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WAYS OF FLOW TRAFFIC CONTROLLING ON RAILWAY TRANSPORT

Abstract

There is an investigation of the flow traffic controlling processes concept and its organization on railway transport; and the concept of choice model for quantization interval of work indicators of productive and economic systems, and also approach to the efficiency assessment of controlling implementation.

INTRODUCTION

The railway transport belongs to the most important backbone branches of economy. Its role is defined by the special characteristics, allowing carrying out the state tasks in the field of social policy, ensuring national security, maintenance at demanded level of rates of economic development. In modern globalization conditions of formation of the competitive environment with a high speed there are technical, organizational, financial, environmental problems. Respectively formation of essentially new mechanisms directed on realization of strategy of increase of competitiveness of railway transport and, as a result of it, on development logistically the focused management is required. It, in turn, demands formation of adequate models, methods and tools by means of which it is possible to operate stream processes in system of railway transport according to changes of parameters of the external and internal environment. One of such tools is controlling. The analysis of experience of the post-industrial countries indicates efficiency of the controlling which main value consists in management improvement of quality on the basis of the accounting of branch specifics of business processes in the companies (See tab. 1).

1. CONCEPTS OF CONTROLLING

From the provided table follows that substantial definition of controlling functions and its construction depend on to what concept the author of definition adheres [3].

Tab. 1. Main concepts of controlling

Concepts of controlling	Main functions of controlling	Authors
The concepts focused on accounting	Creation of information system of support of the administrative decisions on the basis of the internal production accounting connected with planning and control of activity of the enterprise.	D. Schneider
The concepts focused on information	Information support of the management focused on result the organization	T. Reichmann D.Khan I.L.Kolenskiy M.L.Lukashevitch N.N. Pushchenko V.A.Starykh
The concepts focused on coordination with emphasis on planning and control	Coordination of planning subsystems, control and information support for tasks coordination by adaptation of information communications between subsystems.	P.Kchorvat N.I. Olenev A.G. Primak S.G.Falko
The concepts focused on coordination with emphasis on administrative system	Coordination of all administrative system to achieve the enterprise objectives.	K.Y.Kuepper Y. Weber A. Zuend E.A.Anankina S.V.Danilotchkin

However the main concept is administrative as it includes others (Fig.1.).

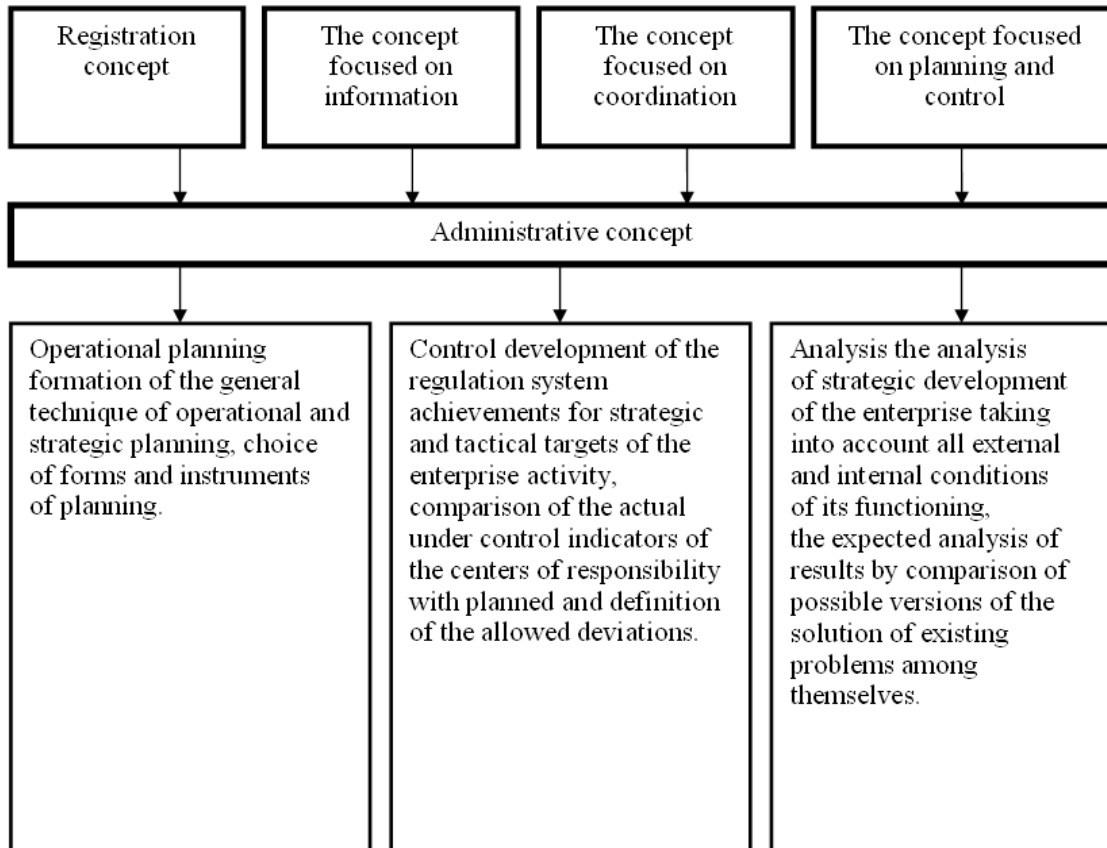


Fig.1. Interrelation of controlling concepts

2. MANAGEMENT SYSTEM CONCEPT

Focused on planning and control the administrative concept is aimed at tasks of coordination of planning, control and information support (Fig.2.).

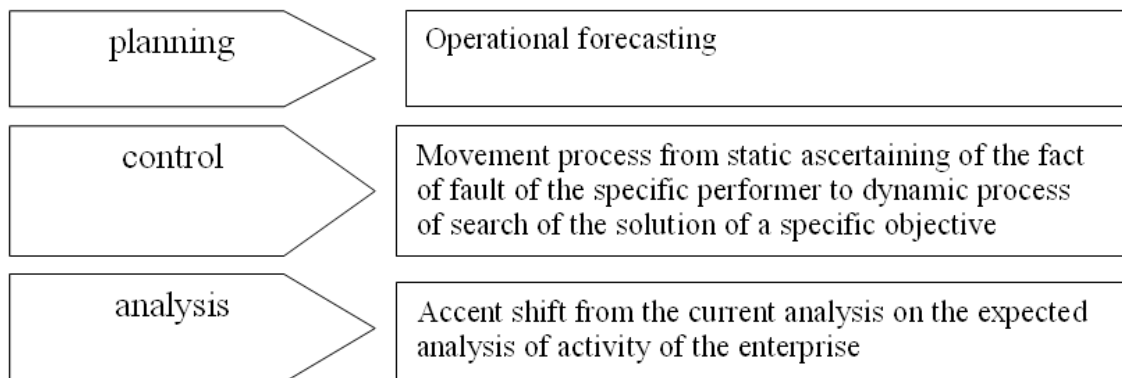


Fig.2. New sense of management elements in the administrative concept of controlling

Implementation of the management system concept by the organization has to provide successful functioning of economic system in long-term prospect, keep or increase financial and economic stability in the short-term period.

The most important purpose of controlling is giving the management complex and reliable information which is necessary for enterprise development management.

The system of controlling integrates technology, the account, planning, marketing into uniform adaptation system in which the purposes and the principles of management according to dynamics of the environment are realized. The system of controlling allows managers to obtain necessary data for adoption of rational administrative decisions. Owing to this fact controlling acts as the most important subsystem of ensuring competitiveness of the enterprise, ensuring financial and economic stability of business, allows to reveal and realize available reserves, quickly and effectively to introduce innovative solutions. However stated above sets a task about formation of necessary and sufficient information on characteristics of streams and a problem of a regularity of their receiving. The latter, in particular, is connected with a choice of an interval of time through which expediently to receive information, that is with an assessment of a step of quantization of information on streams.

3. CALCULATIONS

The increase in a time interval between controlled values of indicators reduces the accuracy of the made decision and, therefore, possible profit of the enterprise since for this period there can be an adverse combination of the external and internal environment.

To choose a step of quantization approach which is based on admissible ε - errors in adoption of the administrative decision, defined by a step of quantization and ε_{\max} – the most admissible error determined by regulations of earlier operating control system is used. It is allocated P_0 – the profit which isn't depending on a step of quantization, defined by strategy of development of the enterprise, ΔP - the profit connected with a step of quantization $\Delta\tau$, it exponential depends on a quantization step [1].

Arising losses are proportional an exhibitor. The coefficient of proportionality (a) has to be defined, proceeding from concrete parameters and statistical data on enterprise work.

Profit change ΔP both costs of collecting and information processing, and also material and labor inputs of maintenance of system of data processing define economic effect of system of collecting and information processing.

Labor input function (ΔM) collecting and information processing defines change of fund of compensation. It is presented as linear dependence on a quantization step, where:

$M = b_1 / (\Delta\tau + b_2) + b_0$ where b_0, b_1, b_2 – coefficients are defined proceeding from concrete parameters $\Delta \Phi OT$ and statistics of the enterprise [2].

Increase in salary fund is proportional to increase in labor input of work and hourly average tariff rate ($\times \overline{ON}$).

Costs of materials, energy are accepted proportionally to labor input and compensation change.

Realization of quantization system (ΔK) leads to change of depreciation charges ($\Delta 3am$) and standard assignments ($E_n \Delta K$) ΔK – the cost of system of quantization it is accepted inversely proportional to a quantization step.

Function of losses not linearly increasing from a quantization step was created. On the basis of minimization loss function was received.

$$\Psi TC * (b_1 / (\Delta\tau + b_2))^2 * (1 + \alpha_M, e + \alpha_{osp}) - a * a_1 * e^{(a_0 + a_1 * \Delta\tau - \varepsilon_{max})} + (P_{am} + E_H) * K_1 / \Delta\tau^2 + K_0 = 0 \quad (1)$$

where:

α_M, e – coefficient of proportionality material and energy consumption between material power-intensive inputs and labor input (ΔM);

α_{osp} – the coefficient determined by obligatory social payments to $\Delta \Phi OT$.

Derivative function is used for determination of optimum value of a step quantization interval ($\Delta\tau$) indicators of analyzed streams (according to system of restrictions and criteria).

It is important to note that introduction of controlling increases quality of management of stream processes and financial and economic stability of PES. For the integrated assessment of increase of financial and economic stability of PES it is offered to use Altman's $1,2K_1 + 1,4K_2 + 3,3K_3 + 0,6K_4 + 0,999K_5$ five-factorial model, where: K_1 – the relation of current and total assets; K_2 – the relation of net profit to the size of all assets; K_3 – the profit relation to the taxation to the size of all assets; K_4 – the relation of own and loan capitals; K_5 – the relation of pure sales volume to the size of all assets.

Altman's model is used usually for quality standard of probability of bankruptcy (if $Z < 1,8$ – the probability of bankruptcy is very great; $1,8 < Z < 2,7$ probability of bankruptcy average; $2,7 < Z < 3$ probability of bankruptcy is insignificant $Z > 3$ – the probability of bankruptcy is insignificant).

Introduction of controlling leads to Z-indicator shift in this or that party within borders defining probability of bankruptcy.

CONCLUSION

The difference between values of a Z-indicator before introduction of controlling can be used as the integrated assessment of change of a stock of financial and economic stability of PES. Change of a stock of financial and economic stability is influenced by parameters of system of controlling, including, the size of a step of quantization of financial and economic indicators. The coefficients entering into model of Altman, are functions of the indicators used at calculation of an optimum step of quantization. Therefore Altman's indicator functionally in a multiplicative form is connected with a quantization step: $Z = f(\Delta \tau)$. In this regard at a choice $\Delta \tau$ set restriction on an admissible minimum of a gain of financial and economic stability of PES can be accepted as one of conditions of definition of a step of quantization of indicators of material, financial, information streams. Thus, the step of quantization defines an error of reproduction of temporary function of indicators and including the accuracy of their expected values. It, in turn, determines extent of approach of

the administrative decision to optimum by criteria of minimization of a loss and maximizing financial and economic stability.

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