of profitability (absolute net profit) for PrAT “Kharkiv Tile Plant” (Ukraine).

5.2. Defining the factors that influence the level of profitability of an enterprise; their analysis

The main tasks of correlation-regression analysis are to test statistical hypotheses about the presence and strength of the correlation between performance and factor characteristics, the formation of a model of a particular process, and forecasting changes using the constructed model.

To calculate and evaluate the parameters of the most adequate multifactor linear regression model of financial security management of PrAT “Kharkiv Tile Plant”, the chosen dependent variable was the profitability of an enterprise (U); independent variables were the indicators of financial condition of an enterprise:

- return on assets (X1);
- coefficient of maneuverability of equity (X2);
- coefficient of financial stability (X3);
- coefficient of the real value of the property (X4);
- the ratio of inventories and costs of working capital (X5).

Table 2 provides initial data for correlation and regression analysis of the impact of factor values on profitability.

Table 2

Summarized data on the correlation-regression analysis of the influence of factor values on profitability

Year	U	X1	X2	X3	X4	X5
2011	0.304	5.447	-0.169	0.57	0.457	-2.03
2012	0.318	5.639	0.013	0.947	0.45	0.099
2013	0.383	5.325	0.238	1.498	0.477	1.048
2014	0.416	5.992	0.215	1.359	0.397	0.854
2015	0.365	7.021	0.14	1.208	0.301	0.537
2016	0.329	5.7	0.023	1.227	0.46	0.083
2017	0.316	4.6	0.102	1.303	0.43	0.396
2018	0.264	3.49	-0.271	0.956	0.639	-0.831
2019	0.204	2.622	-0.135	1.107	0.619	-0.432
2020	0.308	2.718	-0.019	1.05	0.591	-0.384

Note: compiled and calculated on the basis of [18]

In the process of identifying correlation-regression relationships between the performance indicator and factor values, the coefficient of multiple regression, coefficient of determination, standard error, Student’s t-test were calculated; they are given in Tables 3–5.

Table 3

Indicators of regression statistics

Indicators of regression statistics	
Coefficient of multiple regression R	0.929246
Determination coefficient R ²	0.863498
Normalized coefficient of determination R ²	0.692871
Standard error	0.033199

Note: calculated on the basis of data from Table 2

Table 4

Indicators characterizing validity of the regression model

	Df	SS	MS	F	Significance F
Regression	5	0.027889	0.005578	5.060724	0.070681
Residue	4	0.004409	0.001102	–	–
Total	9	0.032298	–	–	–

Note: calculated on the basis of data from Table 2

Considering the high values of the coefficients of multiple regression and determination, this dependence is quite natural. The indicator of variance, F significance, and indicator of F-statistics indicate a sufficient level of reliability of the evaluation results.

Table 5

Table of correlation coefficients

Indicator	Coefficient	Standard error	Student’s t-criterion	P-value
Y-intercept	0.02203	0.298334	0.07383	0.944689
X1	0.034804	0.020949	1.661377	0.171974
X2	0.431051	0.204048	2.1125	0.102202
X3	0.02429	0.142972	0.16993	0.873317
X4	0.40172	0.352394	1.139973	0.317924
X5	0.02175	0.045503	0.47798	0.657611

Note: calculated on the basis of data from Table 2

A model’s equation takes the following form:

$$U = -0.022 + 0.035x_1 + 0.431x_2 - 0.024x_3 + 0.402x_4 - 0.022x_5.$$

The resulting regression model is significant according to the value of R², which is 92.9 %, so the correlation-regression analysis can be considered of high quality.

Based on our results, a graphical representation of the impact of financial coefficients on the company’s profit is drawn (Fig. 3).

Thus, it can be argued that all the studied financial coefficients have an impact on the level of profitability because none of them was removed from the model as insignificant. Thus, the coefficient of profitability of an enterprise is most

influenced by the coefficients of the real value of property and the coefficient of equity maneuverability.

The profitability of the Kharkiv Tile Plant was forecast (Fig. 4).

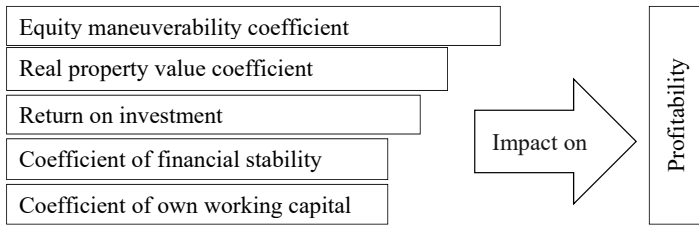


Fig. 3. Impact of the financial coefficients on net profit

Note: drawn on the basis of data from Table 5

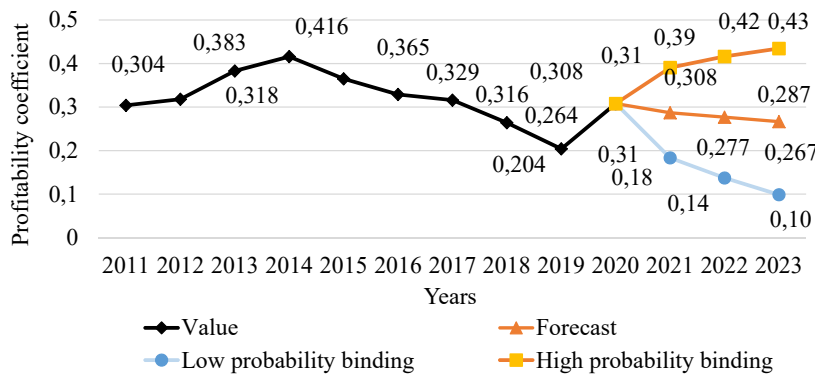


Fig. 4. Forecast result for the profitability of PrAT "Kharkiv Tile Plant"

Note: calculated on the basis of data from Table 2

The maximum possible profitability level of PrAT "Kharkiv Tile Plant" in 2021 was 0.39, minimum – 0.18. In general, the trend shows a tendency towards a decrease in the profitability of the enterprise, which can lead to major losses. The company needs to pay attention to this and provide for the opportunity to maximize profits. The enterprise also needs to maintain the excess of equity over liabilities and maintain the proper condition of fixed assets, which have a strong impact on profitability and net profit through product quality.

5.3. Strategic directions in the financial security management of an enterprise

The issue of optimizing the financial security management of PrAT Kharkiv Tile Plant is relevant. The development of measures to improve the state of financial security management of the enterprise is a process of forming strategic tasks based on the creation, analysis and implementation of new goals and the development of a set of measures to ensure the achievement of this goal. Changes in the external and internal environment of the enterprise, possible risks, threats, and other factors or economic processes related to the instability of enterprises call on them to analyze, maintain, and improve their financial security. Mea-

asures to monitor and maintain the financial security of an enterprise are a cyclical, regular cycle of measures of a strategic nature. Visualization of anything is a graphic representation of difficult-to-perceive formulas, data sets, financial indicators, or a set of measures.

One of the convenient ways to demonstrate strategic measures is a goal tree. The goal tree is a structured list of goals or activities of an enterprise, in which lower-level goals serve as stages in achieving higher-level goals. Thus, the tree of goals for improving the level of financial security of an enterprise is shown in Fig. 5.

That is, with the help of the tree of goals, it was determined that to improve the financial security of an enterprise, it is necessary to ensure the following areas: improve staff, business processes, improve interaction with customers, and ensure proper financial and economic activities.

At the present stage of development, with the change of the industrial era to the information era, the key to the market is effective management of an enterprise. In this regard, strategic planning is a necessary and relevant tool to increase competitiveness, improve internal business processes, increase the financial and economic performance of an enterprise. When developing a strategy all the factors that affect the activities of an enterprise, namely the goals and objectives of an enterprise, environmental factors of direct and indirect influence, potential opportunities of an enterprise, employee skills, enterprise size, and more should be taken into consideration.

Under modern business conditions, the number of factors that negatively affect the financial security of an enterprise is growing, so it is important to use strategic management tools aimed at ensuring the maintenance of the necessary and sufficient level.

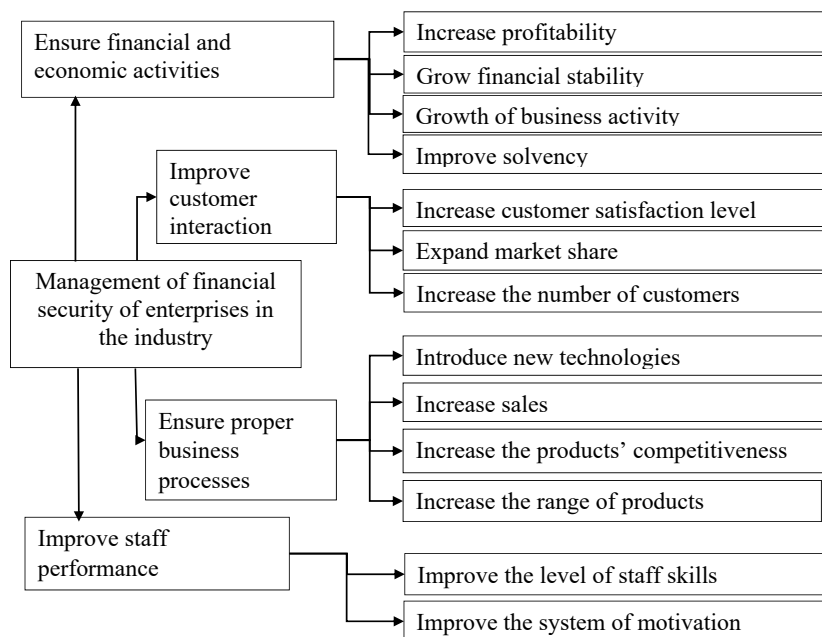


Fig. 5. Tree of goals to improve the state of the financial security of an enterprise

One of the newest methodological concepts of strategic enterprise management is the methodology of developing “strategic maps”. The map is built on a hierarchical principle. All goals, objectives, processes are built in a map and balanced vertically and horizontally – all the activities of the company are interconnected and have indicators that show how the plan is implemented, how fast the goals are achieved.

The functional purpose of strategic maps is to disseminate the strategy among employees of an enterprise and transfer it to the operational level of activity, that is in daily operational processes. Fig. 6 shows a visualization of the strategic map to control the process of financial security management of the Kharkiv Tile Plant.

Thus, the strategic map interconnects all the processes of an enterprise and ultimately achieves an improved level of financial security management of an enterprise. Each task (each stage) provides a goal – an indicator by which one can monitor the implementation of this element of the process of managing the financial security of an enterprise. So, the use of a strategic map could optimize the process of managing the financial security of an enterprise and provide the opportunity to maximize profits by an enterprise and ensure a sufficient level of its financial security.

Defining measures to increase the level of financial security of an enterprise is one of its main tasks. Therefore, using the method of analysis of hierarchies, we identified the optimal approach to ensuring the financial security of an enterprise.

A graphical representation of the decomposition of the solution search is shown in Fig. 7. Constructing a matrix of pairwise comparisons is the main procedure when calculating using the method of analysis of hierarchies. The weights of the alternatives are calculated based on the comparison matrix.

So, as can be seen from Fig. 7, the hierarchy is assessed by experts who have an impact on the implementation of alternatives. The following criteria were identified: complexity, cost, duration, effectiveness of the project. As a result of calculations, it was determined that the overall consistency index is 0.175 and is less than 0.9, which indicates the consistency of all components of this hierarchy. Thus, we can say that the results of solving the problem of choosing an alternative to optimize the level of financial security of an enterprise using the method of hierarchy analysis are the most likely.

Based on our work, a report was compiled. Fig. 8 shows the matrix of pairwise comparisons at the level of “Purpose”.

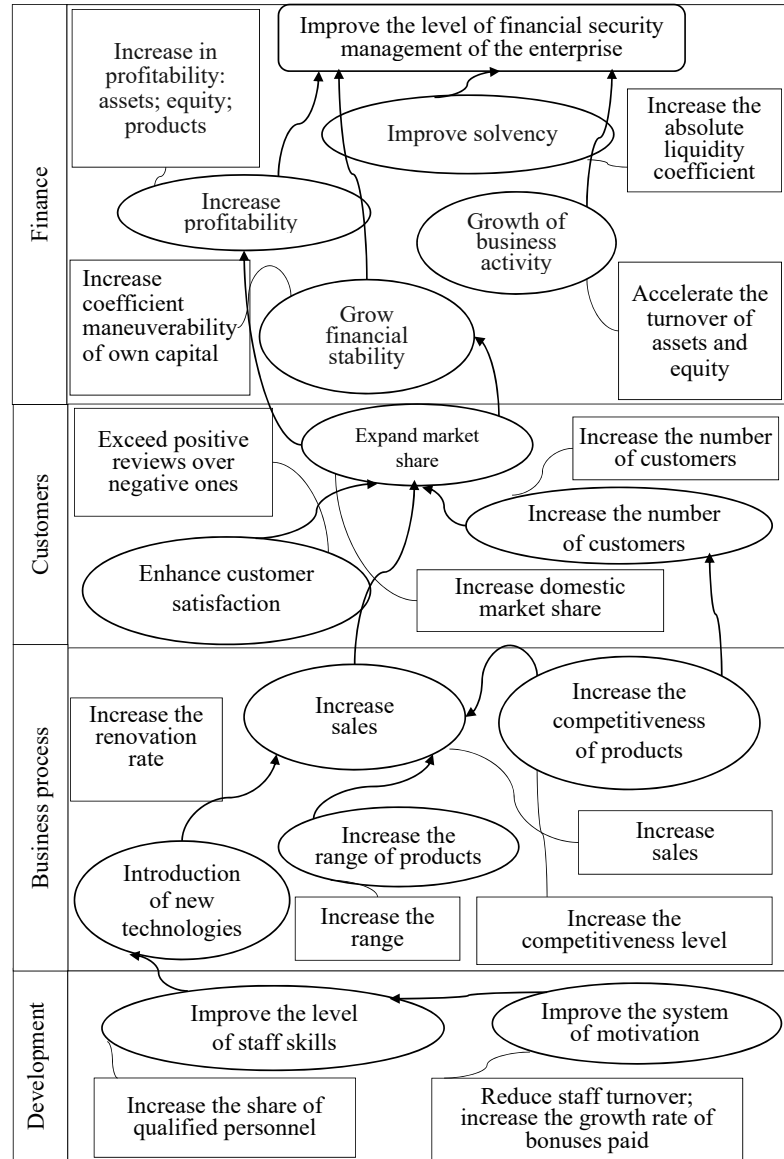


Fig. 6. Strategic map of PrAT “Kharkiv Tile Plant”

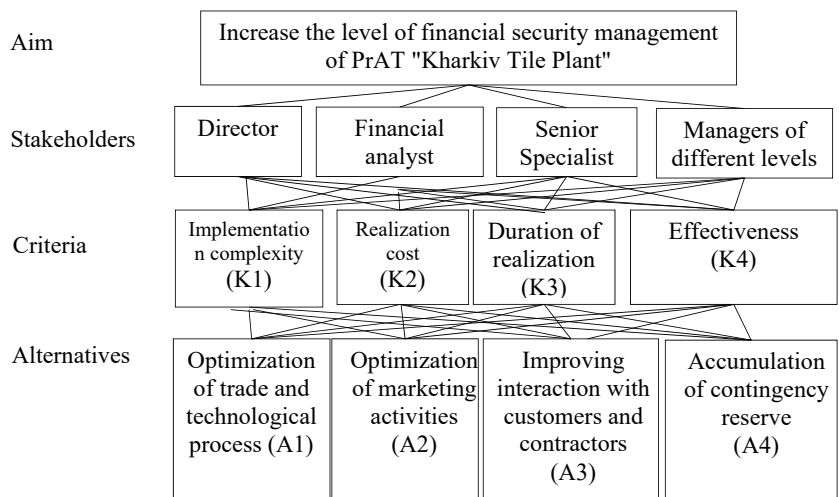


Fig. 7. Hierarchical representation of the solution search

Factors:		Matrix of pairwise comparisons				
1. Director						
Weight – 0.519		K1	K2	K3	K4	
2. Financial analyst		K1	1.00	3.00	3.00	5.00
Weight – 0.254		K2	0.33	1.00	2.00	4.00
3. Senior specialist		K3	0.33	0.50	1.00	2.00
Weight – 0.148		K4	0.20	0.25	0.50	1.00
4. Managers of different levels		λ (matrix eigenvalue)				4.1022
Weight – 0.078		Ic (consistency index)				0.0341
		OC (consistency relations)				0.0379

Fig. 8. Matrix of pairwise comparisons on “Purpose” level

Fig. 8 demonstrates that the director has the greatest influence and the choice of the decision made would depend on the choice of alternatives. Next, Fig. 9 shows a matrix of pairwise comparisons at the level of “Stakeholders”.

Fig. 9 demonstrates that for the director, financial analyst, and senior specialist the most important criterion

is efficiency because for them the implementation of these measures is to improve the level of financial security management of an enterprise.

Fig. 10 show a report based on the comparison matrix at the level of “Criteria”, which analyzes each alternative criterion.

Fig. 10 demonstrates that by the criterion of the least complexity, the lowest cost, and the shortest duration of implementation, the priority is to improve interaction with customers and contractors but, in terms of effectiveness, it is the least influential. The optimization of the trade and technological process will be the most effective. In terms of the complexity of implementation, implementation value, and time for implementation, optimization of marketing activities occupies second place but, in terms of effectiveness, it ranks third and the importance is insignificant.

Director	
Weight: 0.519	
Factors:	
1. Implementation complexity. Weight – 0.240	
2. Implementation value. Weight – 0.082	
3. Implementation duration. Weight – 0.121	
4. Effectiveness. Weight – 0.557	

Matrix of pairwise comparison				
	K1	K2	K3	K4
K1	1	4	3	0.25
K2	0.25	1	0.333	0.333
K3	0.33	3	1	0.167
K4	4	3	6	1

λ	4.446
Ic	0.155
OC	0.173

a

Financial Analyst	
Weight: 0.254	
Factors:	
1. Implementation complexity. Weight – 0.264	
2. Implementation value. Weight – 0.188	
3. Implementation duration. Weight – 0.196	
4. Effectiveness. Weight – 0.352	

Matrix of pairwise comparisons				
	K1	K2	K3	K4
K1	1.00	0.33	6.00	0.50
K2	3.00	1.00	0.20	0.50
K3	0.17	5.00	1.00	0.20
K4	2.00	2.00	5.00	1.00

λ	6.365
Ic	0.788
OC	0.876

b

Senior Specialist	
Weight: 0.148	
Factors:	
1. Implementation complexity. Weight – 0.196	
2. Implementation value. Weight – 0.052	
3. Implementation duration. Weight – 0.329	
4. Effectiveness. Weight – 0.422	

Matrix of pairwise comparisons				
	K1	K2	K3	K4
K1	1.000	6.000	0.333	0.500
K2	0.167	1.000	0.200	0.167
K3	3.00	5.000	1.000	0.500
K4	2.000	6.000	2.000	1.000

λ	4.231
Ic	0.077
OC	0.86

c

Managers of different levels	
Weight: 0.078	
Factors:	
1. Implementation complexity. Weight – 0.563	
2. Implementation value. Weight – 0.048	
3. Implementation duration. Weight – 0.250	
4. Effectiveness. Weight – 0.139	

Matrix of pairwise comparisons				
	K1	K2	K3	K4
K1	1.000	7.000	5.000	4.000
K2	0.143	1.000	0.333	0.143
K3	0.200	3.000	1.000	0.500
K4	0.250	7.000	0.200	1.000

λ	4.807
Ic	0.269
OC	0.299

d

Fig. 9. Matrix of pairwise comparisons at the level of a stakeholder: a – director; b – financial analyst; c – senior specialist; d – managers of different levels

Implementation complexity
 Weight: 0.265
 Factors:
 A1. Weight – 0.061 A2. Weight – 0.342
 A3. Weight – 0.463 A4. Weight – 0.135

Matrix of pairwise comparisons

	A1	A2	A3	A4
A1	1.000	0.200	0.167	0.333
A2	5.000	1.000	0.500	4.000
A3	6.000	2.000	1.000	3.000
A4	3.000	0.250	0.333	1.000

λ	4.138
Ic	0.046
OC	0.051

a

Implementation value
 Weight: 0.254
 Factors:
 A1. Weight – 0.264 A2. Weight – 0.188
 A3. Weight – 0.196 A4. Weight – 0.352

Matrix of pairwise comparisons

	A1	A2	A3	A4
A1	1.00	0.33	6.00	0.50
A2	3.00	1.00	0.20	0.50
A3	0.17	5.00	1.00	0.20
A4	2.00	2.00	5.00	1.00

λ	6.365
Ic	0.788
OC	0.876

b

Implementation duration
 Weight: 0.181
 Factors:
 A1. Weight – 0.144 A2. Weight – 0.289
 A3. Weight – 0.490 A4. Weight – 0.077

Matrix of pairwise comparisons

	A1	A2	A3	A4
A1	1.000	0.333	0.250	3.000
A2	3.000	1.000	0.500	3.000
A3	4.000	2.000	1.000	6.000
A4	0.333	0.333	0.200	1.000

λ	4.14
Ic	0.047
OC	0.052

c

Effectiveness
 Weight: 0.452
 Factors:
 A1. Weight – 0.593 A2. Weight – 0.084
 A3. Weight – 0.030 A4. Weight – 0.294

Matrix of pairwise comparisons

	A1	A2	A3	A4
A1	1.000	9.000	9.000	4.000
A2	0.111	1.000	7.000	0.125
A3	0.111	0.143	1.000	0.111
A4	0.250	8.000	9.000	1.000

λ	4.708
Ic	0.236
OC	0.262

d

Fig. 10. Matrix of pairwise comparisons at the level “Criteria”: *a* – implementation complexity; *b* – implementation value; *c* – implementation duration; *d* – effectiveness

Fig. 11 shows a report based on the matrix of pairwise comparisons at the level “Alternatives”.

Trade and technological process optimization
 Weight: 0.318
 Marketing activity optimization
 Weight: 0.213
 Improving the interaction between customers and contractors
 Weight: 0.276
 Accumulation of contingency reserve
 Weight: 0.193

Fig. 11. Matrix of pairwise comparisons at the level of “Alternatives”

Based on the results of the analysis of hierarchies, it can be concluded that the most effective measure by the set criteria is the optimization of the trade and technological process. As a result of this measure, the company would be able to obtain the maximum level of profit,

be more stable, competitive, and ensure the appropriate level of all elements of the financial security management system of the company.

6. Discussion of results of studying the implementation of strategic tools into the process of financial security management of enterprises

The definition of financial security management of an enterprise is given in the current work. Our conclusions are confirmed by the earlier works of scientists who deal with issues of financial security of an enterprise [2–9]. The result of solving the first task is the established trends in the development of enterprises that produce ceramic tiles and slabs (Fig. 1, 2). The solution to the second task is the established influence of factors on the level of profitability of an enterprise as the main factor influencing the level of financial security of an enterprise (Tables 2–5). The result of solving the third task of the study are the formed strategic directions of financial security management of an enterprise (Fig. 7–11).

A positive direction to advance the study is the use, to substantiate proposals for the use of strategic tools to ensure the financial security of an enterprise, of the mathematical modeling of the level of impact of indicators on the profitability of an enterprise. The priority is to improve the unfavorable macroeconomic situation, which is reflected in the decline in the profitability of enterprises.

As a result of our review of current studies on the management of the financial security of an enterprise, the problem of inefficient use of strategic tools to ensure the financial security of an enterprise was revealed. Our results eliminate this problem.

Within the framework of advancing this study, it is possible to use factor analysis to determine the impact of factors in the external environment on the management of the financial security of an enterprise.

7. Conclusions

1. Our analysis of the activities of industrial enterprises revealed that the overall level of financial performance of industrial enterprises is negative. Therefore, there is a need to develop measures to ensure the financial security of enterprises in the industry.

2. By indicating the qualitative and quantitative indicators of the study results, the use of regression analysis allowed us to argue that all of the studied financial coefficients have an impact on the level of profitability of an enterprise. It was determined that the coefficient of profitability of an enterprise is most influenced by the coefficients of the real value of property and the coefficient of maneuverability of equity.

3. A strategic map has been built that connects all the processes of an enterprise and helps improve the level of financial security management of an enterprise. The use of a strategic map could optimize the process of managing the financial security of an enterprise. Analysis of hierarchies as a tool for strategic management of an enterprise has made it possible to define the hierarchy of areas of management decisions to improve the level of financial security management of an enterprise.

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