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The improvement of enterprise charges management system in terms of structural transformation on railway transport

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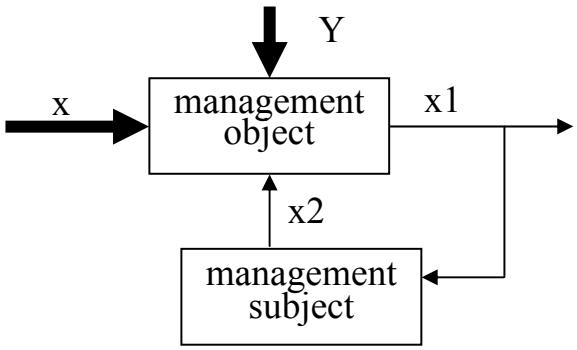
Abstract: The article is dedicated to new approaches of railway enterprises management during the transformation period. The estimation of enterprise charges is described and the models of reducing drawbacks are offered. Any economic subject possesses its own technological complex, infrastructure referring to provision of the main goals. For in our case we have railway transport as an economic subject, most attention is paid to its main activity comprising constant transportation process. The railway transport has the leading position in the united transport system, possessing the main share of income – about 75 % of freight transportation. The development of transport infrastructure as a whole is guided to provision of international economic integration and social stability. On a stage of free competition and Russian economy development the quality of provided services is a determining factor of transport enterprise successful operation.

Keywords: economic subject, operational charges, structural transformation, enterprise management, estimation, forecasting, improvement, input indexes, output indexes.

The up-to-date stage of theory and practice of operational charges management on railway enterprises can be characterized as being transferring, when traditional approaches require correlative methods in terms of reforms and structural transformation [1-3]. The traditional theory of management and either economic or technical systems is based on the principle of feedback.

Fig.1. Traditional management scheme.



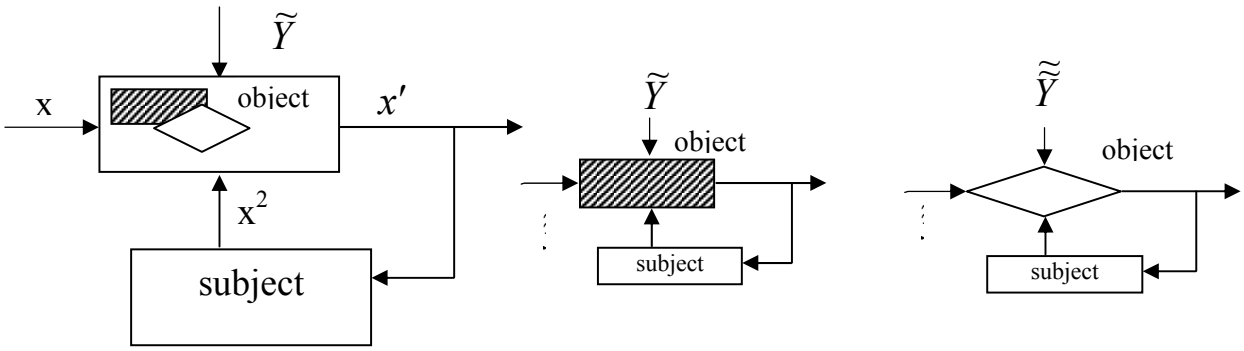
Management is based on internal indexes of X system and external effects on Y system during one time period, where the subject (the person) makes

decisions basing on output information of x^1 and x^2, and taking into account external factors.

As you see from traditional scheme on Fig 2., the management solution is based on analysis of system response on internal and external effects. As a rule, a manager of a definite level possessing some knowledge about possible actions of the system depending on external or internal factors is considered to be a subject management.

Inertial character of economic systems (enterprises) in terms of stabilized economy allows apply trend models, as well as correlative – regressive analysis for forecasting their actions.

Unfortunately, in crisis or structural transformations of management object, such as merging or separation, retrospective information base and base of knowledge lose its relevance for traditional management and forecasting methods. Briefly, such situation is shown on Fig. 2, where the object was separated on two structures.



a) before restructuring b) after restructuring

Fig.2. Deformation of management system during structural transformations.

Its naturally to consider that $x = \tilde{x} \cup \tilde{\tilde{x}}$, $Y = \tilde{Y} \cup \tilde{\tilde{Y}}$, $x^1 = \tilde{x}^1 \cup \tilde{\tilde{x}}^1$, $x^2 = \tilde{x}^2 \cup \tilde{\tilde{x}}^2$. Even if these numerous divisions are currently defined, the matter of transformation, e.g. changing of manager's knowledge is still open.

Let us consider the version of railway enterprise management in terms of structural transformation. Consider the initial management object (enterprise) Ω being divided on two objects (enterprises) Ω_1 and Ω_2, $\Omega = \Omega_1 \bigcup \Omega_2$ and $\Omega_1 \bigcap \Omega_2 = \text{Ø}$, e.g. the division of enterprises derives without merging or dropping – out separate fields of business. To be more simple we believe there is no synergetic effect from merging Ω_1 and Ω_2, and the result of activity Ω is a sum of activity results Ω_1 и Ω_2.

Thus, scores of input options x are also divided on two sub–scores $x = x_1 \bigcup x_2$, the intersection x_1 and x_2 being not empty $x_1 \bigcap x_2 \neq \text{Ø}$. In this case, retrospective base for a new enterprise management would be Ω_1 is x_1, and the second enterprise is x_2. It's natural to suppose that further dynamics of the first enterprise development is dependable on retrospective base of index x_1, the management system being described as a pair of functional

$$x^1 = F(X, Y), \quad (1)$$

$$x^2 = U(X, X^1, Y), \quad (2)$$

where $F(\cdot)$ is a functional determining the enterprise operation results under effects of input and output factors X и Y,

$U(\cdot)$ is a functional determining leading effect on results of enterprise output data analysis.

Taking into account functional (1) and (2), shifts in enterprise management system in conditions of structural transformation will be implemented according separation X and Y on sub–scores. Considering multivariable character of input (1)

and (2) X, X^1, Y, the division of these scores (or vectors) on sub–scores will occur on the following principles.

We believe $X = (x_1, x_2, ..., x_n)$ being a vector characterizing the absolute dimension of indexes $A = (a_1, a_2, ..., a_n)$; the enterprise system is being $-\Omega$. The division of enterprise system on two structures allows us to talk about new sub - scores A_1 и A_2, $A_1 \subseteq A$, $A_2 \subseteq A$, each of the indexes a_i being:

1) $a_i \in A_1$; $a_i \notin A_2$,

2) $a_i \in A_2$; $a_i \notin A_1$,

3) $a_i \in A_1$; $a_i \in A_2$.

In cases 1) and 2) we have a so called “pure distinguishing” of index into one of the structures while in the last case an index record for management retains either in the first or in the second enterprises. Generally, it is considered as

$$x_i^1 = \alpha_i^1 x_i; \quad x_i^2 = \alpha_i^2 x_i;$$

$$\alpha_i^1 + \alpha_i^2 = 1$$

where x_i^1 is an absolute share of index x_i, concerning the structure Ω_1,

x_i^2 is an absolute share of index x_i, concerning the structure Ω_2.

The forecasting and operational management charges concept offered in the previous section has been based on correlative – regressive analysis. Not to be ungrounded we consider the functional (1) and (2) in this case to have additional functions, e.g.

$$F(X,Y) = \sum_{i=1}^{n} f_i \left(x_i, Y\right)$$

Then dependence

$$x_k^1 = \sum_{i=1}^{n} \alpha_i x_i$$

of output system index Ω is divided on two dependences

$$x_k^{11} = \sum_{i=1}^{n} \alpha_i \alpha_i^1 x_i = \sum_{i=1}^{n} \alpha_i x_i^1,$$

$$x_k^{12} = \sum_{i=1}^{n} \alpha_i \alpha_i^2 x_i = \sum_{i=1}^{n} \alpha_i x_i^2.$$

Thus, regressive dependences demonstrated in the previous section may be transformed for railway enterprise operational charges management in terms of structural changes or divisions. As an economic subject any enterprise of railway transport can be viewed. For forecasting any structural transformation it's necessary to make the analysis of the whole activity. Nowadays railway transport is a multi – level structure having numerous subdivisions. Each subdivision has its own statistics and data which shall have accounting. The great attention must be paid to quantity and quality indexes as well as operational charges. Operational charges in turn shall be determined according to their elements, such as: salary fond, average monthly salary, insurance contributions, depressive deductions, power supply, materials, fuel and other expenses [4]. The contingent of every economic subject including also average quantity should be considered separately [5]. In order to give a full evaluation of economic subject activity it is necessary to conduct a research aiming to distinguish the best and the worst sides. Not less than four year statistics shall be included into enterprise activity evaluation. It will allow improve the activity in all directions – to implement new technologies depending on operation particularities and economic subject condition [6]. Any economic subject possesses its own technological complex, infrastructure referring to provision of the main goals. For in our case we have a railway transport as an economic subject, most attention must be paid to its main activity comprising constant transportation process. The railway transport has the leading position in the united transport system, possessing the main share of income – about 75 % of freight transportation. The rest part is for passenger transportation – about 25 %.

Railway transport also cooperates with other modes such as air, road, water (maritime or inland) and pipeline. Each transportation mode can be determined as a separate structure having its own technological complex, its operational technologies basing on transportation process [7]. On railway transport it is possible to distinguish large, middle and small structures of economic subjects; every structure has its own goals and targets aiming to reach definite results. The result is affected by many factors depending on technology and complexity degree of set objectives, the major target being a profit. The small structures can make profit from peripheral additional activity, middle from improving and increasing qualities of provided services while large structures by means of activity varieties. The degree of charges on each enterprise is different but the structure is unified. Viewing the statistics for a one year period it's obligatory to point out proceeding changes. For this purpose, the diagrams capable easy and quickly to show favorable periods can be designed. Railway transport plays an important part in economic development of the country, for carrying freight and passengers in accordance with production requirements it provides smooth operation of all its branches, regions and enterprises. The position of transport in economic system depends not only on its production power, but also on level of management, operational organization and quality transport services.

In market conditions requirements to transport enterprise management effectiveness are constantly growing. Transport enterprise management demands structural, organizational and economic transformations thus setting changes and development directions. Together with the change of market environment in modern conditions new management instruments are required [8]. Management itself is a complex social phenomenon, being a function of any organizational system; it refers to saving of economic balance. It may be considered as a function, instrument, and process of management decision. Nowadays management is a sustained impact process on staff aiming to improve organization quality and

activity coordination and in order to achieve the best results with less outlay. In conditions of constant social and economic reforms the role and significance of management is increasing [9]. Effective management means organization stability and dynamic development. Any economic subject is a complex organizational and technological complex, having specific technological process with definite human resource. Every structural unit has its own indexes according to which the activity of the whole organization is evaluated. The peculiar feature of management theory on modern stage is a social responsibility of management at enterprise human resources. The main goal of creation the evaluation is economic system analysis enhancement. The operational charges analysis provides forecasting of economic state, obtaining quick evaluation of economic environmental changes. The system of operational charges evaluation shall be based on the following principles of target management: monthly, quarterly and annual data analysis, analyzing the definite indexes with the purpose to avoid deviations forecasting and real data, and making management decisions on evaluation results. The estimation of operational charges promotes reduction and decline of transport expenses. It also must contribute the increase of transportation volume, quality satisfaction of national economy demands in passenger and freight transportation, development of railway branch competition, providing the full charges accounting. The last shall be fulfilled in total and in separate subjects, as well as according to separate activities and charges elements. Applying such method allows to take into account the impact of transportation volume changes, degree of transport modes carrying capacity, demand in rolling stock, contingent of separate economic units; to distinguish charges in infrastructure. The diagnostic of operational charges condition allows reveal the most important trends, requiring prompt solutions of the problem, situations forecasting and preparing recommendations. The economic subject state estimation will allow provide supervisors with informative – analytical data about situation in operational charges sphere. The theoretical base

of operational charges evaluation system development represents a system of continuous tracing operational charges transformation of economic subject in time and production options, having a target of production resources savings. While developing evaluation and management a definite controllability is required, capability for adjusting to the style of a definite supervisor without any changes in program and technical support systems. The operational financial accounting doesn't meet the requirements concerning charges. It is not full, it has different forms and kinds of accounting, and it is not united in the system of informative management expenses provision. In this connection it demands improvement and systematization. Generally, the data concerning cost price of definite works are used mainly not for charges analysis, but only for operational charges control implementation [8]. For dissolution these drawbacks it is necessary to develop charges management models. On initial stage there must be models of charges management on linear production structures as an economic subject. Developing models for operational charges management improvement, it's necessary to take into account demands allowing each enterprise to define the specific charges dimension on operational technical unit. Information flow shall be connected with methods of enterprise charges planning. The development of models, improvement of analysis method, introduction of information system, automation all elements of economic operation connected with operational charges, creates conditions for new progressive forms implementation in economic activity management. In conditions of branch restructuring operational charges shall be analyzed on common united principles, methods and targets. Calculation of operational charges in all structural divisions is based on unified information base. The technology of collecting data and economic information transfer has some disadvantages: lack of data processing thorough technologies; lack of unified network that could provide reliable information delivery; processing of most information is repeated by different economic subjects; lack of approved unified regulatory documents, determining

correlation between economic branches. The targets concerning improvements of formation process and operational charges data application can be solved by means of economic information technologies development.

We can conclude that regular estimation of operational charges processes gives the opportunity to realize analysis and forecasting of economic processes, to get an assessment of charges on different levels of management, to improve methods of most important proportions forecasting, to reveal operational charges reserves. In terms of crisis economy and complicated interaction of price system, profit and loses, demand and supply, the role of economic management methods is being enhanced – and that is especially important in strategic management. They're becoming the most important condition of economic mechanism restructuring, developing effective and flexible system of economy management. In this case management represents an integral process of planning, organization, motivation and control, being necessary for economic subject targets achievement. The most significant problems of present day management are development, making management decisions, their further practice which is a basic instrument of managing influence. The effectiveness of supervising and production is strictly depended on right managing solutions. The managing solution is an alternative of a supervisor in frames of his authority forwarded to organization goals achievements. The effectiveness of any enterprise activity depends first of all on managing solution. The quality of these solutions in its turn is a degree of chosen alternative corresponding options, definite characteristics scheme, which satisfies its developers and consumers, and is gained to effective realization provision. The quality of decisions made is dependable on production process indexes. In the economic subject activity there are three currents necessary to be distinguished: material, informative and financial. Each of economic currents reflects the subject state and its prospects. In conditions of any structural changes there must be systematic approach. On every level of economic subject activity it's necessary to

apply new methods and technologies allowing reach more effective results. Each structure shall have its own data base, which would allow to make a necessary index forecast quickly and truthfully. The leaders of structural divisions shall ensure well – timed fulfillment of tasks set.

The up–to–date level of service quality in many fields of economy and transport doesn't satisfy standards and for its improvement it's obligatory to conduct continuous researches aiming to reveal criteria for obtaining expected results. For enhancement of enterprise charges management system, it's expedient to implement new methods of organization and management referred to quality and results improvement.

The development of transport infrastructure as a whole is guided to provision of international economic integration and social stability. On a stage of free competition and Russian economy development the quality of provided services is a determining factor of transport enterprise successful operation [10]. Step–by–step improvements in various spheres of production and national economy would not follow the real achievements, unless the transport infrastructure is modernized. In present day conditions for reaching final results it's necessary to apply mainly economic–analytical currents, which would promote organization and management enhancement.

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