The definition of railway transport enterprises balanced indexes assessment

N.M. Magomedova, M.V. Khlebnikova

Rostov State Transport University

Abstract: For the economic analysis of railway enterprises assessment the special form has been worked out. The results of the economic estimation allow the economic subject supervisor to obtain analytical material for the managing decision-making. One of the main trends of economic subject activity is economic state assessment based on analysis with up-to-date management theory based on economic information technologies that allows comparing production transformation results on the temporal periods and related economic subjects. The peculiarity of this economic assessment method is that all indexes used in the analysis have the same direction vector, i. d. the higher index, the more favorable economic state of analysed economic subject.
Key words: railway transport enterprises economic subject, decision making, assessment results, estimation, data processing, multidimensional approach.

Synergistic components of economic stabilization are provided by economic subject state estimation and make necessary presentation of data in the most convenient way for the user. In order to conduct economic assessment, the special procedure has been worked out: the form for analysis of economic subject state. The economic estimation basis comprises the comparison of economic subjects with standard conditional model according to each index and taken into account the best results of the latter. The assessment options may also be temporary logs of analysed economic subject's financial – economic activity for determining increase or decrease assessed indexes. The target is search of additional funds for the rising of economic activity efficiency realized by economic subject [1-3].

Sublimated mathematical algorithm of economic condition comparative assessment may be presented in the following way: introductory information extrapolates in matrix $A = \{a_{ij}\}$, where $i = \overline{1,n}$ – index number; $j = \overline{1,m}$ – economic subject number. The additional column is introduced in the matrix (m+1), where the economic subject standard indexes are represented. The values of these selected indexes are maximized to the related subject indexes. Assessment indexes are settled in groups and to make the economic condition analysis more detailed

the inside groups' assessments are distinguished. The column "standard" is formed on the basis of best indexes value selection used in the analyses.

The matrix indexes are standardized to the corresponding standard economic subject index, represented in column (m+1):

$$x_{ji} = \frac{a_{ji}}{\max_{j} a_{ji}}.$$

Economic subject state assessment

Index	Economic subject					Model * (Y_{m+1})
	y_1	y_2	y_3	..	y_m	
1	2	3	4	5	6	7
x_1						
x_2						
x_3						
⋮						
x_m						
Economic assessment						
Subject rank						

In case if analyst introduces additional weight rates being determined by an expert way, they are also reflected in mathematical model of economic state estimation. The assessment is determined according to the following formula:

$$P_j = \left[\sum q_i x_{ij}^2 \right]^{1/2}, \quad i = \overline{1, n;} \quad j = \overline{1, m}, \quad q_i \leq 1,$$

where P_j – assessment for j- economic subject;

x_{ij} – standardized -i- index of j- economic subject

q_i – weight rate of -i- indexes, calculated by the analyst.

On the final stage of economic state analysis the obtained assessment results are generalized on the basis of assessment algorithm and deduced in the form of output document "Assessment of economic subject state". Based on represented algorithm the software "The program of economic subject state assessment" has been worked out. The program operation provides calculating of assessment indexes on solvency, turnover, profitability, potential efficiency rising, as well as the total assessment of the whole enterprise.

Any economic subject activity must be initiated with the basic goals solving: determination of economic subject values and optimal assets able to achieve aimed targets; defining of financial sources and their optimal components; organization of current and prospective financial activity management which in turn may provide solvency and economic stability of economic subject [4]. The solving of these tasks includes decision making process connected with problems emergence that can be formulated in the following way: economic subject operation at definite moment and in future will not provide the targets achievement.

Indeed, the task solving is directed to the definition of the optimal activity way for the improvement financial and economic state of economic subject. The results of these analyses based on this method allow the economic subject supervisor to obtain useful analytical material for management decision making.

In the process of estimation results analysis the supervisor can use various methods of economic management, such as forecasting, planning, insurance, crediting, self-financing, financial support system, financial sanctions system, etc. [5-7].

The informational provision basis of economic decision making person is any available information, particularly, accounting, financial authorities data, information from crediting organizations and other things [8].

Indeed, the variety of economic management information provision methods is determined by the assessment results. The supervisor shall raise economic problem, make the choice practicability analysis of chosen way and make final decision concerning the most applicable choice activity variant.

In general economic decision making person activity may be structured in the following way: total economic analysis and planning; resources provision of economic subject, resources distribution.

Decision making process with the use of dedicated directions is realized by means of alternative decisions analysis and the most optimal beneficial way being chosen.

The criteria of economic subject successful management from the economic point of view is the achievement of the following targets: survival of economic subject in arisen economic conditions, avoidance of bankruptcy and large-scaled economic failures, progress in economic positions compared with related economic subjects, production and realization volume increase, profitable activity provision and so on [9, 10].

Computer data processing of economic subject state management allows to gain impartial information about activity results of economic subject; to develop more advanced technology of collection, to handle and store information about economic subject state and providing it the users with the most convenient way; to reduce time necessary for an assessment; to raise reliability, efficiency, objectivity of assessment results; to reduce documents turn-round; to exclude duplicate functioning.

Thus, mathematical and software provision totally realizes goals and targets being set before analysis of economic state on the basis of proposed assessment. Institutional and organizational mechanism of economic processes optimal functioning referred to the developed economic subject assessment system has been realized on the basis of the actual indexes.

The demand on the conceptual development in terms of positive financial economic activity provides the total solvency raise trend of economic subject. So, the rating solvency assessment has been raised to 0, 1192 items and reached 1,770038. In this term the raise occurred due to the whole rating assessment raise tendency typical for both groups – solvency components, financial and liquid stability. Thus, rating assessment of liquidity was the following: in the first period it was 0,83; in the second it was 0,86; in the third – 0,96. The favorable dynamics was thanks to the total liquid value indexes increase on 0,2 items. But in spite of this raise the index value is far from optimal.

According to our calculations for this value achievement considerable investments into economic subject current assets are necessary. While defining more strict outlines of investments into current assets it's worth to analyze urgent and absolute liquidity, particularly, the urgent liquidity indexes reduction reasons.

Thus, one of the main trends of economic subject activity is economic state assessment on the basis of analysis with up-to-date management theory based on economic information technologies that allows to compare production transformation results on the temporal periods and related economic subjects.

The peculiarity of this economic assessment method is that all indexes used in the analysis have the same direction vector, i. d. the higher index, the more favorable economic state of analysed economic subject.

The main advantages of the method considered are the following:
- The principal of complex and multidimensional approaches to the economic subject state analysis is the methodic base of proposed method;
- The method of economic state comparison is based on the statistics and accounting of economic subject;
- The assessment is based on the comparison principal, i. d. practicable data concerning competitors are taken into account, moreover, the data of analysed economic subject itself may be considered in dynamics;

- The assessment process establishes the information base for reserves search and management decision making aimed to increase economic efficiency;

- The flexibility of calculation algorithm, realizing the possibilities of comparison assessment economic subject model;

The analysis with economic assessment application reflects the deviation of productive economic activity indexes that allows to exclude negative trends from financial economic activity on forecasting method. The economic analysis results provide assessment of production and financial activity trends in the context market environment, mobilizes resources for business planning.

Thus, complex economic analysis on the basis of indexes proposed system allows economic subjects the following: to characterize economic in detail; to forecast economic strategy in conditions of market transformation.

References

1. Ilyin I.P. Economy of Railways. M.: 2016. №11. pp. 47-55.

2. Postnikov V.P., Butorina O.V. Vestnik Rostovskogo Gosudarstvennogo Universiteta Putej Soobchhenija [Vestnik RGUPS]. Rostov-on-Don, 2014. №1 (53). pp. 95-100.

3. Pittman R. Journal of Transport Economics and Policy. №. 38 (2). 2004. pp. 309-332.

4. Bulatov A.E., Borodin A.I. Inženernyj vestnik Dona (Rus), 2015, №2 URL: ivdon.ru/magazine/archive/n2p2y/2015/2989/.

5. Ciuffo V., Punzo V., Casas J., Perarnau J., Montanino M. Traffic Engineering and Control. №. 55 (1). 2014. pp. 9-17.

6. Fadeev G.M. Rail International: International Railway Congress Association. №. 35 (1). 2004. pp. 2-11.

7. Ermakova P.A. Inženernyj vestnik Dona (Rus), 2016, №2 URL: ivdon.ru/magazine/archive/n2y2016/3577/.

8. Makarov I.A., Sokolova A.K., Stepanov I.A. International Journal of Transport Economics. №. 42 (4). 2015. pp. 431-460.

9. Davis-Sramek B., Germain R., Krotov K. International Journal of Physical Distribution and Logistics Management. №. 46 (2). 2016. pp. 128-152.

10.   Macheret D.A. Railway Gazette International. №. 168(10). 2012. pp. 30-33.