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Tools to Manage Strategic Efficiency of Corporations

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Abstract: Two approaches to feedback system intended for efficient corporation management are considered. The first approach is simulation of relationship between company investment managers' thinking and the progress in market value of company shares with due regard to Markowits portfolio theory and regression analysis. On the other hand a group of experts give the same influence parameters, but this time in top-management's opinion. These two sets of estimates are used in decision-making. The second approach is based on the use of netographic data to monitor efficiency of corporation integration strategies and its key competences.

Key words: Corporation · Investments · Portfolio · Strategies · Core competences · Estimates

INTRODUCTION

Re-structuring rocket-space industry (RSI) is one of the key tasks for modern Russian economy [1, 2]. At present time methodological tools which can be used for RSI modernization have not been found yet. In this article methodical approaches and managerial tools are described which can be used in control and monitoring of modernization processes, as exemplified by RSC *Energy* (further referred to as the Company) [3].

The activity of corporations is characterized by two parameters which mainly determine its efficiency - market capitalization and consumers' opinions. This article is an attempt to build formalized algorithms engaging above mentioned parameters as feedback channels for creation of efficient strategies of Company development and in this way provide the top-management of the company with a tool to monitor internal investments' efficiency and/or development strategies.

Main Part:

Investigation Diagram: The degree of influence of company's managerial factors on its market efficiency can be evaluated in 2 ways (Figure 1):

- By RTS trading results and by Company reports - in order to formulate objective, unbiased, estimates.
- By the opinions of linear managers of the Company - in order to formulate subjective estimates.

Mathematical models of objective evaluation (method#1). This method is based on the subjective decisions about purchasing shares at stock exchange. But since market entities do not depend on the managers of the Company and are elements of external environment in regard to the Company they reflect the situation with the Company in unbiased way.

The First Method Is Based on the Models of 2 Types:

- The Markowits portfolio optimization model [4] which evaluates the proportion of the Company shares in Markowits optimal portfolio (MOP) of any external investor who acts rationally.
- Regression model which correlates the proportion of shares in MOP with a number of internal factors, which are reflected in regularly published corporate reports and which can be influenced by managers who control some aspects of corporate activity and development, in particular, investments distribution.

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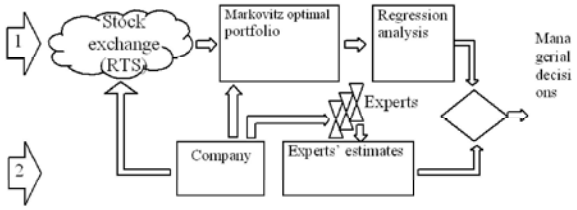

Fig. 1: Simulation diagram

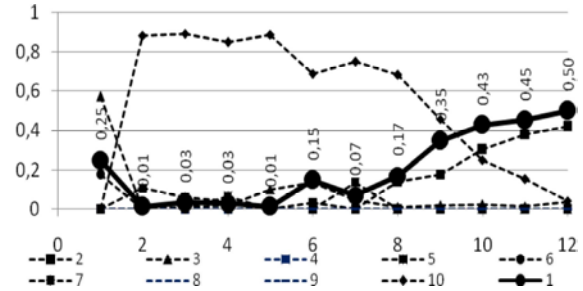

Fig. 2: Proportions the Companies' shares in Markowits portfolio.

MOP Model: The unified integral indicator of market attractiveness of the Company is the proportion of Company shares in MOP.

The key task in MOP formation is to form such a portfolio (to choose the proportions of investments into specific shares $x_i, i = 1$) which would provide minimum risk σ_p (or dispersion (variance) D_p) with given profitability m_p Optimization criteria in the task of MOP formation is as follows:

$$D_P = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \, K_{ij} \to \min_{x_i, x_j} \tag{1}$$

where K_{ij} is covariance of 2 kinds of shares (*i*- and *j-)* and the condition that expected profitability must reach some desired level, m_p is:

$$\sum_{j=1}^{n} x_j m_j = m_p \tag{2}$$

where m_j is average (expected) profitability of *j*-shares.

The solution of this problem was based on real statistical data for the period since 1 quarter of 2009 (from this time steady growth was observed after 2008-crisis) to 4th quarter of 2011. Quarterly accounting reports for this period are available on the Company website, this gave us 12 sets of data with step=1 quarter. Original data on shares' price were taken from the website of Moscow stock exchange (RTS)[5].

The portfolio consisted of the following shares (further we shall mention only their numbers): 1. Company; 2. Gazprom; 3. Lukoil; 4. Sberbank; 5. Rostelekom; 6. Rosneft; 7. Uralkaliy; 8. Norilsk Nickel; 9. Aeroflot; 10. Severstal. At every step of observations profitability value was average value for all trading sessions of the current quarter.

Calculation of MOP Parameters: MOP was formed with due regard to expected portfolio profitability m_p, which was 75% of the bottom limit of the current observation's profitabilities interval. The proportions of shares on all 10 companies are given in Figure 2, where bold line corresponds to the quartery changes in amounts of money invested in 10 companies.

Regression model allows to assess the influence of internal corporate factors on the proportion of Company shares in MOP for every observation, on the base of unbiased Company quarterly reports.

In this work 5 factors are considered which can influence market value of the Company: fixed assets volume (f_1), wages fund (f_2); net profit volume(f_3); profitability (f_4); core product volume (f_5). All factors are given in unified scale [0; 1] in order to make calculation easier. Regression analysis produced the following regression coefficients

$|C_1, C_2, C_3, C_4, C_5 |=|$ -0.006, 0.262, 0.216, 0.029, 0.179

Subjective (Personal) Assessment of the Contribution of Company Internal Factors into Integral Effect of its Operation: Second method of evaluation is based on Company managers' opinions. It is assumed that while distributing invested money and doing other managerial actions linear managers of the Company understands correctly the influence of some levers on the final result. Informally this correctness must be provided by their experience and managerial professionalism, but in real practice not everything goes well in this sphere. That is why top-management would like to know how adequately linear managers understand the influence of some managerial levers on final result. In order to do that Company managers are asked to give weight coefficients to influence factors and then these weight coefficients are compared with similar weight coefficients obtained by market "opinion" obtained with the aid of the 1st method. If the difference is big it means that top-management must take appropriate measures to "orientate" the management to market opinion.

Table 1: Objective and subjective weights of factors

	Factors				
Evaluation methods	1	2	3	4	5
Unbiased (RTS)	-0.008	0.384	0.317	0.043	0.263
Subjective (experts)	0.253	0.138	0.287	0.178	0.144

In order to build subjective estimates of how internal factors contribute into integral efficiency the method of experts' estimates was used [6]. After processing the pairs of comparison every expert was given a combination of factors' weights in 4 methodological versions - obtained by addition on discrete scale, addition on continuous scale, multiplication on continuous scale, by Lewis method on continuos scale. The estimates are average in regard to number of processing methods and ranged in accordance with weight reduction. All weights are significant.

Comparison of Objective (Unbiased) and Subjective Weights of Factors: Weights and ranging calculated on the base of objective data are different from results obtained from experts. Table 1 shows weights obtained by 2 methods, the sum of weights is equal to 1.

Thus the 2 methods of comparison of weights coefficients do not allow to consider them rather close to each other.

Managing Company's Efficiency with the Aid of Netographic Data: In the previous part of the article we considered one of the variants of feedback in order to provide efficient management of investment activity of the Company. In the second part we shall consider the way of organization of feedback intended for increase of efficiency in Company's work but based on other data sources. If the first variant is intended mainly for making investment decisions and refers to financial management, the second one can cover all aspects - from technical issues to work with the staff.

Integration as one of the Company attributes has many aspects and coordinates of development. Wish of different economic entities for integration is determined by their desire to obtain more stability or to survive in conditions of high market volatility. Besides that integration has significant synergetic potential.

Taking into account positive potential of integration and possible losses, on the phase of planning and in the process of its realization we face very difficult task to grow-up integration relations both inside the association (between the Company and its divisions) and in external environment - with partners, customers, state, public institutions.

The source of information for the 2nd feedback loop in Company management is netographic data [7-10]. Netography has been used only recently and can not be considered as fully valuable tool of analysis.

By one of its definition netography is a sphere of research based on the analysis of statements produced by internet users - in web-publications, blogs, forums. Netography provides opportunity to find out the problems, managerial procedures that must be adjusted, investment and development strategies.

Management diagram (Figure 3) is based on the formation of the complex of corporate integration strategies which takes into account Company core competences. Brief diagram can be explained in the following way: Company while supplying its goods and services onto the market forms a combination of consumers indicators, reflecting current set of existing problems connected with Company activity.

The problems can be presented with the lines of cause-effects (the causes are marked with black dots on the line). Strategies which are developed by top-management of the Company must eliminate the causes of the problems. With the aid of regular surveys the weights of strategies are identified (C_{ij}) every of which "works" for one of the core competences of the Company, providing appropriate efficiency of its functioning. Now we shall consider how this management diagram can be implemented in reality.

In order to identify main problems and consumers' claims in regard to Company activity a series of inquiries (core words which represent core activities of the Company mentioned in its website) was formed to be used by search machines. [3]. All problems of RSI were put together [2] into the following groups: state management system; regulatory (legislative) framework; economic issues; scientific and technological foundation.

The following core problems in the sphere of space activity (SA) were selected from different sources:

- Undeveloped state policy in SA.
- Undeveloped regulatory framework in regard to SA.
- Ineffective insurance system in the sphere of SA.
- Big number of employees in RSI (more than 200 000 people while in the USA and China only 100 000 people are engaged).
- Low labour productivity in RSI (the lowest among all space countries).
- High launch accident rate.
- Increasing technological obsolescence.

Table 2: Cause-effect relationship between problems

Problems P_i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total number of causes
1	-	C	C	-	-	-	C	-	C	C	C	-	C	C	8
2	E	-	C	-	-	-	-	C	C	C	-	-	-	C	5
3	E	E	-	-	-	C	C	-	-	-	C	-	C	C	5
4	-	-	-	-	E	C	E	E	-	-	C	-	-	-	2
5	-	-	-	C	-	C	C	E	-	-	C	-	C	C	6
6	-	-	E	E	E	-	E	E	-	-	C	C	C	C	4
7	E	-	E	C	E	C	-	E	-	E	C	C	C	C	6
8	-	E	-	C	C	C	C	-	C	E	C	C	C	C	9
9	E	E	-	-	-	-	-	E	-	E	-	-	-	-	0
10	E	E	-	-	-	-	C	C	C	-	C	-	C	C	6
11	E	-	E	E	E	E	E	E	-	E	-	-	-	C	1
12	-	-	-	-	-	E	E	E	-	-	-	-	-	E	0
13	E	-	E	-	E	E	E	E	-	E	-	-	-	E	0
14	E	E	E	-	E	E	E	E	-	E	E	C	C	-	2
Total number of effects	8	5	5	2	6	4	6	9	0	6	1	0	0	2	

Table 3: Core competences and integration strategies of the Company

Core competences	Integration strategies
Technological competences	Strategies of technological and technical integration with external partners, competitors
Organizational-managerial competences in internal environment	Strategies of marketing integration including the measures on product development, services, sales channels and promotion Strategies of interaction with internal customers which form loyalty to corporation from the side of its shareholders and employees: • With shareholders (corporate management strategies) •With employees (staff management or internal marketing)
Organizational-managerial competences in external environment	Strategies of interaction with external customers - customer-oriented strategies - (sponsorship, branding, customer loyalty programs) Strategies business-partnership (interaction marketing) with partners or strategies for integration with partners Strategies of integration with the state in the framework of private-public partnership. Strategies of integration with public organizations

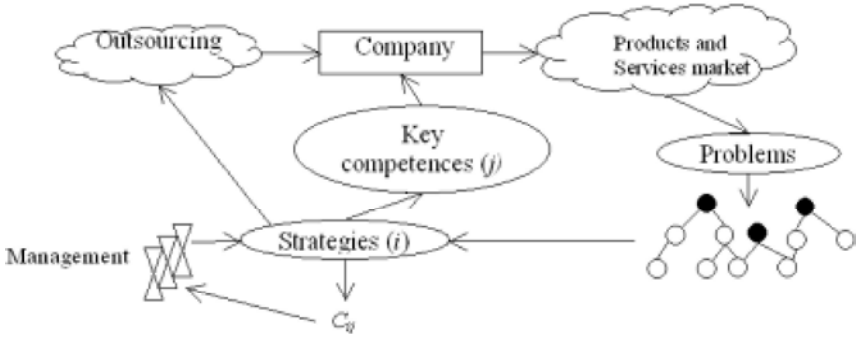

Fig. 3: Core competence management diagram

- Out-of-date organization of Industrial production in RSI (6% of world production of space aircraft in 2011).
- Undeveloped system of utilization of SA results.
- Absence of mechanisms of technological transfer.
- Adoption of costly and inefficient programs.
- Loss of public support of SA.
- Loss of launch services market (5% in 2011)
- Loss of competitiveness of SA on the external and internal market.

We shall include this list into analysis procedure. Combination of problems must be submitted to a group of experts each of them while filling-up the matrix of pair

comparisons must decide which of 2 problems is a cause and which is the effect (or they are not related to each other) [8]. Then all matrixes are put together, experts' opinions are unified by one of the methods of opinions processing [5], for example, by Kemeni method. The unified matrix (table) is given below:

Here if 1st problem is compared with the 2nd and the 1st is the cause, then at the crossing point of 1st line and 2nd column there is C-symbol, if, on the contrary, the effect, then the letter E is put at the crossing point. This data can be used in the form of problem numbers ranging $P_8 \square P_1 \square P_5 \approx P_7 \approx P_{10} \square P_2 \approx P_3 \square P_6 \square P_4 \approx P_{14} \square P_{11} \square P_9 \approx P_{12} \approx P_{13}$ or in the form of rank vector: $r' = [2, 6.5, 6.5, 9.5, 4, 8, 4, 1, 13, 4, 11, 13, 13, 9.5]$

where the least number corresponds to the highest rank of the problem. These results can be presented in the form of line (tree) of cause-effect relationship (Figure 3). Combination of the problems hierarchically mutually determined can be solved with the aid of company's integration strategies.

At the next stage group of analysts identifies the system of existing in the company integration strategies [8]. Each strategy is aimed for provision of some core competences [8]. The following combination is the most characteristic for the Company (Table 3):

Then experts must be asked again to assess every integration strategy (i) providing appropriate core competence (j). Then, if the weight of j- core competence (as the sum of strategy weights which refer to it) will be different from reference (planned) figures, then such discord means that appropriate adjustment must be made by top-management in regard to such integration strategy of the Company.

Inference:

- Difference of subjective weights of factors from objective ones proves misunderstanding by Company top-management of market mechanisms and testifies inefficient investment management in the Company.
- The first method of management analysis can be used as a tool in choosing those managers who adequately understand mechanisms of Company operation in market conditions and for regular monitoring of the level of this adequacy.
- Approach to core competences management based on netographic data can be used for building a subtle and efficient monitoring system of consumer efficiency of the Company.

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