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Complex Technique for Evaluation of Planning System Quality of Organizations

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***Abstract* — Planning is important function of management, assuming anticipatory foresight and consideration of factors, which influence on organization, and proposing elaboration of definite program for mission's implementation of organization. In this article the subject of evaluation of organization planning system is studied. Incompleteness and / or non-obviousness of different techniques and methods are revealed with analysis of existing views on the problem. New technique for evaluation of planning system quality, suggesting analysis of planning's accuracy and content of planning's processes for goals determination is represented. Accuracy of planning system is determined with precision evaluation of actual and planned values' compliance. Assessment of content of planning system's processes con-siders determination of compliance of planning system with principles and requirements. Aggregation of evaluations of planning's accuracy and content of planning's processes allows to estimate the integral indicator of quality of planning system. Stability and equability of planning system's evaluation is measured with standard deviation and coefficient of variation. Finally algorithm of implementation of technique with application of developed quantitative coefficients is offered.**

Keywords — planning, planning system, quality of planning

I. INTRODUCTION

Planning is one of the key functions of management [1]. In response to increasing complexity of modern economics the amount of information has substantially increased and therefore predetermined the attention of management to the quality of planning system necessary to assure association in subsidiaries unit work and to subordinate them to the general strategy.

II. RELEVANCE AND SCIENTIFIC VALUE OF THE PROBLEM

The importance to achieve a high quality of planning requires using the appropriate tool to evaluate planning system and to take decisions for its improvement hence the relevance of this topic at the current stage of economic development. Analysis of reflection of this problem in literature shows that scholars pay their attention to different nuances of the planning system quality.

The study of P.Philips, L.Moutinho [2] proposes calculation of index of strategic planning from empirical analysis of factors which characterize the quality of planning process.

The work of V Ramanujam, N. Venkatraman [3] includes measuring of planning complexity and its resourcing and also underlines the importance of situational approach to evaluate the quality of planning.

The book of J. Shim, J. Siegel [4] focuses on issues of effective planning including plan-and-fact analyzing and controlling.

The article of V.Y. Tchernyshev [5] includes methodology developing quantitative indicators of the state, tension, organization and ratio of results and expenditure based on criteria of planning effectiveness.

The methodology of A.V. Clayman and P.I. Karih [6] utilizes calculation of deviations in actual values from planning figures and their subsequent aggregation using ranked ratios of correlation with factoring analysis.

The article of S.N. Yashin and G.M. Ohezina [7] specifies the measuring direction of the quality of the very planning process (by means of estimating of conformity with the principles) and the final impact of planning (by means of estimating of implementation of plans).

The study of I.L. Yurzinova and V.N. Nezamaykin [8] aims to estimate planning on the basis of organizational, managerial, financial and technological aspects with calculation of appropriate ratios.

According to the methodology of A.S. Kostarev [9] the quality assessment is performed by indicators of business in terms of its profitability and security, output and expenditure including calculations of different quantitative ratios and their scaling.

The article of O.A. Petrova [10] offers methodology of plan reliability assessment using Harrington-Mencher desirability function.

The approach of V.A. Azev [11] involves calculation of ratios of completeness and accuracy of accounting factors to be estimated in the process of planning quality measuring.

In the papers of O. V. Khoroshilova [12], S.S. Panyushkin [13], M.A. Dementienko [14], E.V. Petrova, S.V. Khmel'nitskaya [15] the planning assessment is considered in the context of relation expenditure to the profit from planning system.

The studies of G.T. Guseynov [16], S. V. Dokholyan, S.M. Gazimagomedov [17], A.M. Abacharaeva [18], I.V. Kozlova [19] highlight necessity of appropriateness of planning system to principles emphasizing the role of experts for assessment of the relevant business processes.

Thorough analysis of abovementioned studies identified some controversial proposals and aspects which from our point of view requires further refining and/or re-searching. It can be seen in the following:

- measurement of accuracy does not require allowable deviation of actual values from planning figures with the result in neglecting uncertainty of environment and factors which do not depend on planning system;
- planning effectiveness is estimated in one qualitative dimension on a number of indicators while the planning system of modern organizations suggests a broader segmentation of their activity using both qualitative (including territory, products, sales channels, structural units etc.) and quantitative data;
- in abovementioned methodologies there are no established indicators characterizing sustainability and homogeneity of the planning quality assessment;
- some of the works aim to estimate certain aspects of planning system without comprehensive coverage of the mentioned problem;
- the content of business processes is analyzed without reference to the level of hierarchy of economic planning department of an organization;
- some of the methodologies entail calculation of uncertain and outsized indicators which prevents both carrying out its aggregation and performing objective analysis of different planning systems;
- some of the papers propose rates which are difficult to calculate in practice either because of the absence of relevant accounting system or impossibility to make an objective assessment of planning system direct contribution to business results;
- several studies examine the matter of the planning system quality assessment from the perspective of peculiarities of individual environment and activities which reduces universality of the proposed methodological tools.

In our view existing instruments are not complex, objective and universal enough to fully meet the needs of management in planning system quality assessment.

III. Preparation of Indicator Framework and Algorithm of Organization Planning System Quality Assessment

Taking into consideration conclusions from the analysis we should develop a complex of quantitative rates K_j, whose numerical value is to reflect the essence of set $J = \{j_1, j_2,\ldots, \gamma\}$ of business processes performed by economic planning department of an organization. This work proposes 2 main criteria: planning accuracy and content of planning processes.

In assessing the planning accuracy, planning figures and their actual values are proposed to be corresponded using both qualitative and quantitative data. To do so let's introduce measure of planning accuracy *A,* applying the function sgn(x), to be explained in [20]:

$$A = \left(\frac{F}{P}\right)^{\operatorname{sgn}\ P-F} \quad (1),$$

where F (P) – actual (planning) value of planning system indicator.

Set of specific qualitative data $M = \{m_1, m_2,\ldots, \mu\}$ may be expressed in planning system (for instance territory, products, sales channels, structural unit, reporting period etc). The importance of specific data in which planning is carried out should be determined by expert method an appropriate rating B_i complied with each element $m_i \in M$. Then, the relative importance of qualitative data b_i may be determined as a portion B_i in total sum of rating B_i.

Each element of $m_i \in M$ is also a set $P_i = \{p_{1i}, p_{2i},\ldots, \pi_i\}$ (for instance, multiplicity of territories includes cities where subsidiaries of organization are located). Set $D = \{d_1, d_2,\ldots, \delta\}$ of actual for an organization indicators (such as proceeds, cost etc.) need to be considered among quantitative data. These indicators form the final result of organization activity (financial statement in P&L, amount of cash balance in cash flow budget) and can be analyzed on the basis of set M.

That along with this we designed success rate of planning system K_1, calculated from the expression:

$$K_1 = \sum_{m=1}^{\mu} b_m \cdot \left[\sum_{d=1}^{\delta} s_d \cdot \left[\sum_{p_m=1}^{\pi_m} w_{dp_m} \cdot A_{dp_m} + \min\ H_{dp_m}; 1 - A_{dp_m}\right]\right] \quad (2),$$

where b_m is a relative importance of qualitative data; s_d – a share of planning value of quantitative indicator in the sum of absolute planning value of all quantitative indicators; A_{dpm} (H_{dpm}) – a planning accuracy (planning accuracy tolerance, in fractions of one) in accordance with p-element of m-qualitative data in d-indicator; w_{dpm} – a share of planning value of p-element of m-qualitative data in accordance with d-indicator in total sum of planning value in accordance with d-indicator.

In the process of the content analysis status of plan-establishing is determined which implies the need to estimate appropriateness of planning system to set of principles and requirements $F = \{f_1, f_2,\ldots, \varphi\}$, of which the most important in our opinion are efficiency, completeness, balance, degree of automation and conformity with the rules.

Since the measurement of the appropriateness of planning system to principles and requirements is hampered by impossibility of full coverage of the aspect being studied or by the absence of adequate accounting system in our opinion the analysis of the content of planning must be based on peer review.

Content assessment of planning system should also differentiate with reference to the elements of set of hierarchy levels of planning economy department $L = \{l_1, l_2,\ldots, \lambda\}$ (for instance budget committee, the planning directorate, regional (structural) units).

With due regard to that we designed content rate of planning system K_2, calculated from the expression:

$$K_2 = \sum_{l=1}^{\lambda} c_l \cdot \left[\sum_{f=1}^{\varphi} q_{lf} \cdot \left(\frac{E_{lf}}{N_{lf}} \right) \right] \quad (3),$$

where c_l – relative importance of l-hierarchy level in order to evaluate planning system, in the fraction of one ; q_{lf} – relative importance of f-planning principle on l-hierarchy level, in the fraction of one; E_{lf} (N_{lf}) – peer review (the size of rating scale) of conformity to f-principle on l-level.

The integrated rate of planning system quality assessment Z in turn can be calculated from the expression:

$$Z = \sum_{j=1}^{\gamma} t_j \cdot K_j \quad (4),$$

where t_j – relative importance of j-criterion, in the fraction of one.

It should be pointed out that within the assessment system it is supposed

$$\sum_i b_i = \sum_l c_l = \sum_f q_f = \sum_j t_j = 1 \quad (5).$$

Taking into account (5) the standard deviation σ can be calculated from the expression:

$$\sigma = \sqrt{\sum_{j=1}^{\gamma} t_j \cdot \left(K_j - Z \right)^2} \quad (6),$$

Then assessment of homogenity is calculated through coefficient of variation:

$$V = \frac{\sigma}{Z} \cdot 100\% \quad (7).$$

To define factor analysis of contribution R_j of indicators K_j into integrated rate Z the following formula can be applied:

$$R_j = \frac{t_j \cdot K_j}{Z} \cdot 100\% \quad (8).$$

Derived coefficients must be used in methodology of planning system quality assessment, including next steps:

- **Step 1**: Initiating of assessment;
- **Step 2**: Selection of internal and external experts;
- **Step 3**: Selection of relevant indicators;
- **Step 4**: Determination of relative importance of indicators and tolerance of accuracy;
- **Step 5**: Collection of information;
- **Step 6**: Calculation of coefficients K_j, Z, σ, V, R_j;
- **Step 7**: Development of conclusions and final report;
- **Step 8**: Implementation of corrective action.

After finishing Step 8, the procedure of planning system quality assessment can be repeated.

IV. PRACTICAL SIGNIFICANCE AND FINAL CONCLUSION

A set of original developments this methodology is generally based on was used in the process of assessment of planning efficiency of the enterprises manufacturing medi-cal corks. (see [20]). Universal methodology we developed is considered to be useful for planning system quality assessment available to a broad group of enterprises.

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