ECONOMY

ATTRIBUTIVE PROPAEDEUTICS OF ACCOUNTING REPORTING AS A MEANS OF COMMUNICATING THE SYSTEM OF INDICATORS IN DESCRIPTIVE MODELS OF ECONOMIC ANALYTICS

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ABSTRACT

The article deals with accounting reporting as a means of communicating the system of indicators in descriptive models of economic analytics. Formalized algorithmic procedures for calculating key invariant indices suitable for use of standard packets of analytical orientation applications are constructed. The descriptive model and the formation of its information support are considered. In forming the system of indicators for conducting an economic analysis of the financial condition of the enterprise, in order to reduce the number of calculations and improve the efficiency when conducting an express analysis of the financial condition of the enterprise, a heuristic method of permissible multicollinearity with acceptable (tested by practice) characteristics is proposed.

Introduction. The application of a descriptive approach in modeling economic processes is due to the empirical manifestation of different interactions in the economy, the establishment of statistical laws of economic behavior of certain subjects, the study of probabilistic ways of the development of any processes with the definition of the source information or the unchanging nature of it. Unlike other models, such as regulatory ones, such models, using a posteriori sources of information, usually answer the question "How has this happened?", "How will it evolve further?".

One of the first attempts in world practice, the analyticity of such models was first used in the publications of its famous "Economic Table" ("laugh", or later on time, "arithmetic formula"), the basis of genius which can certainly be considered rules of mathematical action in solving some algebraic equations and geometric proportions and their additions, the Italian mathematician "founder of accounting" Luca Bartolomeo de Pacioli, which served as the basis for building and developing an information base for many descriptive models of economic analysis policy.

These models include the production of balance sheets, the presentation of financial statements in various analytical aspects, the analysis of financial statements, the system of analytical ratios, analytical reports to the reporting, etc., which allow to structure and identify the relationship between the main indicators of the enterprise in the implementation of a comprehensive economic analysis of the company's activities and situations requiring the use of methods of system analysis and modern simulation.

The system of the results of the implementation of descriptive models associated with any financial and economic activity of the enterprise, as well as the efficiency of management significantly depends on the selectivity and reliability of information provision. In such models, for the further conduct of in-depth analysis procedures, the most adequate information base is accounting reporting, which can quickly describe the economic potential of the enterprise. The priority role of accounting reporting as the main means of communication lies in the fact that it is the organizing start and the best of the existing financial models of this enterprise, which is considered in the context of the environment, includes labor and capital markets and allows the construction of a system of indicators that does not contradict and has a logical explanation. In addition, all objects of accounting are expressed in cost estimation, and financial resources are a priority kind of resources because of their importance from the point of view of operational and strategic management of the company's activity, and also due to its unique opportunity with a minimum time lag transformed into any other kind, as well as continuous and continuous.

Analysis of actual research.

Different theoretical, methodological and organizational aspects of the problems of systematization and processing of economic information have been reflected in the writings of Ukrainian scholars, Ye. V. Mnykh, O. V. Oliinyk, V. H. Shvets, Yu. S. Tsal-Tsalko et al., Russian scientists S. B. Barnholts, V. V. Kovalov, B. H. Ploshko, A. D. Sheremet et al.

Despite the undeniable significance, the value and effectiveness of the scientific apparatus, through which the system of indicators in the economic analysis is implemented and improved, not all of its aspects in the field of assessing the financial status of enterprises are sufficiently theoretically worked out and meet the requirements for the activation of modern management activity.

The precision and representativeness of the results of the implementation of descriptive models of financial and economic activity of enterprises are attributive assessments for conducting an effective comprehensive financial and economic analysis of the enterprise, which in turn is a link between financial management and accounting on the one hand and the consumer of information and the factor of the formation of targeted information support management process from another. In this regard, the quality of financial management, and the effectiveness of management largely depend on the complexity, volume, depth and quality of the source information base of models in which space they are implemented.

The simulation procedure requires fairly strict requirements for information systems. But real opportunities for obtaining and preparing information limit the choice of practical application of models. It takes into account not only the fundamental possibility of preparing information, but also the value of information, that is, the cost of preparing an appropriate information base, which should not exceed the effect of its use, but not lead to its annihilation.

The reform of the national accounting system, the use of accounting and statistical standards (SNA), accounting reform through harmonization and standardization required the change in the informational model of the economic system, which in turn led to the modern development of information provision in the construction of a leading element of the analysis of the financial state of the enterprise - the system of analytical coefficients and implementation of descriptive analytical models of economic analysis in general. In this regard, certain analytical thinking requires Eurostat's typical characteristics of the criteria for the quality of information such as expediency, accuracy of data, relevance, accessibility and quality, comparability and interconnection of individual data with information from other sources [1, 6,8]. Focusing on the requirements of IFRS should be such qualitative reporting characteristics as clarity, relevancy, reliability, predictability, stability, efficiency, efficiency, etc.

An objective judgment of the financial position of an enterprise can be made only on the basis of some indicators. It is no accident that according to the IFRS, the annual report of any large company begins with the section "Highlights," - "the main moment", "attaches the main value", which provides key financial indicators that comprehensively characterize the financial status and performance of this the company.

The selection of indicators, as a rule, is carried out purposefully, although some of them can be universal. Since, according to one indicator, no matter how congruent it was, it is usually not possible to get a complete picture of the activity of the enterprise, therefore, an absorbed and well-ordered set of indicators is used to assess the financial situation. Therefore, when solving multidimensional economic complex problems of evaluating the activities of economic entities inevitably there is a problem of selection of indicators.

If we take into account factors such as the purpose of the analysis, available information support, time limitation, the availability or absence of appropriate technical means, etc., this problem becomes more complicated. However, even if the target is general, the complexity of the assessment can only be achieved if it is possible to form a system of indicators.

The objectives of the article. Of course, the development of a system of indicators is always relational and creative, therefore, with the aim not to emphasize the controversial system of concepts and

categories of the system of indicators, not to carry out a comprehensive revision and specification of definitions, but in order to further clearly and consistently formulate the actual the understanding of the categorical apparatus, the scientific and practical tools of the analyst, proposes its own selective approach to the formation of a system of indicators of the analysis of the financial state of the enterprise.

The purpose of the article is to develop and modify existing methods of constructing a system of indicators of economic analysis of the financial state of the enterprise as a stage of economic analysis for the creation of a methodological apparatus that would serve as a basis or starting point for further concrete calculations, analysis, justification and selection of optimal strategic management decisions, as well as possible options for development.

The main material of the study.

The term "indicator system" is widely used in economic research. It is the complexity of the analysis that involves the use of certain sets of aggregates of indicators. According to certain criteria, it is necessary to select the indicators and form a system, analyze it. Of course, any set of indicators can not be considered a system. Compared to individual indicators or some of their set, the system is qualitatively new in education and is always more significant than the sum of its individual parts, since, in addition to representing the individual aspects of the phenomenon (process, object) that is being investigated, it carries certain information that, which appears as a result of the interaction of these individual parties, that is, information on the development of the phenomenon as a whole.

The construction of an expanded system of indicators is based on a clear understanding of two points: what system and what basic requirements it should satisfy. Definition of the concept of "system of indicators" is presented in sufficient detail in the scientific and educational literature [1, 6, 8, 8].

In the future, under the system of indicators, we will understand such an ordered set of them, in which each indicator gives a quantitative and qualitative characteristic to a certain side of the state and development of the subject or phenomenon in correlation with other indicators, but does not duplicate them, which inherent properties of consolidation and divisibility. For pragmatic segmentation and use, the metrics system must meet certain requirements.

When forming a system of economic indicators, in our opinion, certain principles should be guided, the implementation of which in practice is often restrained by certain circumstances. The most important of those with a methodological and pragmatic significance are:

a) the maximum degree of axiomaticity;

b) interconnection and maximum connections horizontally and vertically;

c) a reasonable ratio of absolute and relative indicators:

d) dendrographic nature; d) the principle of availability of inspection;

e) adaptability and compatibility for other tasks;

f) Verification;

g) the principle of informality.

Without stopping in detail on the principles of constructing a system of indicators, note the main:

− *the principle of the dendrogram structure of the system of indicators* - ensuring the logical collapse of partial indicators in generalization. This logic is not something fundamentally new and is used extensively in various types of analysis and is widely used in methods of consekventive and perspective simulation, in particular, in the methods of prolongation of factor systems;

− *the principle of availability* - presupposes the availability of some set of indicators, optimal for this enterprise. In this case, the system's performance should be permissible multicollinear;

− *the principle of optimal combination of absolute and relative indicators*. The most suitable for constructing a system of indicators are relative and specific values, the prevalence of which is conditioned by the fact that they have certain advantages over absolute ones - allow to compare objects that can not be compared in absolute terms, make it possible to eliminate the influence of some general economic factors (for example, inflation , revaluation, etc.) are more stable in space and time, that is, they characterize more homogeneous variational series (in the context of their membership in the distribution law close to normal), which is a significant factor of the for correct data processing with the help of economic and mathematical methods;

− *the principle of informality*. This means that the system should have the maximum degree of analyticity, provide an opportunity to assess the current financial state of the enterprise and the prospects for its development, as well as be suitable for management decisions and be based primarily on accounting, because accounting is the most reliable information support process economic analysis of the financial condition of the enterprise, and the data generating accounting, with the appropriate degree of adjustment and "open work in the account" is formalized In the meantime, most (and often absolute) are considered to be accurate in comparison with other information of an economic nature.

It is also worth stressing the importance of the requirement of verification, that is, the establishment of authenticity (the possibility of verification). In manuals, textbooks and some

monograph editions on the theory of statistics and economic analysis, indicators or systems of indicators are often presented, for which the calculation algorithm is unclear as well as informational support. The cognitive value of such indicators is rather dubious. It is no coincidence that the annual reports of Western companies and the Methodological Regulations on Statistics of the State Statistics Committee of Ukraine distinguish sections describing the algorithms for calculating key indicators.

Assume, a priori, information that on the basis of absolute financial reporting indicators it is possible to calculate more than 200 relative analytical indicators that can be used to characterize a financial state of the enterprise [1,3,6]. But it is certainly known that in countries with a market economy more than 80 financial ratios are used to analyze the financial state and financial results [6].

Guided by the maximum informativeness and principle of permissible multicollinearity for the development of a method for conducting a comprehensive assessment of the financial condition of enterprises on the basis of absolute indicators of accounting, which is characterized by comparability of planning and reporting, completeness, accuracy, objectivity, timeliness and efficiency, clarity and efficiency, flexibility and dynamism, we have selected 56 financial ratios. This allowed, based on certain unification of available information, to form the information space of the study, to construct formalized algorithmic procedures for calculating key invariant indices of suitable for use of standard packets of analytical orientation applications.

These indicators grouped in 10 functional subsystems, each of which characterizes the relevant aspect of the activities of business entities and has a direct or indirect effect on their financial state of the enterprise is:

1) liquidity ratios (5 coefficients);
2) coefficients of the structure of sources of funds (6 coefficients);
3) turnover ratios (working capital, operating capital) (8 coefficients);
4) coefficients of turnover and assets transformation (5 coefficients);
5) coefficients of business activity: rotation of accounts receivable and payables (4 coefficients);
6) coefficients of business activity: coefficients of resource efficiency (5 coefficients);
7) profitability coefficients: total profitability (7 coefficients);
8) profitability coefficients: total return on capital (5 coefficients);
9) efficiency of the use of property (7 coefficients);
10) analysis of the position of the company in the securities market (5 coefficients).

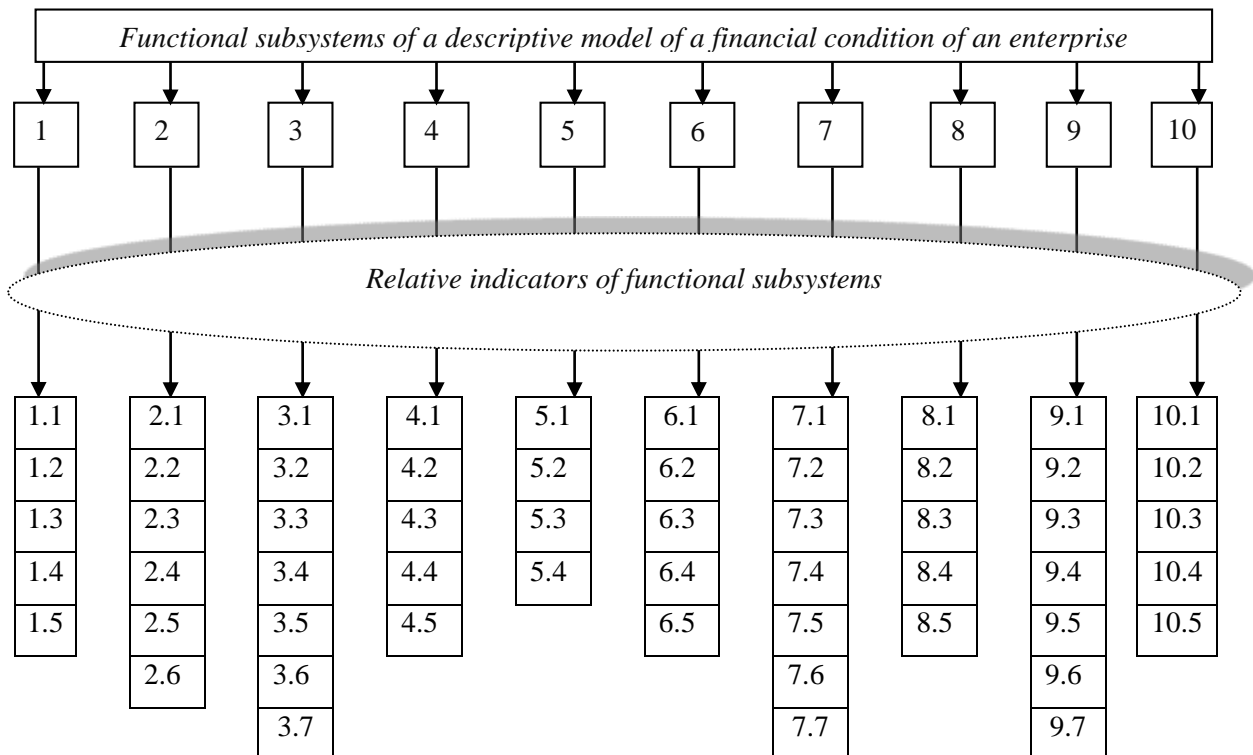Descriptive model, system and subsystems of indicators are shown in Fig. 1.

Fig. 1. Discriminant model and formation of its information support

Where,

1.1. Absolute liquidity. 1.2. Liquidity refined. 1.3. Total liquidity. 1.4. Maneuverability factor.1.5. Current debt.

2.1. Independence 2.2. Financial stability. 2.3. Financing 2.4. Own investments. 2.5. Investing in own and long-term investments. 2.6. Financial leverage.

3.1. Providing working capital. 3.2. Turnover of working capital. 3.3. The period of turnover of working capital. 3.4. Removement of funds from the turnover. 3.5. Maneuverability of own working capital. 3.6. Provision of stocks with own working capital. 3.7. Coverage of stocks.

4.1. Asset turnover. 4.2. Maneuverability of working capital. 4.3. Mobility of funds. 4.4. Equity turnover. 4.5. Turnover of finished products.

5.1. Turnover of receivables. 5.2. Repayment period of accounts receivable. 5.3. Period of payout of accounts payable. 5.4. Doubtful receivables.

6.1. Turnover of fixed assets. 6.2. Stock turnover. 6.3. Storing stocks. 6.4. Operating cycle. 6.5. Financial cycle.

7.1. Equity. 7.2. Assets for profits from ordinary activities. 7.3. Assets for net profit. 7.4. Production facilities. 7.5. Implemented production on the profit from sales. 7.6. Realized products from operating activities. 7.7. Realized products at net income.

8.1. Reinvestment. 8.2. Economic growth. 8.3. Paid interest and profit. 8.4. Net income relative to assets. 8.5. Equity relative to net profit.

9.1. Production facilities in working capital. 9.2. Fixed assets in assets. 9.3 Depreciation of fixed assets. 9.4. Fixed asset renewal. 9.5 Long-term financial investments in assets. 9.6. Revolving production assets. 9.7. Mobility of assets.

10.1. Dividend income. 10.2 Stock Quotes. 10.3 Stock prices. 10.4 Dividend yield of shares. 10.5 Change in the welfare of shareholders.

The algorithm of realization, formation and calculation of the system of indicators of the information base for analysis based on descriptive models written as a sequence of operations:

On the basis of the information provided in the periodic, state-regulated forms of accounting (P(S)A), the value of all indicators (coefficients) is calculated. At the same time, an array of financial statements is formed, usually 10-13 periods (for annual reporting) and preferably, but not less than 15 periods (for quarterly reporting).

2. Graphs of changes in the value of coefficients are constructed, depending on the periods, while the dependence (trend), trend parameters, recommended limits of the coefficient change and the coefficient of multiple correlation (the value of the accuracy of the approximation) and, if necessary, other characteristics are determined.

Thus, for the description of time series, a functional dependence (hereinafter model) defined, which allows obtaining some set of artificial data in the form of time series.

If we take into account, only the accuracy of the model, then this may lead to the selection of not qualitative of them. Nevertheless, in the practice of economic analysis, when choosing models, they are often limited to analyzing the final variation, which essentially characterizes the degree of fitting the model to the known values of the signs. When modeling the values of the indicators of new objects, the difference between the estimated and actual values of the signs can be quite significant.

Thus, the accuracy of the forecast on the output data does not guarantee the high quality of the model, that is, sufficient accuracy and reliability of estimates of the values of the effective indicator for all possible values of factor characteristics. But on the other hand, the model of the description of time series allows not only to extrapolate the quantitative characteristics of indicators, but also to better understand but on the other hand, the model of the description of time series allows not only to extrapolate the quantitative characteristics of the indicators, but also better understand the scenario of the behavior of these series. In spite of the fact that for the analysis we need reliable predictions of the behavior of indicators, it would be too rudely to count on one hundred percent accuracy of the results of extrapolation, because the desired accuracy is practically inaccessible, since a truly unexpected event cannot predicted by definition.

In the analysis of time series, a wide range of different approaches and methods are used which continue to be improved and developed. The most commonly used modern time series analysis methods are the analysis of the trends and the ARIMA-processes of Box-Jenkins [1, 6], the methods of the theory of fractals [8], and others. The latter are quite powerful methods that are used in actuarial calculations and allow somehow disregarding and simulating not only the probability in time series, but also stochasticity (uncertainty).

We, by virtue of simplicity and to reduce computer computing, have chosen the first, which is a direct, intuitive approach to the evaluation of the basic components of the quarterly or annual time series.

Such an in-depth statistical understanding of the behavior of the indicator dynamics is undoubtedly useful as the basis for further analysis (Items 3,4,5).

3. Using the information on the dynamics of absolute values by reporting forms, based on which indicators are determined (coefficients), as well as calculations obtained in 1.2, an analysis of the dynamics of each coefficient is carried out, the substantiated conclusions are presented, which indicate the main reasons for the coefficient change by article balance sheet.

4. The functional subsystems of the indicators are composed of analytical notes, which, based on the conclusions, provides a general detailed description of the enterprise for each subsystem of indicators.

5. After the implementation of clauses 1-4, a general analytical note of the entire system of indicators is prepared, which gives a complete comprehensive complex of the enterprise characteristics for all subsystems as a whole, financial state and recommendations for further effective functioning.

One of the pressing problems is the establishment of the recommended limits of coefficient change. Determining the methods of their establishment should not depend on the subjectivity of experts or performers, but to clearly defined.

In our practical implementation, the recommended limits were determined according to current GAAP standards, taking into account national industry specifics, as well as considering expert considerations [1, 3, 4, 9], and the personal experience of authors.

In general, calculation of indicators of the financial state of analysis based on descriptive models can be described schema (Fig. 2).
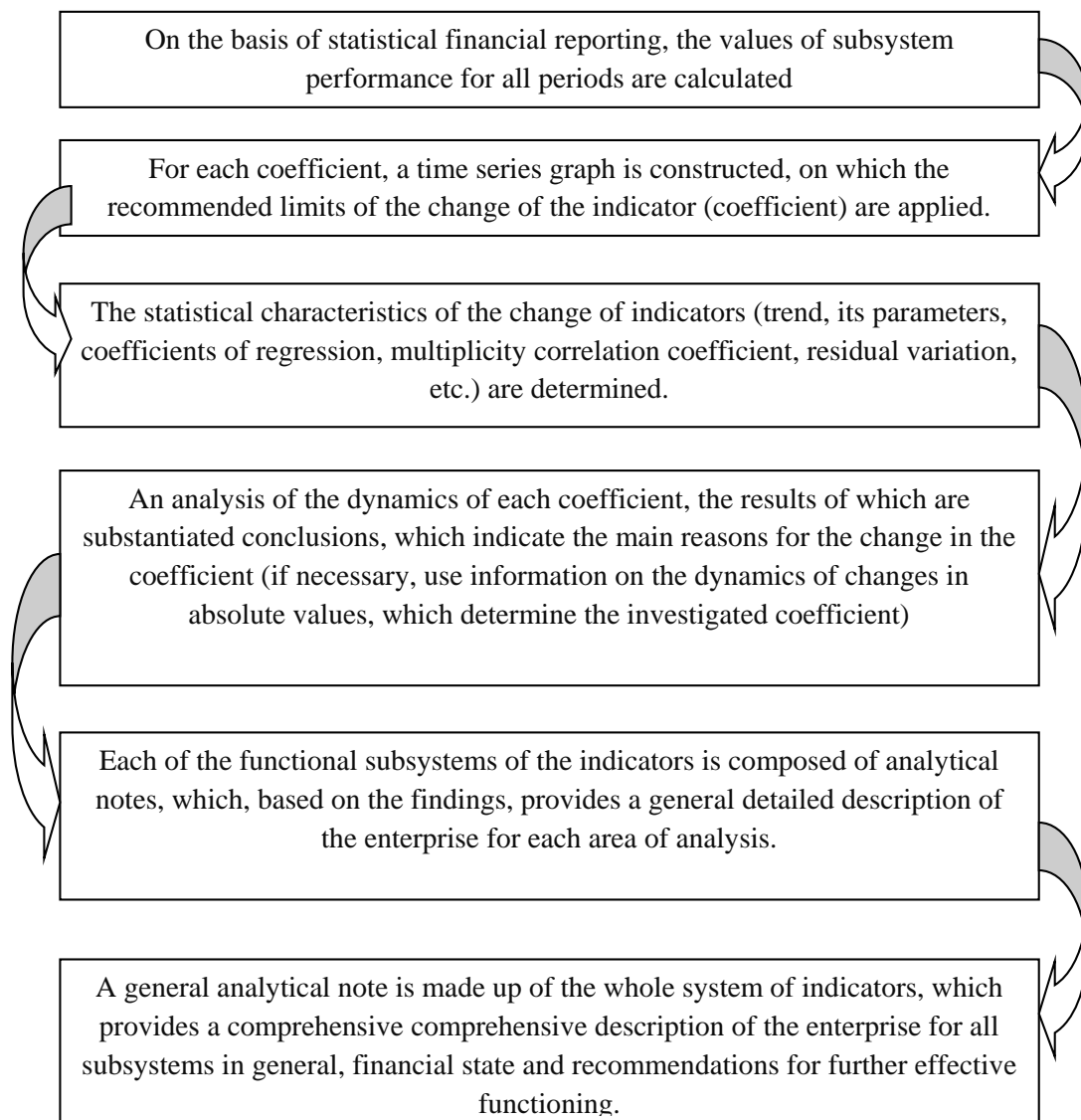
On the basis of statistical financial reporting, the values of subsystem performance for all periods are calculated

For each coefficient, a time series graph is constructed, on which the recommended limits of the change of the indicator (coefficient) are applied.

The statistical characteristics of the change of indicators (trend, its parameters, coefficients of regression, multiplicity correlation coefficient, residual variation, etc.) are determined.

An analysis of the dynamics of each coefficient, the results of which are substantiated conclusions, which indicate the main reasons for the change in the coefficient (if necessary, use information on the dynamics of changes in absolute values, which determine the investigated coefficient)

Each of the functional subsystems of the indicators is composed of analytical notes, which, based on the findings, provides a general detailed description of the enterprise for each area of analysis.

A general analytical note is made up of the whole system of indicators, which provides a comprehensive comprehensive description of the enterprise for all subsystems in general, financial state and recommendations for further effective functioning.

Fig. 2. Scheme of the sequence of estimation of the financial state on the basis of subsystems of indicators in descriptive models.

The proposed method differs from the existing that was developed and revised not only as a system of indicators, but also by the fact that it involves a sequential analysis of indicators, the totality of which belongs to the category of time series. Of course, the time series is not a random sample of some general population (except for the process of pure random noise) and requires certain transformations and the use of special methods that take into account a certain relationship between the indicators [1,4].

In addition, the proposed three-stage scheme of sequential analysis (analysis of changes in the dynamics of the indicator $\Rightarrow$ analysis of the dynamics of functional subsystems indicators $\Rightarrow$ analysis of the dynamics of the system of indicators in general) allows comprehensive, comprehensive and, in our opinion, quantitatively, consistently and most accurately estimate the financial condition of the enterprise.

In carrying out an in-depth comprehensive economic analysis of the financial state, focusing on the large amount of information intended for data analysis led to the fact that often-unsystematic flows, in which it was not always possible not only to use the information but also to get acquainted with it, led to annihilation necessary information.

In the practical implementation of descriptive models, the selection of indicators can be carried out on the principle of eliminating multicollinearity. Of course, any method of eliminating multicollinearity can be applied, but unfortunately, this procedure cannot be unified, that is, to clearly define the influential factors based on which to form the information base of economic analysis.

We, in developing a system of indicators for conducting an economic analysis of the financial state of the enterprise, in order to reduce the number of calculations and improve the efficiency while conducting an express analysis of the financial condition of the enterprise, proposed a heuristic method of permissible multicollinearity, which has acceptable (verified practice) characteristics. The algorithm of the method can be as follows:

1. Calculate financial indicators $\left\{ a_{ij} \right\}_{i=\overline{1,n}\,;\,j=\overline{1,m}}$ (n-number of analytical indicators (coefficients), m - the number of periods, usually $m \geq 7$)) of all the above functional subsystems;

2. For each subsystem and system of indicators in general, a correlation matrix $\left\{ \rho_{ir} \right\}$ ($\left\{ \rho_{is}^{l} \right\}_{i=\overline{1,n};s=\overline{1,n_k}}^{l=\overline{1,L}} \in \left\{ \rho_{ir} \right\}$, n_k – number of indicators in the subsystem k, L – number of subsystems,

$\sum_{k=1}^{L} n_k = i$, $i = r$) is constructed;

3. For all coefficients of correlation, an allowable correlation coefficient is set Ω^D;

4. The pair of coefficients for which $\left\{ \rho_{ir} \right\}_{ir=\overline{1,n}} \geq \Omega^D$;

5. For the correlation coefficients from item 4, there are those for which $\left\{ \rho_{i,r} \right\}_{i,r=\overline{1,n}} =$

$= \max_{\rho_{ir} > \Omega^D} \left\{ \rho_{ir} \right\}_{i,r=\overline{1,n}}$;

6. For each pair of coefficients of item 5, calculate $\sum_{i=1}^{n} \left| \rho_{ir} \right|$ and $\sum_{r=1}^{n} \left| \rho_{ir} \right|$;

7. Finding $\Theta_{i',r'} = \max_{\left| \rho_{ir} \right|} \left(\sum_{i=1}^{n} \left| \rho_{ir} \right|, \sum_{r=1}^{n} \left| \rho_{ir} \right| \right)$;

8. The coordinate indicator (i', r') is excluded from the system.

When conducting an express and detailed economic analysis of the financial condition of the enterprise, the use of the method of permissible multicollinearity allowed several times to reduce the number of iterative calculations and thus obtain acceptable results, and the difference in quantitative calculations in the analysis of other methods is no more than permissible error and has only the theoretical value and does not affect on the quality of the analysis.

On the other hand, for qualitative characteristics, it is sometimes necessary to consider interdependent quantities. For example, when conducting a comprehensive and comprehensive analysis of the financial state of the company such indicators as the turnover rate of working capital (share of proceeds in working capital – $K_{об.об.к}$), the period of turnover of working capital (the average period from investment of production to receipt of funds for sold products) and the coefficient

of consolidation of working capital ($K_{закр.об.к.} = 1/K_{об.об.к}$) are interrelated in time space (the correlation coefficient is $-|r| \geq 0,95$), but the absence of at least one of these indicators can significantly reduce the efficiency analysis of the operating (working capital) in particular, and the financial condition of the enterprise as a whole.

That is why the requirements of the necessary adequacy of the original data are indisputable, are creative and do not have an unambiguous solution.

Although all the calculations given in the work approved and confirmed by the practical implementation of them, of course, in no case should be absolutised, they were developed in order to systematize the content of analytical procedures in addition to the assessment of the financial condition of the enterprise.

Conclusions. Along with the problem of developing a system of indicators for the purpose of analyzing the financial condition of the enterprise, there are problems not only with the definition of representative integrated rating assessments, which are the quintessence of financial and economic activity and increase to a certain extent the ability to conquer and retain competitive advantages, but also what remains out of focus. the question of studying the possibilities of obtaining a loan is not in terms of the bank, but from the point of view of the enterprise.

This requires, first of all, the optimization of the system of indicators, the improvement of the methodology, methodology and algorithmic evaluation of the financial monitoring for the investment creditworthiness of the enterprise, which significantly differs from the usual creditworthiness by the need to forecast the future state of the enterprise, that is, taking into account the dynamics of the development of its financial situation in the future in the realization of investment projects, relying, at the same time, on the analysis of financial activity in the past years, but this is a topic of further scientific research.

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