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Expert Evaluation of Information Potential Efficiency by Business Structures

[1]O.M. Gorelik and [2]Ye.I. Koroleva
[1]The Volga Region State University of Service, Tolgliatli, Russia
[2]TYAZHMASH, Syzran, Russia

Abstract: The study discusses the aspects of the improvement and development of the systems of integration process control. It proposes to use the developed methodological set of tools including the model of unified information potential of the integrated system of business structures and the system of indicators to evaluate the level of development of information potential.

Key words: Integration, integration processes, information potential, management, model management, integrated business structure

INTRODUCTION

The growth of the Russian economy in 2002-2008 (before the crisis in 2009) was in many ways due to the intensification of integration processes of business structures. Integration was one of the components of successful industrial development of the country in general and influenced the growth of GDP in Russia. It occurred primarily on account of the increased investment activity and the industry gross product, the raised competitive capacity and other factors. But low efficiency of the system of integration process management did not allow to save the synergistic effects and develop most of the integrated business structures, on the results of 2014 the volume of mergers and acquisitions market has decreased by 60% in USD and 51% in ruble terms (Vereshchagina, 2011). The main factors of great drop in steel were: the devaluation of the ruble, fall in oil prices, foreign political instability and a slowdown of the Russian economy. Year 2014 was the worst for the Russian market of mergers and acquisitions for the entire post-crisis period. As a result, the volume of transactions, calculated according to the methods of AK and M Information Agency, amounted to 48,72 billion dollars, the lowest value since 2009. Therefore, research and development of the methodological set of tools for improving the systems of integration processes control of business structures is relevant today, especially in a crisis economy.

The theory of economic growth suggests that the business structures that implement the strategy of rapid growth have two possible variants of development: internal growth the intensification of the activities and external growth-on account of the processes of integration. Integrative growth gives greater efficiency by factors of reducing costs and producing a synergy which increases the possibility of creating a strategic advantage enhancing the overall economic efficiency of functioning both an entire integrated business structure and the business entities involved. Integration processes are the most rational in the presence of sectoral barriers, administrative and socio-cultural constraints.

The analysis of a number of scientific papers covering the investigation of management of integration processes (Mikhalenko, 2012) enabled us to identify the main elements of the combined capacity of integration interaction of the industrial business structures, namely, industrial, information, scientific, technical, technological, personnel, financial, intellectual, marketing and other potentials on the basis of the unity of long-term goals of their functioning and management system.

An effective functioning of the Integrated Business Structure (IBS) is possible only at a certain management system, being able to promote the release of high-quality competitive products at optimum cost under specific conditions of production with consideration for the characteristics of internal and external environment. To improve the management system and develop methodological set of tools, it is recommended to use different modeling elements such as graphic and economic and mathematical ones (Gorelik, 2009).

Unfortunately, in practice, the formation of management systems occurs quite chaotically which leads to the reduced efficiency of integrated systems in spite of their potential. Also, very short shrift is given to the formation and development of information interrelation between the elements of the system of management of integration processes having regard to the fact that there is a constant need for comprehensive information about the state of internal indicators of the

Corresponding Author: O.M. Gorelik, The Volga Region State University of Service, Tolgliatli, Russia

enterprise: dynamics of material, financial, manpower and information resources that ensure long-term development of production as well as the state of the external environment (Koroleva, 2012). More often than not in practice, management of the integrated business structures, particularly large, faces inopportuneness, duplication, insufficiency, incompleteness of information for making management decisions (Mitrofanova, 2011). Some researchers (Gorelik, 2009) note that the information potential is a part of the economic potential of business structure.

Development of the information potential is an opportunity for a business structure to provide itself timely information related to the preparation of the data needed to make strategic decisions, to the research and development, production requirements, the resource base state (Koroleva, 2012; Mitrofanova, 2011).

MATERIALS AND METHODS

To evaluate the efficiency of management of a large enterprise structure it has been elaborated the estimation procedure of using information potential in management of the processes of integration of business structures characterizing the level of development of the information potential of integration of enterprise structures both on the whole and sub-systems including the system of performance indicators (estimation is carried out by means of the Microsoft Excel spreadsheet).

The growth of interest in the expert methods is such a factor as the instability of the socio-economic situation which has reduced the practical importance of many exact methods of analysis. In addition, the initial information is often insufficiently reliable. Expert research aims to improve the validity of such problems that cannot be fully defined mathematically as they are «semi-structured», i.e., contain the uncertainties associated not only with measuring but also with the very nature of the objects.

The developed estimation procedure of the use of information potential in management of the processes of integration of business structures is based on expert evaluation of the importance of the primary factors that influence the economic productivity of management of business activities and upgrade through the implementation of the information potential of individual elements of the IBS and all the structures in general.

The first stage of the estimation procedure for the use of information potential in managing the processes of integration of business structures is the selection of appropriate indicators. Table 1 represents the system of indicators in our opinion, characterizing the level of development and use of information potential by the system of the IBS management.

These indicators can be used to evaluate both an individual business structure and the IBS (with the exception of indicators 3.5.1 and 3.5.2). This integrated indicators are likely to be higher as they allow for making a more qualitative analysis and as a result, a more exact and correct management decision at the expense of operating all the available information data on the corporation on the whole. Besides, the pooling of informatization means into a single resource can significantly speed up the processing and analysis of information of each business structure of the IBS due to the unified powerful means of informatization under a single coordination centre.

The next methodical step is forming an expert group to assess the importance of the indicators taken into account in the analysis of the use of information potential in management of the integration processes of enterprise structures. For the purpose of evaluating the groups of dedicated indicators, an expert group with appropriate

Table 1: The system of indicators characterizing the level of development and use of information potential by the system of management of the IBS

The group of indicators	The name of indicators
The indicators of informational support of management of the IBS	Effectiveness of the strategy of information management development
	Mass media application effectiveness in management
	The level of organizational infrastructure of informatization
	The indicator of efficiency of informational support of business-processes
	Efficiency of Decision Support System (DSS)
	Efficiency of information potential of managerial staff
	The level of integrated interaction of information potential of enterprises being part of the IBS
The indicators of development of internal information potential of the IBS	Annual of volume of investments in information development of the IBS
	The workers having information systems skills
	Total cost of informatization means of the IBS
	Costs of support and maintenance of informatization means of the IBS
The indicators of external information potential of the IBS	The use ration of cloud computing
	The presence of external Database (DB)
	The applications using the Internet resources
	The availability of Complex Systems of Information Security (CSIS) of the IBS
	The availability of sites in the enterprises being part of the IBS
	The availability of a IBS corporate portal

education and experience in the target field of activity was formed. The results of expert evaluation demonstrate the competence of the expert group associated with the professional qualification of the experts. Concordance of experts' opinions is evaluated on concordance coefficient, the formula for determining of which is the following (Eq. 1):

$$W = \frac{12S}{\left[n^2(m^3-m)\right]} \quad (1)$$

Where:

S = The sum of deviation squares of all evaluations of the ranks of each object of expert opinion from the arithmetical mean value of ranks
n = The number of experts
m = The number of objects of evaluation

The concordance coefficient varies between $0<W<1$ (0 corresponds to inconsistency and 1-to complete concordance). If the value of the concordance coefficient is greater than 0.6, the quality of evaluation is considered to be high. As a result of the assessment of concordance of experts' opinion, the value of the concordance coefficient being equal to 0.75 has been obtained which indicates a high concordance of opinion of the expert group.

RESULTS AND DISCUSSION

When using expert evaluation, the opinion of the group of experts is usually assumed to be more reliable than the opinion of a single expert. Some theoretical studies note that this assumption is not obvious but at the same time it is stated that subject to certain requirements in most cases, the group evaluations are more reliable than the individual. Such requirements include: distribution of the evaluations obtained from expert should be «smooth»; two group assessments given by two identical subgroups, selected at random, must be close.

Various methods are used when obtaining and processing expert evaluations. The most common procedures of expert measurements are: ranking; paired comparison; multiple comparisons; direct evaluation; sequential comparison; the Thurstone Method; the method of von Neumann-Morgenstern.

The practicability of a particular method depends on the nature of the analyzed information (Gorelik, 2009). If only qualitative evaluations of the objects for some qualitative characteristics are justified, then the methods of direct evaluation, ranking, paired and multiple comparison are used. If the nature of the analyzed information is such that it is appropriate to get numerical evaluation of the objects, one can use either of the methods of numerical evaluation, beginning with direct numerical estimates and ending with more sophisticated methods of Thurstone and Neumann-Morgenstern.

Based on the data of comparative analysis we have selected the method of direct estimation. The method consists in assigning numerical values to the objects in the interval scale. The expert must assign a point at a certain interval of the number axis for each object. In so doing, the equivalent objects are necessary to be attributed to the same numbers. The expert assigning a point to the object measures it to a certain segment of the number axis. One uses 5, 10 and 100-point scales. To evaluate the indicators, a qualimetric scale has been elaborated where:

- 0 points characterizes the lack of works on this aspect
- 1 point characterizes very low level, many mistakes and lack of an effect
- 2 points are put when the development of this area is at the low level, there are minimal effect, significant drawbacks
- 3 points characterize satisfactory or average level, low efficiency, some drawbacks
- 4 points characterize the level above the average, average and high level of efficiency, non-essential easy eliminable shortcomings
- 5 points characterize the high level, a high level of efficiency

Further, the expert group with consideration for the specifics of business structures defined weighting coefficients of indicators.

Within the methodology of evaluation of indicators not only a system of indicators to assess the information potential of certain business structures before the integration has been developed but also economic and mathematical models for assessing the level of development and using information potential by the system of management of the integrated business structure on the whole as well as by individual enterprises in particular. The economic and mathematical model for evaluating the level of information development and using the IBS on the whole is presented below (Eq. 2):

$$y_{\text{and}\Pi C} = \sum_{z=1}^{m} \beta_z \sum_{i=1}^{n} \alpha_i \times \Pi K_{ij} \quad (2)$$

Where:

m = 1, 2, …, z = The number of groups of indicators
i = 1, 2, …, n = The number of all indicators
j = 1, 2, …, N = The number of enterprises being part of the IBS management system
β_z, α_i = The weighting coefficients appointed by experts

CONCLUSION

On the basis of the qualimetric scale and effectiveness estimate formula defined by experts, a comparative evaluation of the efficiency of the level of development and use of information potential of the IBS for all groups of indicators.

The testing of the presented methods was carried using the data of the group of companies «TYAZHMASH» which has proved that the developed system of indicators is rather universal and can be applied to integrated systems of different scale and scope of business activities and the presented evaluation mechanism allows to identify key trends and assess the level of information potential of the system of management, monitor and analyze the current trends of information development of the integrated business structure.

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