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SCIENTIFIC AND METHODOLOGICAL SUPPORT OF FINANCIAL EXPRESS ANALYSIS OF SMALL INDUSTRIAL ENTERPRISES OF UKRAINE

The **subject** of research of this work is the current direction in the financial activities of small industrial enterprises – financial express analysis. The **purpose** of the study is to develop a scientific and methodological basis for a simplified procedure of financial supervision of small industrial enterprises in the country in order to provide qualified assistance to managers of small industrial enterprises in the financial sphere of their activities. The article solves the following **tasks**: study of the state of small industrial enterprises and their role in the development of Ukraine's economy, definition of "financial supervision", development of algorithm for financial express analysis of small industrial enterprises, choice of directions for financial express analysis of small industrial enterprises financial supervision, the formation of a bank of input data on four components, testing of scientific and methodological support on the example of a particular enterprise. The following **methods** are used: theoretical generalization, retrospective analysis, comparative analysis, analytical, analysis and synthesis, rapid analysis. The following **results** were obtained: the method of financial express analysis of a small industrial enterprise was proposed on the basis of financial supervision; selected areas of financial analysis under a simplified procedure; the scheme of algorithm of carrying out procedure of financial supervision is developed; the bank of the input data which are necessary for the decision of the set task is formed; substantiation of the choice of applied mathematical models is carried out; the experimental approbation of the offered scientific and methodical approach to carrying out the financial express-analysis on the factual basis of the real small industrial enterprise is carried out; appropriate recommendations were given to the management of the researched enterprise. **Conclusions**: It is determined that in the current unstable economic conditions, small industrial enterprises need professional assistance of consulting orientation in financial activities. Obtaining up-to-date relevant information on the financial condition of small industrial enterprises is a very important task that requires a rapid financial analysis of their activities. The study of this issue showed the lack of consensus of analysts on the directions and methods of financial rapid analysis. This led to the need and feasibility of developing for the management of small industrial enterprises under a simplified procedure of an orderly methodology of financial rapid analysis on the basis of financial supervision.

Keywords: small enterprise; retrospective analysis; financial supervision; methodical support; algorithm scheme; data bank; mathematical model; express analysis; results.

Introduction

Negative phenomena currently occurring in the economy of Ukraine and many countries around the world, significantly affect the viability, competitiveness and efficiency of industrial enterprises, regardless of their size and ownership [1]. This leads to a crisis in the activities of enterprises and can lead them to bankruptcy. A necessary condition for the recovery of the country's economy is the survival of small business. According to a survey conducted by the Union of Ukrainian Entrepreneurs and the Ukrainian Marketing Group, during the pandemic, 29% of Ukrainian companies suspended their quarantine and 6% closed their businesses. Small and medium-sized businesses lost 25-50% of profits and were forced to lay off 10-25% of employees compared to the pre-quarantine period [2].

Thus, in the period of crisis from 2020, small businesses suffer the most. This can be seen in the deterioration of the financial results of small industrial enterprises, their financial stability, and insolvency. Not all companies in crisis can stabilize in time. In the conditions of unstable external environment, strengthening of threats and growth of crisis phenomena in economic and political spheres of the country for domestic industrial small enterprises the task of receiving a positive financial result of their activity acquires special value. That is why the issue of conducting a financial rapid analysis of the small industrial enterprises of the country as a measure that helps prevent companies from falling into crisis and manage them in such a period, is very important and necessary today. We consider it

expedient to propose the introduction of scientific and methodological support for financial rapid analysis as a modern tool of supervision. Based on general interpretations of the concept of supervision [3, 4], we define the definition of "financial supervision" as follows: it is a tool for providing professional assistance in conducting rapid analysis of financial activities of small industrial enterprises, which aims to work with professional difficulties and eliminate shortcomings organization of work in general.

The introduction of such a methodological approach (tool) requires, first of all, the development of a set of measures of scientific and methodological orientation due to the lack of a specialist in financial management in the staff of small enterprises. This determines the relevance of this study, focused on the development of scientific and methodological tools for financial supervision of the management of small industrial enterprises.

Analysis of recent research and publications

Many foreign and domestic scientists have been engaged in research of theoretical and methodological issues of financial analysis of industrial enterprises. Determining the content and assessment of the financial condition of the enterprise, directions, methods and forms of financial analysis, the choice of indicators for assessing solvency, financial stability, business activity, financial management, issues of preventing bankruptcy of economic entities are widely considered in the scientific works of F. Allen, G. Artemenko, O.Ya. Bazilinskaya,

I.T. Balabanov, I.A. Blank, M.V. Belendyr, I.A. Berzhanir, I.M. Boyarko, R. Brayley, E. F. Brigham, A. E. Voronkova, L.T. Gilyarovsky, O.V. Deineka, I.V. Demyanenko, O.V. Yefimova, L.V. Ivchenko, V.V. Kovaliova, L.O. Ligonenko, S. Myers, I.P. Otenko, A.M. Podderogin, V.M. Rodionova, G.V. Savitskaya, O.S. Stoyanova, L.S. Strygul, T.E. Unkovskaya, K. Walsh, N.M. Ushakova, Yu.S. Tsal-Tsalko, R.A. Chemchikalenko, V.V. Chepko, Yu.V. Shevchuk, A.D. Sheremet, N.I. Shifrin, I.O. Shkolnik, M. Erhard, V.P. Yakovenko, O.O. Yatsukh and many others [5-22]. Scientists have considered a significant part of methodological and applied issues in a particular area of research, but still there is no consensus on the scientific and methodological support of financial rapid analysis of small industrial enterprises. Some issues of theoretical and methodological orientation require further research, which led to the relevance of the research topic.

According to the authors of [19], the analysis of domestic and foreign scientific literature reveals the lack of coverage of the evaluation of the mechanism of studying the financial stability of enterprises. Therefore, they proposed the use of a method of comprehensive comparative rating assessment of financial stability of enterprises.

Scientist V.M. Polozova developed a method of comprehensive graphical assessment of the financial condition of the enterprise [18]. The proposed economic-mathematical model is complex, dynamic and simulation, which makes it impossible to use it as a tool for financial rapid analysis of small industrial enterprises.

In the scientific work of G.M. Shamota and D.O. Malysh approaches to a comprehensive assessment of the financial condition of the enterprise are given [7]. The possibilities of using traditional methods of analysis of the financial condition of business entities in combination with models for assessing their financial stability, which are used in the practice of foreign countries, are described. It is concluded that the current problems are the imperfection of methods for assessing the financial condition of the enterprise, the complexity of the analysis of the financial condition of enterprises. This means that domestic methods need to unify and reduce the number of indicators analyzed. When choosing the estimated financial and economic indicators, preference should be given to those indicators that are more necessary, most meaningful and accessible by the method of calculation.

An article by scientists N.S. Pedchenko and V.O. Zirka [5] is devoted to the modern view on the application of the method of rating assessment of the financial condition of the enterprise. The developed methodology is based on the use of modern economic and mathematical methods and necessarily requires the formation of a group of enterprises – participants in such an assessment within a certain market segment or a certain industry. This approach, in our opinion, is quite problematic in terms of practical implementation.

Scientific and methodological approach to the integrated assessment of the financial condition of the enterprise for the purpose of its comprehensive analysis and development of proposals for its improvement is covered in [6]. The authors of the article I.A. Berzhanir, O.A. Vinnytska, N.I. Gvozdey came to the conclusion that despite the large number of publications on the assessment and analysis of the financial condition of enterprises, today we can state the lack of a unified approach to the formation the main indicators of financial condition assessment, methods of their calculation and interpretation of evaluation parameters that affect the quality and reliability of the calculation of the integrated assessment of the financial condition of economic entities, with which it is impossible to disagree.

To date, not all experts, analysts agree on the directions and methods of financial rapid analysis. So scientists V.M. Ivakhnenko and K.G. Kirichenko devoted their article to the express analysis of the financial condition of the enterprise [13]. Based on the results of consideration of existing developments in this matter, they proposed as a criterion for assessing the financial condition of the enterprise solvency ratio. Co-authors of the work [2] Sinitsyna Yu. P., Kvasova L.S., Chebanova M.O. conducted research of crisis situations during a pandemic on the example of small business organization, which determines a certain potential for further research on possible ways to improve scientific and methodological approaches to financial express analysis, diagnostics and overcoming of crisis situations in the activity of small industrial enterprises of Ukraine. To assess the level of financial stability of small enterprises in [30] a methodological approach is proposed, which is based on the use of a system of financial indicators with a limited number of them: Beaver ratio and total solvency ratio. Scientists L.V. Sokolova and O.V. Kolisnyk in scientific work [26] formed a matrix of dynamics of the level of financial stability on the example of statistical information of four real small enterprises. The advantages of the proposed methodological approach are the simplicity of calculation of indicators, visual presentation of the results, the ability to assess the level of financial stability of enterprises in the dynamics, which can be further taken into account when developing strategies for small industrial enterprises and management decisions.

An important component of financial rapid analysis is the assessment of the stability of the financial condition of a small enterprise. Both foreign and domestic scientists have dealt with the issue of crisis prevention and the probability of bankruptcy at enterprises, so currently there are many working methods/assessment models, some of which are used in the practice of domestic enterprises [43-45]. Popular mathematical models and methods in Ukraine are those that are presented in table 1.

80

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Table 1. *Comparative characteristics of existing models for assessing the crisis probability of bankruptcy*

Name of methodology/model	Advantage	Disadvantage
Regulatory methods for diagnosing the threat of bankruptcy		
Order of the Ministry of Economy of Ukraine dated January 19, 2006 No. 14	Unambiguous approach in assessing the crisis and bankruptcy, a comprehensive analysis of financial and economic activities, the ability to determine the type of bankruptcy and the causes of the crisis	Too many evaluated indicators complicate the application of the methodology, duplication of individual ratios, ignoring the indicators of market activity, as well as the state and structure of cash flows of the enterprise
Models of integrated assessment of crisis/probability of bankruptcy		
Models of Altman, Fox, Taffler, Springgate, Fulmer, Tishaw, Olson, R-model of bankruptcy risk forecast	Insignificant number of indicators, simplicity and speed of calculations, availability of data necessary for calculations, possibility to estimate a financial condition and to predict bankruptcy	Not suitable for the economy of Ukraine, the impossibility of application to small businesses, lack of accounting legislation, inconsistency of methodological methods of calculating indicators of Ukrainian financial statements, subjectivity of choice of indicators, lack of time adjustments, the use of linear dependence
Rating number method (Saifulina, Kadykova)		Insufficient validity of indicators and their normative values, impossibility to determine the reasons for enterprises to fall into the zone of "insolvency", ignoring the sectoral characteristics of objects
Discriminant model of integrated assessment of financial condition by Tereshchenko	Taking into account the specifics of the subjects, a small number of indicators, the availability of information needed to calculate the parameters of the model	Insufficient level of validity of indicators, application only for individual enterprises, wide range of uncertainty
Comprehensive diagnosis of crisis state by Ligonenko	A large number of indicators of financial condition, the possibility of application by both internal and external stakeholders, the allocation of indicators of rapid and fundamental diagnostics	Duplication of individual indicators, identification of liquidity and solvency indicators, ignoring indicators of production and economic activity and market activity of the enterprise
Techniques based on building a system of indicators		
In-depth analysis of financial and economic activity by Chernyavsky	Coverage of various indicators of economic activity, the presence of criteria for which the state of the enterprise can be attributed to a certain type	Insufficient number of indicators, unavailability of information for calculation of indicators of the model of ignoring indicators, which are calculated on the basis of net cash flow
In-depth analysis of the financial and economic activities by Gryaznova	Phased and simple calculations, coverage of indicators of various aspects of economic activity, availability of information for analysis	ignoring indicators of business activity, identification of indicators of liquidity and solvency, lack of limits of criteria for carrying the enterprise to this or that condition
Methods for assessing the threat of financial crisis and bankruptcy of enterprise by Sypyagin	Insignificant number of indicators, simplicity and speed of calculations, availability of information for analysis, detailed analysis of the composition and structure of receivables and payables	Lack of indicators that can be used to predict the loss or recovery of solvency, limited list of indicators of financial condition, which does not allow for a comprehensive assessment, lack of consideration of the dynamics of changes in the financial condition of the enterprise
The system of indicators of the financial condition of the enterprise for the diagnosis of its bankruptcy according to the Beaver model	Ability to identify unsatisfactory balance sheet structure, simplicity and speed of application, forecasting the risk of bankruptcy for several years ahead	Designed only for successful enterprises, non-compliance with regulatory values for enterprises in some industries, ignoring the status and structure of cash flows, receivables

Source: formed taking into account [43-45]

Each model and methodology has its advantages and disadvantages that can affect the forecasting results. Therefore, it is important to indicate them in order to make an adequate choice of model and correctly interpret the results. It is necessary to choose such models that would take into account the peculiarities of the Ukrainian economic space and the industry in which a particular enterprise operates.

Selection of previously unsolved parts of the overall problem

Currently, the strategic focus of the industrial enterprises of Ukraine is a high level of their competitiveness, which is impossible without ensuring their efficiency, financial stability, solvency, flexibility [1, 23] in an unstable environment. The analysis of professional literature on the chosen research topic

allowed to state the following: despite a significant amount of theoretical and methodological developments in the field of financial management of enterprises, further research requires the development of theoretical and methodological support for small industrial enterprises to conduct financial rapid analysis of their activities; the choice of specific scientific and methodological support to some extent depends on the ultimate goal of financial analysis, the essence of analytical work at the enterprise, its size and industry affiliation.

It was found that not only the essence of the definition of "financial supervision" has been insufficiently studied, but also a number of issues related to the procedure of providing professional assistance in conducting a simplified procedure of financial express analysis of small industrial enterprises. This indicates the relevance of the topic of this study.

Formulation of the goals of the article (task statement)

The purpose of the study is to develop a scientific and methodological basis The purpose of the article is to develop a scientific and methodological basis in the form of methodological recommendations for providing financial express analysis of the activities of small industrial enterprises in selected areas on the basis of financial supervision to provide qualified professional assistance to the management of these enterprises. The purpose of the article is to create a scientific and

methodological basis for the financial supervision of the activities of small industrial enterprises in the country using the method of express analysis.

Study results

In a market economy, small business is an element of development of the regions and Ukraine as a whole. Small enterprises are an organic structural element of the national economy, because the results of their activities affect the socio-economic indicators of the country [24-26]. Therefore, today the intensification of Ukrainian small industrial enterprises, their development, organization and analysis of financial results is of particular importance. Indicators of development of small enterprises in Ukraine are characterized by a certain dynamics. The table 2 shows the data that characterize the changes in the volume of output by small enterprises - small businesses of Ukraine for the period 2013-2019 [27].

It can be concluded that the volume of products produced by small enterprises, calculated both in natural and relative terms, and is characterized by growth dynamics. However, against the background of increasing inflation in the country, it is impossible to assess this as a 100 percent positive result. Table 3 shows individual indicators that characterize the activities of small enterprises.

Table 2. *Volume of products manufactured by small enterprises of Ukraine*

Year	Volume of products manufactured by small enterprises			
	total		industry	
	million UAH.	% to the total indicator of business entities	million UAH.	% to the total indicator of business entities
2013	513644	19,8	91512	7,2
2014	616086	21,3	96450	7,2
2015	745058	21,6	120655	7,5
2016	1014203	24,0	169140	8,8
2017	131332	24,7	216640	8,8
2018	1605385	25,9	267790	9,6
2019	1971187	28,2	295145	10,1

Source: formed on the basis of [27].

Table 3. *Performance indicators of small enterprises in Ukraine*

Year	Number of small enterprises, units	The share of the number of small enterprises in the total number of enterprises, %	Volume of sold products (goods, services) of small enterprises / total enterprises, UAH million	The share of sales of products (goods, services) of small enterprises in total sales, %
2013	373809	95,04	670258/4050215	16,55
2014	324598	95,19	705000/4170660	16,90
2015	327814	95,45	937113/5159067	18,16
2016	291154	95,03	1177385/6237532	18,88
2017	322920	95,47	1482001/7707935	19,23
2018	339374	95,36	1766150/9206049	19,18
2019	362328	95,20	1839876/9639731	19,09

Source: formed on the basis of [27].

It should be noted that the statistics, which are given in table 2 and table 3, do not take into account the information of the temporarily occupied territories of the Autonomous Republic of Crimea, the city of Sevastopol

and parts of the temporarily occupied territories in Donetsk and Luhansk regions. The positive direction of the dynamics of the above specific indicators is mainly characteristic of the periods of time: 2013-2015, 2017.

The number of small enterprises per 10 thousand people of the current population was: 2013 - 82, 2014 - 76, 2015 - 77, 2016 - 68, 2017 - 76, 2018 - 80, 2019 - 86 units [27]. The rate of change in the number of small enterprises per 10 thousand people of the current population amounted to 104.88% in 2019 compared to 2013, which is a positive sign of development.

A necessary factor in the development of the economy of Ukraine and its regions is the cash flow from the activities of business structures, including the activities of small industrial enterprises. A significant percentage of the population working in a particular sector of the economy creates competitive products, thus affecting the socio-economic situation of the country. For example, in many European countries, small businesses generate up to 60% of cash flows to the budget [24]. In Ukraine, unfortunately, the pace of development of small enterprises has an unstable trend. In fig. 1 presents changes in the share of sales of products (goods, services) by small enterprises of Ukraine in the total sales for the period 2013-2019.
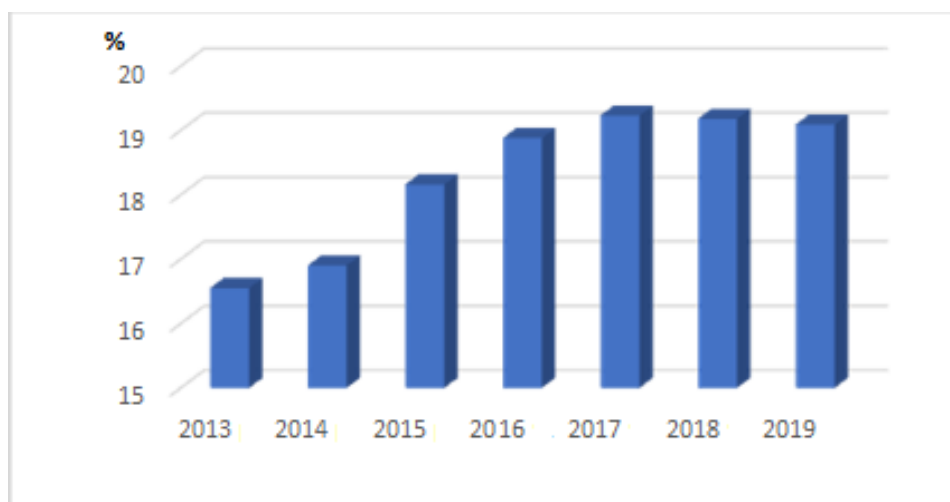

Fig. 1. The share of sales of products (goods, services) by small enterprises of Ukraine

Source: formed on the basis of [27].

An important indicator of the activity of each small enterprise is the financial result. An analysis of the net profit indicator, which is a characteristic of the financial result of production and economic activities of each entity was done. In order to assess the dynamics of changes in such indicators as the share of profitable enterprises of Ukraine and the financial result of their activities, based on official statistical information of the State Statistics Service of Ukraine [27] was analyzed profitability of small industrial enterprises of Ukraine. The table 4 shows data that demonstrate the change in profitability of small industrial enterprises of Ukraine during 2013-2019.

Table 4. *Dynamics of profitability indicators of small industrial enterprises of Ukraine*

Year	The share of small industrial enterprises that made a profit, %	Financial result of profitable small industrial enterprises	
		absolute value, UAH million	relative value, % to the previous year
2013	65,0	35748	100,00
2014	65,7	45237	126,54
2015	73,5	89390	197,60
2016	72,8	99299	111,09
2017	72,3	107935	108,70
2018	73,7	127659	118,27
2019	73,3	162563	127,34

Source: formed taking into account [27].

The analysis of the obtained data shows the instability of the dynamics of the financial result of profitable small industrial enterprises from 2014 to 2019 inclusive compared to the previous year, respectively.

Representatives of small business of Ukraine - small industrial enterprises represent one of the leading sectors of the market economy, which is formed on the basis of small-scale production. Small enterprises are characterized by rational forms of management, rapid and adequate adaptation to unpredictable changing challenges of the market and the external environment. A significant advantage of small enterprises is their mobility, which is ensured by the absence of complex multi-level management decision-making systems. During the pandemic and, as a consequence, the financial crisis in the country, the advantages of small businesses over large areas of life include those listed in table 5.

83

Сучасний стан наукових досліджень та технологій в промисловості. 2021. № 3 (17)   ISSN 2522-9818 (print)
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Table 5. *Advantages of small enterprises during the financial crisis*

Sphere of life	Advantage
Economic	Structural restructuring of the country's economy and its regions, freedom of market choice, mobility of responding to changes in the external environment and economy of the country, promotion of weakening of monopolism and development of competition
Social	Formation of a new social layer of entrepreneurs - owners; reducing social tension in society, ensuring the saturation of the market with consumer goods and services of everyday demand
Financial	Replenishment of local budgets of regions, fast payback of expenses, implementation of innovations, introduction of creative startups
Labor	Creating additional jobs, solving the problem of unemployment in the country
Banking	Carrying out activities at their own funds, which eliminates the problem of providing loans

Source: formed taking into account [24, 25, 28, 29].

So we can hope for the revival of Ukrainian industry through the successful development of small enterprises, because the modern development of Ukraine's economy takes place in an instability environment, inflationary fluctuations, and crisis of defaults, which leads to a decline in production and has a very negative impact on industrial enterprises, especially in the small business segment. Recently, small industrial enterprises operate in a harsh pandemic in the country, resulting in a decrease in their solvency and financial stability, which can lead to complete bankruptcy [26,29].

In these conditions, the problem of obtaining relevant information on the financial condition of small industrial enterprises is very relevant, which requires rapid analysis of their activities. Adequate assessment of the financial condition, attraction and highly efficient use of financial resources requires constant monitoring, with the long-term goal of achieving and maintaining the current level of competitiveness of the enterprise. In the analysis of the financial condition of small businesses can use a variety of techniques, methods and models of analysis. Their number and breadth of application depends on the specific objectives of the analysis and are determined by its objectives in each case. However, small businesses, as small businesses, objectively have limited opportunities to conduct regular financial analysis of their activities. Therefore, we consider it appropriate to recommend small businesses to conduct on a regular basis financial rapid analysis, which belongs to the group of methods of analysis of financial ratios. The economic essence of this method is to assess the crisis parameters of the financial development of the enterprise, carried out on the basis of its financial statements [17, 21, 31-33]. The advantages of this method include efficiency, speed, simplicity (does not require extra time and complex calculations), cheap calculations, the ability to detect signs of crisis in the early stages of the entity, the disadvantage is the superficial assessment of crisis phenomena.

The developed step-by-step scheme of the algorithm of financial express analysis of the activity of a small industrial enterprise is shown in Figure 2.

1. The task statement includes the purpose of solving this problem and contains a description of the economic essence of the financial rapid analysis of a small enterprise and the sources of obtaining the necessary information. Financial rapid analysis is one of the main forms of internal financial analysis at the enterprise level on the basis of "research purpose". The main objectives of the

rapid analysis of the financial condition is a general assessment of the enterprise, its financial condition, identification of "weaknesses" and areas for further in-depth assessment. It is used to quickly assess the financial condition of the enterprise in selected areas and the relevant calculated indicators. Financial rapid analysis is performed according to the financial statements; its advantages are the speed and simplicity of calculations. The source of input information by year is usually an official document of Annex 1 to the provision (standard) of accounting 25 "Simplified financial statements" (paragraph 5 of section 1) "Financial statements of a small enterprise" consisting of: form № 1-m "Balance Sheet", code for SCMD 1801006; form № 2 "Report on financial results", code according to SCMD 1801007. The factual basis of the study was chosen a private small industrial enterprise, the main activity of which according to NCEA 25.62 is the machining of metal products.

2. In the context of financial supervision, a method of scientific and methodological support of financial express analysis of a small industrial enterprise in a simplified procedure in such areas as:

a) analysis of the comparative analytical balance with the determination of the dynamics and share of its main sections of assets and liabilities (if necessary);

b) analysis of the "golden rule of economics" (business activity) of the enterprise;

c) ratio analysis of liquidity, financial stability, business activity, profitability;

d) analysis of the level of probability of bankruptcy (as an example of the R-model and the Beaver model;

e) the use of financial scoring (for example, according to the method of YouControl) as a fast and convenient system for assessing the solvency of a potential borrower (provided the opportunity and need for the company to assess in advance a positive decision to obtain a loan) [16, 18, 20, 21, 22, 30-42].

3. The formation of the input bank is assumed by such components as: input data of a small enterprise (I - input statistical information; II - intermediate normative and reference information; III - scale of assessment of the stability of the financial condition of the enterprise (Table 6 on the example of a real small industrial enterprise according to the R-model); IV - mathematical models of financial express analysis of enterprise activity (table 7). To solve the problem, a certain set of deterministic analytical multiple and mixed models and the corresponding methods of deterministic analysis was

84

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selected, taking into account the recommendations of [6,   7, 11, 13, 14, 16, 18, 19, 20, 22, 30, 31, 35-38, 42, 43-45].
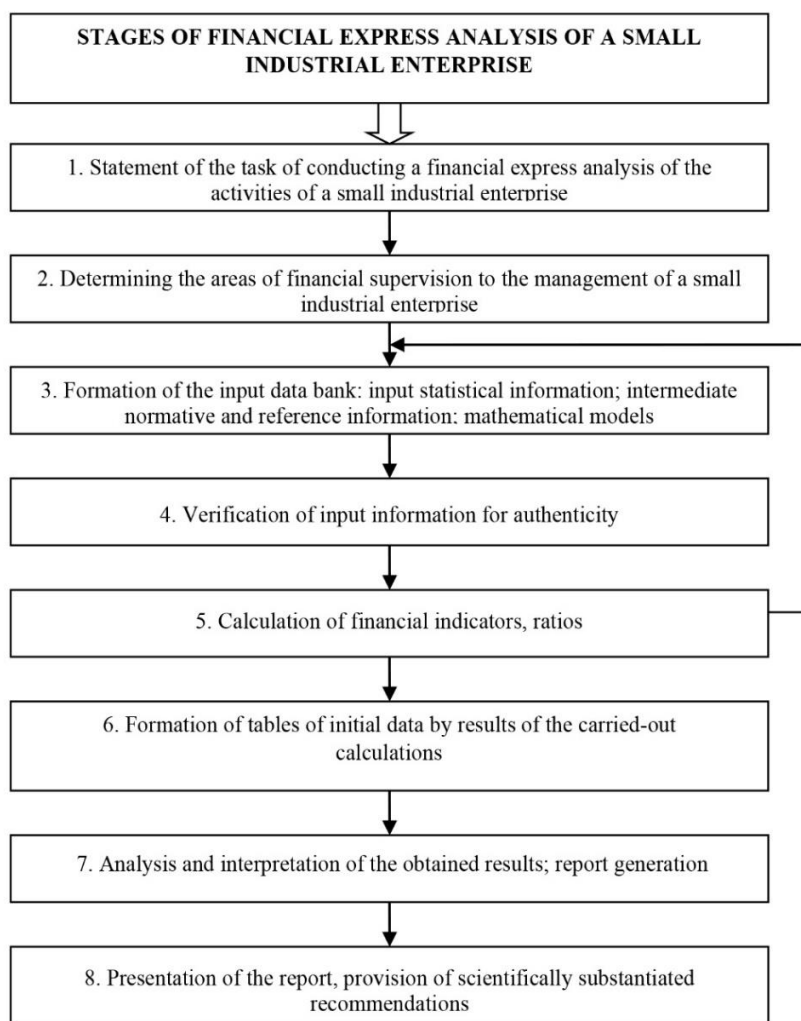

Fig. 2. Scheme of algorithm of financial express-analysis of activity of small industrial enterprise

Source: author's development.

Table 6. *Data bank structure by component "Input data of small industrial enterprise"*

Indicator	Value, thousand UAH.	
	(t-1) year	**t year**
1	2	3
I. Input statistical information		
Non-current assets	78,3	289,2
Wear and tear	274,7	293,0
Current assets	437,1	617,9
Balance	515,4	907,1
Equity	210,9	197,7
Long-term liabilities	-	-
Current liabilities	726,3	1104,8
Net income from sales of products (goods, works, services)	2769,5	2690,7
Total costs	2602,0	2677,6
Net profit	167,5	13,2
II. Intermediate regulatory information		
Coefficient/indicator	Recommended value	
Current ratio	1,0–1,5	
Coefficient of financial stability	0,7–0,9	
Coefficient of financial autonomy	0,5	
Financial risk ratio	<1	
Beaver coefficient	>0,2	
Indicator of financial stability according to the R-model	>0,42	

The end **Table 6.**

III. Scale for assessing the stability of the financial condition of the enterprise according to the R-model	
The value of the stability index R	Level of stability, %
Less than 0	Minimum (90-100)
0-0,18	Low (60-80)
0,18-0,32	Average (35-50)
0,32-0,42	High (15-20)
More than 0.42	Maximum (up to 10)

Source: developed by the authors taking into account [7, 8, 16, 22, 35-38].

Next, according to the presented algorithm, it is necessary to check the input information for authenticity. In case of errors it is necessary to correct input data (table 6).

Table 7. *The structure of the data bank on the component "IV - Mathematical models"*

Direction of analysis	Mathematical model (formula)	Characteristics of the model parameter
1	2	3
1. Analysis of the main items of the balance sheet of the enterprise	$GRE_i = \dfrac{I_{ir}}{I_{ib}} \cdot 100\%$	GRE_i – growth rate of the i-th indicator of the balance sheet of the enterprise; I_{ir}, I_{ib} - the numerical value of the i-th indicator of the balance sheet of the enterprise in the base and reporting years, respectively
2. Analysis of the "golden rule of economics" of the enterprise	$100\% \le GR(A) \le GR(Eq) \le GR(NI) \le GR(NP)$	$GR(A)$, $GR(Eq)$, $GR(NI)$, $GR(NP)$ – chain growth rates of assets, equity, net income from sales of products (goods, works, services), net profit of the enterprise, respectively
3. Calculation and ratio analysis of liquidity, financial stability, business activity, profitability	$R_{cl} = \dfrac{C_{irc}A}{CL}$, $C_{fs} = \dfrac{Eq + LL}{A}$, $R_{fr} = \dfrac{CL}{Eq}$, $CB = \dfrac{NP + A_m}{BC}$, $T_{wc} = \dfrac{NP_S}{WC}$, $R_a = \dfrac{NP}{A} \cdot 100\%$, $R_{ca} = \dfrac{NP}{CircA} \cdot 100\%$, $R_{eq} = \dfrac{NP}{Eq} \cdot 100\%$	R_{cl} – current liquidity ratio; $C_{irc}A$ – circulating assets; CL – current liabilities; C_{fs} – coefficient of financial stability; Eq – equity; LL – long-term liabilities; A – assets of the enterprise; R_{fr} – financial risk ratio; CB – Beaver coefficient; A_m – amortization; BC – borrowed capital; NP – net profit of the enterprise; T_{ta} – turnover of total assets; NP_S – net income from sales of products (goods, works, services); $\overline{A}$ – average annual assets; T_{wc} – working capital turnover; $\overline{WC}$ – average annual working capital; R_a – return on assets; R_{ca} – return on current assets; R_{eq} – return on equity
4. Assessment of the stability of the financial condition of the enterprise	$R = 0,838K_1 + K_2 + 0,054K_3 + 0,63K_4$	R – an indicator of the stability of the financial condition of the enterprise according to the discriminant R-model; K_1 – coefficient, which is determined by the ratio of $CircA$ to A of the enterprise; K_2 – coefficient determined by the ratio of NP to Eq; K_3 – coefficient determined by the ratio of NP_S to A; K_4 – coefficient, which is determined by the ratio of NP to IC (integrated costs) of the enterprise

Source: formed taking into account [14, 16, 30, 35, 37, 38].

We consider it expedient to substantiate the choice of a mathematical model for assessing the stability of the financial condition of predicting the risk of bankruptcy of a small enterprise in the form of a discriminant R-model

86

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[37]. In conditions of economic instability in Ukraine, a sufficiently high share of unprofitable domestic industrial enterprises, uncertainty and variability of the external environment, enterprises have a growing risk of losing their solvency, financial stability, which can lead to bankruptcy. Therefore, it is important to solve the problem of timely detection of negative changes in the financial condition of economic entities, including small industrial enterprises.

To solve this problem, it is proposed to choose a discriminant R-model [37], according to which you can assess the stability of the financial condition of the enterprise. It has the following advantages: availability of accounting information; selection of independent variables; choice of a set of financial indicators; simplicity of calculations; suitable for companies whose shares are not listed on the stock exchange.

It is advisable to pay attention to another of the methodological approaches to conducting a rapid financial analysis of the enterprise. In the financial sphere of activity of each industrial enterprise efficiency, convenience and saved time are considered by experts as one of the main assets. The new tool "Financial Scoring" from YouControl provides an opportunity to quickly analyze the financial performance of the company and further calculate the consolidated final score - the index FinScore (1-4) [40]. This index reflects the financial condition of the enterprise relative to others in the industry, has a probabilistic nature, indicates a relatively lower probability of bankruptcy. In the field of banking, the FinScore risk index is a convenient and fast system for assessing the solvency and integrity of a potential borrower.

Financial scoring is based on the following indicators: current liquidity; absolute liquidity; coefficient of autonomy; return on assets; return on current assets; net margin; return on total assets; turnover of total assets; working capital turnover; turnover of receivables. The scale of financial scoring is as follows: A – high level of financial stability (4 points); B – good level of financial stability (3 points); C – satisfactory level of financial stability (2 points); D – unsatisfactory level of financial stability (1 point).

It should be noted that this method is an information product, it reflects the opinion of YouControl experts on the overall level of financial risks of economic entities. The financial scoring system uses special computer programs that allow you to analyze information about each business entity [39-41]. For these reasons, the current bank of mathematical models does not contain information on the calculation of financial scoring.

The calculation of financial indicators, coefficients is provided at the fifth stage of implementation of the developed algorithm. Table 8 presents the results of the financial express analysis of this enterprise in the first (a) direction.

Table 9 presents the results of the financial express analysis of the enterprise in the second (b) direction, which allowed to analyze its "golden rule".

Table 10 presents the results of the financial express analysis of a small industrial enterprise in the third (c) direction, which allowed to conduct a ratio analysis of liquidity, financial stability, business activity, profitability of the enterprise

Table 8. *The results of the analysis of the comparative analytical balance with the determination of the dynamics and the share of its main sections (on the example of the asset)*

Section name	Balance line code	At the beginning of t year		At the end of t year		Change of the indicator		
		abs. val., thousand UAH	rel. val., %	abs. val., thousand UAH	rel. val., %	in abs. val., (gr.5- gr.3), thousand UAH	in the structure, (gr.6- gr.4), %	basic growth rate, (gr.5/ gr.3), %
1	2	3	4	5	6	7	8	9
Active								
I. Non-current assets	1095	78,3	15,2	289,2	31,9	210,9	16,7	369,3
II. Current assets	1195	437,1	84,8	617,9	68,1	180,8	-16,7	141,4
III. Non-current assets held for sale and disposal groups	1200	-	-	-	-	-	-	-
Balance	1300	515,4	100,0	907,1	100,0	391,7	0,0	176,0

Source: author's development.

Table 9. *The results of calculating the chain growth rate of economic indicators of the enterprise*

Indicator	The value of the indicator, thousand UAH		Chain growth rate of the indicator (gr.3/gr.2),%
	as of the beginning of the t-th year	as of the end of the t-th year	
1	2	3	4
1. Net income	167,5	13,2	7,88
2. Net income from sales of products (goods, works, services)	2769,5	2690,7	97,15
3. Equity	210,9	197,7	93,74
4. Assets	515,4	907,1	176,00

Source: author's development.

Table 10. *The results of the analysis of liquidity, financial stability, business activity, profitability and probability of bankruptcy of a small industrial enterprise*

Indicator	Recommended value, positive trend	Indicator value		Absolute change in the indicator, (gr.4-gr.3)
		(t-1) year	t-year	
1. Current liquidity ratio	1,0–1,5	0,60	0,56	-0,04
2. Coefficient of financial stability	0,7–0,9	0,42	0,22	-0,20
3. Financial risk factor	<1	3,44	5,56	2,12
4. Beaver coefficient	>0,2	0,61	0,28	-0,33
5. Turnover of total assets	growing	0,62	0,39	-0,23
6. Working capital turnover	growing	7,62	5,11	-2,51
7. Return on assets, %	growing	32,50	4,60	-27,90
8. Profitability of current assets, %	growing	36,60	2,10	-34,50
9. Return on equity, %	growing	38,30	6,70	31,60
10. Stability by R-model	>0,42	1,8	0,8	-1,0

Source: author's development.

The penultimate stage of the proposed algorithm (fig. 2) is the analysis and interpretation of the results and report generation. The following conclusions can be drawn from the results of the financial express analysis of a small industrial enterprise conducted as an example 1) The balance of the enterprise for the *t*-th year is characterized by positive dynamics of growth by 391.7 thousand UAH. due to the change of non-current assets by UAH 210.9 thousand. and current assets - by UAH 180.8 thousand. The basic growth rate of non-current assets in the amount of UAH 369.3 thousand gets 227.9% ahead of the same indicator of current assets in the amount of 141.4 thousand UAH. In general, the basic growth rate of the balance sheet of the enterprise for the studied year was 176.0%, which is a good sign. 2) The "golden rule of economics" for the studied small business for the whole chain of inequalities is not fulfilled, except for the latter, namely: 100% <TK (A). This inequality means that the economic potential of the enterprise is growing – the scale of its activities is expanding and this is a good sign. However, the chain rate of change in net profit, net income from sales of products (goods, works, and services), and equity is characterized by a negative trend that will not strengthen the financial condition of the enterprise. Therefore, it is recommended that the company's management pay attention to improving the financial situation in the future. 3) The estimated values of liquidity, financial stability, business activity and profitability of the surveyed enterprise do not meet the relevant recommended values and are characterized by a negative trend over time. 4) Despite the decrease in the value of the Beaver coefficient over time, we can state the following. Since the estimated values of this indicator exceed 0.2, this is a positive sign of the financial stability of the enterprise in assessing the risk of bankruptcy.

Numerical values of the indicator of stability of the financial condition of the enterprise according to the R-model for two years exceed 0.42, which indicates the maximum level of the required indicator.

The implementation of this algorithm ends with the presentation of the report and providing the management of the enterprise with scientifically sound recommendations. The application of the proposed mathematical models of financial express analysis of small industrial enterprises, which were combined in the areas of financial supervision, allowed to calculate a certain set of financial and economic indicators on the example of a particular small enterprise. Their analysis in the dynamics provided a basis for drawing conclusions about the financial condition of a particular enterprise.

Conclusions

The study of the methodological support of financial analysis of industrial enterprises revealed that there is an urgent need to use the tools of financial supervision in the small business sector of the country. Therefore, the problem of developing appropriate scientific and methodological support for financial rapid analysis of small industrial enterprises of Ukraine has become important. The practical application of the developed scientific and methodological approach to conducting financial express analysis on the basis of financial supervision will serve as a "guideline" for the analysis of the financial condition of small businesses and will facilitate the timely adoption of scientifically sound decisions in the financial management of small industrial enterprises of Ukraine.

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88

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89

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НАУКОВО-МЕТОДИЧНЕ ЗАБЕЗПЕЧЕННЯ ФІНАНСОВОГО ЕКСПРЕС-АНАЛІЗУ МАЛИХ ПРОМИСЛОВИХ ПІДПРИЄМСТВ УКРАЇНИ

Предметом дослідження даної роботи є сучасний напрямок у фінансовій діяльності малих промислових підприємств – проведення фінансового експрес-аналізу. **Метою** дослідження є розробка науково-методичного підґрунтя для проведення за спрощеною процедурою фінансової супервізії діяльності малих промислових підприємств країни з метою надання кваліфікованої допомоги керівникам малих промислових підприємств у фінансовій сфері їх діяльності. В статті вирішуються наступні **завдання**: дослідження стану малих промислових підприємств та їх ролі в розвитку економіки України, визначення

дефініції поняття «фінансова супервізія», розробка алгоритму фінансового експрес-аналізу малого промислового підприємства, вибір напрямків проведення фінансового експрес-аналізу малих підприємств промисловості на засадах фінансової супервізії, формування банку вхідних даних за чотирма складовими, апробація науково-методичного забезпечення на прикладі конкретного підприємства. Використовуються такі **методи**: теоретичне узагальнення, ретроспективний аналіз, порівняльний аналіз, аналітичний, аналіз та синтез, експрес-аналіз. Отримано наступні **результати**: в роботі запропоновано на засадах фінансової супервізії методичні рекомендації щодо проведення фінансового експрес-аналізу малого промислового підприємства; обрано напрямки проведення фінансового аналізу за спрощеною процедурою; розроблено схему алгоритму реалізації фінансової супервізії; сформовано банк вхідних даних, які необхідні для вирішення поставленого завдання; проведено обґрунтування вибору прикладних математичних моделей; проведено експериментальну апробацію запропонованого науково-методичного підходу до проведення фінансового експрес-аналізу на фактологічній базі реального малого промислового підприємства; надано відповідні рекомендації керівництву досліджуваного підприємства. **Висновки**: Досліджено фінансові результати функціонування суб'єктів господарювання у сфері малого бізнесу. Визначено, що у теперішній час малі промислові підприємства України потребують професійної допомоги консультаційної спрямованості у фінансовій сфері своєї діяльності. Було розроблено науково-методичне підґрунтя для фінансової супервізії з використанням методу експрес-аналізу, складено та описано етапи схеми алгоритму проведення фінансового експрес-аналізу за спрощеною процедурою. Проведено апробацію реалізації алгоритму на фактологічній базі конкретного малого промислового підприємства, зроблено конкретні рекомендації.

Ключові слова: мале підприємство; ретроспективний аналіз; фінансова супервізія; методичне забезпечення; схема алгоритму; банк даних; математична модель; експрес-аналіз; результати.

НАУЧНО-МЕТОДИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ФИНАНСОВОГО ЭКСПРЕСС-АНАЛИЗА МАЛЫХ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ УКРАИНЫ

Предметом исследования данной работы является современное направление в финансовой деятельности малых промышленных предприятий - проведение финансового экспресс-анализа. **Целью** исследования является разработка научно-методического основания для проведения по упрощенной процедуре финансовой супервизии деятельности малых промышленных предприятий страны с целью оказания квалифицированной помощи руководителям малых промышленных предприятий в финансовой сфере их деятельности. В статье решаются следующие **задачи**: исследование состояния малых промышленных предприятий и их роль в развитии экономики Украины, определение дефиниции понятия «финансовая супервизия», разработка алгоритма проведения финансового экспресс-анализа малого промышленного предприятия, выбор направлений проведения финансового экспресс-анализа малых предприятий промышленности на основе финансовой супервизии, формирование банка входных данных по четырем составляющим, апробация научно-методического обеспечения на примере конкретного предприятия. Используются следующие **методы**: теоретическое обобщение, ретроспективный анализ, сравнительный анализ, аналитический анализ и синтез, экспресс-анализ. Получены следующие **результаты**: в работе предложено на основе финансовой супервизии методику проведения финансового экспресс-анализа малого промышленного предприятия; избран направления проведения финансового анализа по упрощенной процедуре; разработана схема алгоритма проведения процедуры финансового супервизии; сформирован банк входных данных, которые необходимы для решения поставленной задачи; проведено обоснование выбора прикладных математических моделей; проведена экспериментальная апробация предложенного научно-методического подхода к проведению финансового экспресс-анализа на фактологической базе реального малого промышленного предприятия; даны соответствующие рекомендации руководству исследуемого предприятия. **Выводы**: Установлено, что в современных нестабильных условиях хозяйствования малые промышленные предприятия нуждаются в профессиональной помощи консультационной направленности в финансовой деятельности. Получение актуальной релевантной информации о финансовом состоянии малых промышленных предприятий является очень актуальной задачей, требующей проведения финансового экспресс-анализа их деятельности. Изучение данного вопроса показало отсутствие единого мнения аналитиков относительно направлений и методов проведения финансового экспресс-анализа. Это обусловило необходимость и целесообразность разработки для руководства малых промышленных предприятий по упрощенной процедуре упорядоченной методики финансового экспресс-анализа на основе финансовой супервизии.

Ключевые слова: малое предприятие; ретроспективный анализ; финансовая супервизия; методическое обеспечение; схема алгоритма; банк данных; математическая модель; экспресс-анализ; результаты.

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