INDICATOR SYSTEM FOR MEASUREMENT OF FINANCIAL AND ECONOMIC ACTIVITIES IN PUBLIC INSTITUTIONS

Valeriy DUDNYK[1], Ludmila LOZOVSKA[2],
National Metallurgical Academy of Ukraine, Ukraine

Abstract. The object of the work is study of methods for analyzing the current financial and economic performance of a company as well as the usage of existing methods for the assessment of the company in the current and future periods. Analysis of financial and economic performance provides not only assessment of the current situation of a company, but a projection of its future behavior. Thus, the results can be used for planning and prediction. Different ways of handling of economic information are currently used in activity analysis to study the factors influencing the performance of a company and to account its reserves. An objective assessment of the financial and economic situation of the modern enterprise is the crucial part of justified decision-making. It forms the basis for determining the development strategy and acts as one of the key indicators for investors and creditors. Tracking and evaluating the effectiveness of a company requires above all comprehensive assessment of its financial and economic activities, monitoring the implementation of decisions, and identification of reserves for improvement. The process of activity analysis requires generalization of models which allow using their results both as a guide for future development of the economic system as well as a base for comparison and evaluation of the present state of the company. This enables justified decision making in particular situations and clarifies usage of existing methods for assessment of the company in the current and future periods. **Results.** Financial and economic activities of a company require comprehensive analysis, which may be carried out in the following steps: formulating and analyzing business objectives of the company, forming the information basis, constructing a comparison table, analyzing the data, producing a comprehensive rating score of the financial and economic situation of the company. Comprehensive rating score should take into account all important parameters of financial, economic, and industrial activity in the company. It should be constructed using the data on the production potential of the company, its profitability and business activity, financial independence and financial status, etc. The rating score can be determined using additive convolution. **Practical value.** Thus, a comprehensive analysis of financial and economic performance of a company through dynamic analysis using reference matrices allows: to get a justified assessment of the financial position and financial results of the company; to identify the causes of changes in financial position and financial results; to calculate a comprehensive rating that takes into account the most important parameters of financial, economic, and production activity of the company; to provide well-reasoned managerial decisions in finance in order to improve the financial condition and financial results of the company and to increase the efficiency of its economic activity. Achieved results enable conducting a comprehensive analysis of the financial and economic state of public institutions.

Key words: financial position, financial results, efficiency, forming the information basis, dynamic analysis.

JEL Classification: G13, G23, H21, D81

1. Introduduction

Controlling is a well-known part of the concept of system management. It is usually em-ployed in those organizations where management is in crisis or economic activity does not meet modern requirements and market demands. Reasons for development and implementation of con-trolling in organizations include worsening of economic indicators, appearance of new goals, lack of coordination in existing goals, outdated methods of planning and analysis, existing methods of accounting and analysis being inadequate for activity tracking and decision-making, duplicate or lacking functionality or conflicts arising from its usage. Such conditions demand introduction of a controlling system in different areas: organization, products, procurement, personnel, equipment, information systems and reporting. (Blank, 2001).

Corresponding author
[1] Department of Economic Informatics, National Metallurgical Academy of Ukraine.
E-mail: Vv.dudnyk@gmail.com
[2] Department of Economic Informatics, National Metallurgical Academy of Ukraine.
E-mail: l.lozovskaya@gmail.com

Controlling is meant to solve the task of merging diverse management information of an organization into a single stream. Controlling instruments can be classified by two criteria: their scope and period. One of the most effective methods of controlling implementation is gradual changing of information and control flows of the organization.

Currently, many enterprises have an urgent need for integrated methodical and instrumental support of major management functions: planning, monitoring, accounting and analysis, comprehensive coordination of business process management aspects. This need results is a growing interest on behalf of many organizations to software support for planning and accounting. However, even the introduction of the most modern and expensive software products cannot and will not con-tribute to the construction of a clear, unbiased model of a company without usage of modern analysis and prediction methods, especially when management personnel is incapable of at least medium-termed planning. It should also be noted that managers and analysts use different sets of tools. This fact can cause difficulties in coordination and lack of information provided to the company administration. Controlling solves this very of task of management information integration within an organization.

It should be noted that it is necessary to think carefully and weigh the need for the introduction of any tool. For example, companies that have monopoly in the market do not really need tools for detailed analysis of their competitors' activity. In such cases, the budgeting system is the most appropriate method of planning. However, there are companies where the creativity of the staff is the primary source of income. Usage of a budgeting system in such companies often gives negative effect by reducing motivation.

Implementation of controlling requires careful assessment of the tools to be implemented as well as the correspondence of the implementation complexity, the need for acquired information, and the resulting model of the company to its actual situation. Step-by-step implementation will result in optimal usage of available human and financial resources.

Financial and economic analysis is one of the most important functions of the controlling system. It allows development of strategy and tactics of the company, control over their execution, objective assessment of the company effectiveness and identification of reserves for its improvement. Certain models are the most appropriate for studying of company activities. Such models should enable usage of the acquired results as a guide to the future development of the economic system, as a base for comparison and evaluation of the current state, and as a justification of management decisions in particular situations.

Analysis of financial and economic performance provides not only assessment of the current situation of a company, but a projection of its future behavior. Thus, the results can be used for planning and prediction.

Our goal is to study methods for analyzing the current financial and economic performance of a company as well as the usage of existing methods for the assessment of the company in the cur-rent and future periods.

2. Analysis of recent research and publications

Different ways of handling of economic information are currently used in activity analysis to study the factors influencing the performance of a company and to account its reserves. Decision to use the either way depends on the goals and objectives of the analysis, available computational capacity, and many other factors.

An objective assessment of the financial and economic situation of the modern enterprise is the crucial part of justified decision-making. It forms the basis for determining the development strategy and acts as one of the key indicators for investors and creditors.

Rapid changes in economic relations between the various entities require appropriate supply of information about financial and economic condition of market economy. Financial reporting is the main source of information for formalized evaluation and analysis of financial and economic performance.

Domestic literature on economics often notes that "providing the investor with objective in-formation is a prerequisite for attracting investment through the securities market, the investor should obtain effective indicators of solvency and financial stability, calculated in accordance to financial statements" (Zaharchuk, 2009).

Analysis of the recent research and publications indicates existence of issues in completeness and quality of information sources on the subject of objective assessment of financial and economic state of the modern companies. For example, G. Kucherenko concluded that "existing principles of balance do not correspond to the economic concept of controlled resources, and therefore do not provide useful information to external users on the financial condition of the entity" (Kucherenko, 2009).

Prominent Russian scientist Ya. Sokolov emphasizes that "new methodologies have with-drawn concepts such as "abstract assets" and "persistent liabilities", the lack of which, of course, distorts the analysis of the financial condition of the company".

Reliability of traditional methods of assessment of financial and economic activity when applied to different economies is also a subject to discussion. Ya. Sheverya notes that "differences in information sources compilation (financial reports based on different standards) require adaptations and changes in methods and techniques to implement proper financial analysis" (Sheverya, 2007).

In today's economy, performance analysis of financial and economic performance is an important component of overall management information system, primarily meant to ensure stable operation of the business. In practice, the assessment of the financial and economic state enterprises, regardless of the technique used, generally comes down to calculating numeric values of financial ratios, indicators of structural changes, the pace of change.

Success of financial analysis greatly depends on the select method. In practice, the following methods of financial

analysis are used most often (Blank, 2001, Korobov, 2000): horizontal analysis, vertical analysis, trend analysis, method of financial ratios, comparative analysis, factor analysis.

According to O. Oleksyuk (Oltksyuk, 1998), financial competitiveness of a company is characterized by its financial condition. Flow of assets, labor, and material resources is accompanied by formation and expense of funds. Thus, a company cannot conduct industrial, economic and financial activity without knowledge of its own financial condition and factors affecting it, without comparing profits to expenses.

Financial condition of a company reflects all aspects of its production and business activities. Through analysis of the financial condition of a company it is possible to evaluate past, current, and future position of the company in the market environment and to take decisions which may affect future production and economic activity of the company.

M. Korobov notes that financial condition is characterized by the supply of financial re-sources necessary for normal industrial, commercial and other activities, by feasibility and efficiency of their deployment and usage in financial relations with other business entities, by solvency and financial stability of the company (Korobov, 2000).

3. Statement of problem

Tracking and evaluating the effectiveness of a company requires above all comprehensive assessment of its financial and economic activities, monitoring the implementation of decisions, and identification of reserves for improvement. The process of activity analysis requires generalization of models which allow using their results both as a guide for future development of the economic system as well as a base for comparison and evaluation of the present state of the company. This enables justified decision making in particular situations and clarifies usage of existing methods for assessment of the company in the current and future periods.

4. Principal research findings

Financial and economic activities of a company require comprehensive analysis, which may be carried out in the following steps.

Step 1. Formulation and analysis of business objectives.

Financial analysis depends primarily on the purpose and objectives of the company, including the owner of the production means (i.e, the state), personnel, management, suppliers, partners, and tax authorities. All of them are interested in effective operation of the company. For example, the owners are interested in income and financial independence of the company. The management and personnel are interested in financial results, profitability, etc.

Step 2. Formation of an information basis.

Financial statements are the basis for comprehensive economic analysis as the actual activities of a company are recorded in its integrated accounting system. Comprehensive financial analysis considers performance indicators as a whole, without using the individual ones as a single data source. Important requirements to the performance indicators system are: overall coverage of

activity aspects, relationships among the indicators, their logical coherency.

Step 3. Construction of a comparison table.

This step involves aggregation of individual balance sheets and financial reports of the company to calculate financial ratios, which are then grouped into specific clusters of indicators and collected into a pairwise comparison matrix. The matrix of pairwise comparisons is a matrix $//\Phi_{ij}//_{N \times N}$ consisting of financial and economic indicators (Utochnenie, 2009):

$$\Phi_{ij} = \begin{cases} 1, & \text{if } t(\Phi_i) > t(\Phi_j) \\ 0, & \text{if growth rates are not comparable,} \\ -1, & \text{if } t(\Phi_i) < t(\Phi_j) \end{cases} \quad (1)$$

where $t(\Phi_i)$ denotes growth rate of the i-th indicator which is the ratio of the current indicator value to its baseline (preceding) period, i.e. $t(\Phi_i) = \Phi_i(t)/\Phi_i(t-1)$;

N is the number of financial and economic indicators.

Growth rates of indicators are considered incomparable if the available knowledge for the current period does not allow to positively determine dynamics of the indicators, whether they are going to increase or decrease.

Construction of a dynamic analysis model consists of the following stages:
– develop and analyze the goal;
– select the analytical ratios;
– group financial and economic indicators;
– order the indicators of each group by their growth rates;
– build a matrix of pairwise comparisons of financial and economic indicators using financial and operational ratios.

Step 4. Data analysis.

It should be performed as follows:

4.1. Use the initial data of the company's balance sheets and financial statements to construct the matrix of pairwise comparisons of growth rates of financial and economic indicators belonging to a particular group.

4.2. Calculate generalized assessment of the financial condition of for the group of indicators which describe the distance between the approximation and the actual reference matrix. That is

$$C = \frac{\sum_{i=1}^{N} \sum_{j=1}^{N} a_{ij}}{\sum_{i=1}^{N} \sum_{j=1}^{N} |e_{ij}|}, \quad (2)$$

where C is the rating of financial and economic stability of the company;

N is the number of indicators in the reference model;

i, j are indices of the indicators;

a_{ij} is an element of a match matrix for the actual and reference growth rates (equal to one when the actual growth rate is less than the corresponding reference value, and zero otherwise);

e_{ij} is an element of the reference matrix of ratios of indicator growth rates.

Stability rating values are between zero and one. The closer stability rating is to the unit, the closer the indicators are to their reference ratios.

4.3. Conduct a factor analysis of generalized assessments of financial condition of the company. Define the main factors, rate them by degree of their influence over economic activity of the company. (Zaharchuk, 2009, Kucherenko, 2009, Korobov, 2000).

4.4. Conduct a qualitative analysis of the results in order to identify problems and ways of increasing financial and economic stability of the enterprise.

4.5. Make a short or long term prediction for the values of financial condition parameters. (Zaharchuk, 2009).

Step 5. Producing a comprehensive rating score of the financial and economic situation of the company.

A comprehensive rating score should take into account all important parameters of financial, economic, and industrial activity in the company. The data on the production potential of the company, its profitability and business activity, financial independence and financial status, etc. should be used in construction of such rating.

The rating score can be determined using additive convolution (Yakovlev, 2006):

$$R = \sum_{i=1}^{N} \lambda_i k_i \,, \quad \sum_{i=1}^{N} \lambda_i = 1, \qquad (3)$$

where λ_i is weight coefficients, $i = \overline{1,N}$;

k_i is the rating by the i-th indicator group.

The weight coefficients are obtained after the indicators are ordered by the experts:

$$k_1 \succ k_2 \succ \ldots \succ k_N \,. \qquad (4)$$

Here each of the experts offers his or her own ordering of financial and economic indicators by decreasing importance.

Preferences of individual experts are compiled into a generalized rating as in (4). After that a matrix of pairwise comparisons is constructed for groups of financial statement indicators. If one group of indicators is favored over another, the corresponding element of the matrix of pairwise comparisons x_{ij} contains unity, otherwise it contains zero.

Weight coefficients of particular groups are calculated using the following formula:

$$\lambda_i = \frac{\sum\limits_{j=1}^{n} x_{ij}}{\sum\limits_{i=1}^{n} \sum\limits_{j=1}^{n} x_{ij}} \,. \qquad (5)$$

Suppose that we have identified six groups of financial statement indicators: e.g., solvency liquidity, business activity, profitability, financial independence, the situation in the stock market, and property status (see table 1).

5. Research conclusions.

Thus, a comprehensive analysis of financial and economic performance of a company through dynamic analysis using reference matrices allows: to get a justified assessment of the financial position and financial results of the company; to identify the causes of changes in financial position and financial results; to calculate a comprehensive rating that takes into account the most important parameters of financial, economic, and production activity of the company; to provide well-reasoned managerial decisions in finance in order to improve the financial condition and financial results of the company and to increase the efficiency of its economic activity.

Table 1

The matrix of pairwise comparisons of groups of financial report indicators and the calculation of weight coefficients

#	Indicator group	1	2	3	4	5	6	Sum	Weight coefficient
1	business activity	1	1	1	1	1	1	6	0,28571429
2	profitability	0	1	1	1	1	1	5	0,23809524
3	property status	0	0	1	1	1	1	4	0,19047619
4	financial independence	0	0	0	1	1	1	3	0,14285714
5	solvency liquidity	0	0	0	0	1	1	2	0,0952381
6	position in the stock market	0	0	0	0	0	1	1	0,04761905

References

Blank, I. (2001). Osnovy finansovogo menedjmenta [Basics of financial management]: Vol. 1 – Kyiv, Nika-Center, 591 p.

Kucherenko, T. (2009). Balans v konteksti z resursnoyu koncepcieyu kapitalu [Balance in connection to the resource concept of capital]. Bulletin of Ternopil National University of Econom-ics, 1, pp. 148-159.

Korobov, M. (2000). Finansovo-ekonomachnyi analiz pidpryemstv [Financial and economic analysis of enterprises] – Kyiv, Znanya, 378 p.

Layta, Y. & Gerasimov, B. (2005). Sozdanie sistemy kontrolinga na promyshlenom predpiyatii [Implementation of a controlling system in an industrial company] – Tambov National Technical University, 96 p.

Ob upravlencheskom kontrolinge [On management controlling]. Retrieved from http://www.intalev.ua/ on 26.01.2012.

Oltksyuk, O. (1998). Systemy pidtrymky pryinyatya finansovyh rishen na mikrorivni [Fi-nancial decision support systems on a microlevel] – Kyiv, Naukova dumka, 507 p.

Sheverya, Y. (2007). Metody analizu ta pryinyatya rishen na pidstavi finansofyh zvitiv, yaki skladeni za mijnarodnymy standartamy buhgalterskogo obliku [Methods of analysis and decision making based on financial reports composed in accordance with international standards of account-ing]. Bulletin on Uzhgorod University, Spec. iss. 22(II), pp. 351-357.

Utochnenie soderjaniya kontrolinga kak funkcii upravleniya i ego podderjki [Refining the meaning of controlling as a service and support for management]. Retrieved from http://www.management. com.ua/finance/ on 23.02.2009.

Yakovlev, U. (2006). Kontroling na bazi informaciinyh tehnologii [Controlling on the basis of information technologies] – Київ, Center of educational literature, 318 p.

Yaroschuk, S. Rol koncepcii «kontrolingu» v procesi upravlinya pidpryiemstvom [Role of the concept of "controlling" in business]. Retrieved from http://www.library.tane. edu.ua/images/nauk_vydannya/VMtcdg.pdf on 13.03.2013.

Zaharchuk, N.(2010). Analiz finansovoy zvitnosti yak faktoriv pryinyatya investytciynyh rishen [Analysis of financial reports as a factor for investment decision making]. Innvatciina ekonomika. Ukrainian scientific and industrial journal, 1, pp. 196-199.

Zorina, O. (2009). Organizatciya kontrolingu v Ukraini: pytania teorii i praktyky [Theory and practice of implementation of controlling in Ukraine]. Proc. of the bulletin of the national university "Lvivska polytechnika", 647(113).

Валерий ДУДНИК, Людмила ЛОЗОВСКАЯ

ФОРМИРОВАНИЕ СИСТЕМЫ ПОКАЗАТЕЛЕЙ ОЦЕНКИ ФИНАНСОВО-ХОЗЯЙСТВЕННОЙ ДЕЯТЕЛЬНОСТИ В ГОСУДАРСТВЕННЫХ УЧРЕЖДЕНИЯХ

Аннотация. Целью работы является исследование методов анализа текущего финансово-экономического состояния предприятия, а так же использование существующих методик для оценки состояния предприятия в текущем и будущих периодах. Учитывая, что анализ финансово-экономического состояния предприятия предусматривает не только текущую оценку деятельности предприятия, но и оценку состояния предприятия будущих периодах, то полученные результаты можно использовать для прогнозирования. Для изучения факторов влияния на результаты деятельности предприятия с учетом резервов, во время анализа деятельности используются различные способы обработки экономической информации. Объективная оценка финансово-экономического состояния современного предприятия является ключевой в процессе принятия обоснованных управленческих решений. Она служит основой для определения стратегии развития предприятия, одним из ключевых показателей как для инвесторов так и кредиторов. Отслеживание и оценивание эффективности деятельности предприятия требует прежде всего проведения комплексной оценки финансово-экономической деятельности учреждения, контроля над выполнением принятых решений и выявления резервов ее повышения. Процесс исследования деятельности предприятия требует обобщения моделей, которые предоставляют возможность использования полученных результатов как в качестве ориентира будущего развития экономической системы, так и в качестве базы для сравнения и оценки достигнутого состояния, обоснования и принятия управленческих решений в конкретной ситуации, и дальнейшее уточнение использования существующих методик для оценивания состояния предприятия в текущем и будущих периодах. **Результаты.** Финансово-экономическая деятельность предприятия требует всестороннего анализа, который можно выполнять по следующим шагам: формулирование и анализ цели деятельности предприятия; формирование информационной базы; построение таблицы сравнений; анализ информационной базы; формирование комплексной рейтинговой оценки финансово-экономического состояния предприятия (системы). Комплексная рейтинговая оценка должна учитывать все важнейшие параметры финансово-экономической и производственной деятельности предприятия. В процессе ее построения следует использовать данные о производственном потенциале предприятия, его рентабельность и деловую активность, финансовую независимость, имущественное состояние и др. Рейтинговую оценку можно определить по формуле аддитивной свертки. Таким образом **практическое значение** состоит в возможности проведения комплексного анализа финансово-экономического состояния предприятия (учреждения, системы) на базе динамического анализа с использованием идеальной матрицы, что предоставляет следующие возможности: получить объективную оценку текущего финансового состояния и финансовых результатов предприятия; определить причины изменения финансового состояния и финансовых результатов предприятия (учреждения, системы); рассчитать комплексную оценку, которая учитывает важнейшие параметры финансово-экономической и производственной деятельности предприятия; подготовить обоснованные управленческие решения в области финансов с целью улучшения финансового состояния и финансовых результатов предприятия, повышения эффективности хозяйственной деятельности. **Значение** полученных результатов состоит в том, что они предоставляют возможность проводить комплексный анализ финансово-экономичного состояния государственных учреждений.

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