The Evaluation of Efficiency of the Information System about Tax Capacity of a Business Entity

H Kuzmenko[1] **and N Shalimova**[2]

[1] Department of Audit, Accounting and Taxation, Central Ukrainian Technical University, 8 prospect Universytetskyi, Kropyvnytskyi 25030, Ukraine
[2] Accounting and Finance Faculty, Central Ukrainian Technical University, 8 prospect Universytetskyi, Kropyvnytskyi 25030, Ukraine

E-mail: galina.leda@gmail.com

Abstract. It has been substantiated that the formation of the information system on tax capacity and evaluation of its efficiency is an important task of tax management which is closely linked with the system of accounting at a company, the completeness and reliability of the information received. There are a large number of methods for assessing tax capacity, each of which has its advantages and disadvantages, expressed in precision and complexity of measurement. It has been grounded that among them, at the enterprise level, it is expedient to use methods involving the calculation of tax capacity, based on the official forms of tax reporting, as well as the method of regression analysis. The existing approaches to evaluation the effectiveness of the information system on tax capacity of a business entity are considered. The general essence of the process of formation of information systems is shown; the indicators of the evaluation of information system about tax capacity are summarized. The scope of feasibility of using financial and non-financial methods in the process of evaluation the effectiveness of information systems is determined. The proposed mechanism for assessing the efficiency of the current information system on tax capacity of an entity will help identify major problems in the system, focusing on improving individual factors, and reducing uncertainty in the tax planning stages. The application of weight factors makes it possible to adapt the criterion of efficiency depending on the dominance of certain factors over others in the current period of time.

1. Objectives and Topicality of Research.

In the process of analysis of tax capacity of economic entities a large amount of information is used. That requires the need for its systematization and evaluation. At the same time it should be noted that capacity evaluation is a process that is difficult to formalize. Objectivity and quality of work in this direction are determined by the degree of access to the information, its completeness, reliability, qualifications of the specialists who assess it.

In order to assess tax capacity of a company, different methods can be used in the Ukrainian and foreign practice. Therefore, one of the most important problems is the substantiation of the evaluation methods, since it should be based on the definition of the range of indicators that most reveal tax capacity of a company. At the same time, the information should be non-exaggerated and unambiguous, and the results of the evaluation should be systematic and provide the idea of the

relationship of the indicators. The system of indicators should fully correspond to the tasks of analysis and forecasting of tax capacity.

Taking into account the approaches will make it possible to make optimal decisions, to carry out a permanent or cyclical monitoring of the financial condition of economic entities and assess their tax capacity. Monitoring of actual and projected tax and financial indicators is needed in the development of scientific and practical bases for improving tax forecasting, timely tracking risks and minimizing them.

The research of the problems of the efficiency of using information systems was done by Yu Ivanov, V Kozachenko, O Pysarchuk, K Skrypkin and other scientists [1-13]. However, a comprehensive analysis of the existing methods for assessing the effectiveness of the information system on tax capacity has not been carried out. In connection with this, there was an insistent problem regarding the application of financial and non-financial methods for assessing the efficiency and determining the scope of their application in modern economic conditions.

The objective of developing the criteria for assessing the effectiveness of the current system of information on tax capacity is to help professionals find necessary solutions, reduce the level of risk, qualify the relationship between the decisions taken and the costs necessary for their realization with their future returns. The purpose of this article is to study the existing scientific approaches to assess the effectiveness of the information system on the taxpayer's capacity and to develop on this basis grounded and useful for science and practice conclusions.

2. Presentation of the main research material.

2.1. Information System about Tax Capacity of a Business Entity.

The system of information about tax capacity is the process of continuous and direct obtaining the information necessary to plan tax payments and to make management decisions at different stages of tax management.

Generally, the system is a set of elements (parts) that form a coherent whole and interact with each other and the environment. The main features of the system are as follows: each system has stable ties among its elements; the system has certain qualities that are not inherent to its separate parts; the system and its parts can not be considered in isolation from each other; all systems are not the same because they are inherent internal contradictions, and they are subject to external influences.

The listed system-generating features are universal and characterize all types of systems. At the same time, the system of calculation of tax capacity includes the following components: information base; organization of collection and processing of information; methodical and instrumental means.

The calculation process begins with the compilation (updating) of the information base which is essential in terms of the completeness, relevance and quality of the formed base, since the quality and reliability of the results depend on it. In this case, it is envisaged to systematize and generalize the source information (the information base can comprise both actual accounting data (accounting, tax, statistical reporting) and forecasting data of the company for the future period) and identification of tax capacity of a business entity.

It should be noted that the national economic science has not a clearly developed approach to the selection of criteria for assessing the effectiveness of the current system of information about tax capacity of a business entity. In our opinion, it is expedient to formulate the evaluation criteria taking into account the following areas of the entity's activity: production, financial, commercial and managerial activities.

The most objective result of the study can be obtained by simultaneously assessing tax capacity of a company by different methods and selecting on their basis actual characteristics. Taking into account that tax capacity of the entity and the tax burden indicators depend to a large extent on the results of its financial and economic activity, using of a combination of economic and statistical research methods in the process of assessing the array of information is proposed.

The quantitative evaluation of the established system of information about tax capacity should be

based on the results of preliminary evaluation of the economic, productive, innovative, financial, marketing, managerial, and motivational capacity of the entity. After all, it is from these components that the company's tax capacity depends to a large extent. Basic approaches to evaluating the capacity components of a business entity are described in works [1; 2; 3; 5; 6; 8; 10; 13].

Based on the main characteristics of the entity's tax capacity, it can be stated that its model is determined by: the volume and quality of available resources; educational, qualification, psycho-physiological and motivational potential of the personnel of the company; management capabilities to make optimal use of available resources; informational, innovative, financial and other possibilities of the company.

In the process of evaluation it is necessary to take into account that the tax potential is characterized by the following properties of economic systems: integrity (tax capacity is a unit that has certain properties); poly-structure (tax capacity consists of certain parts (subsystems)); complexity (tax capacity is determined by heterogeneity of components, hierarchical links between them); non-stationary (it has variable parameters, characterized by stochastic behaviour); uniqueness (tax capacity has at any time inherent only to him the possibilities and properties); adaptability (tax capacity has the aptitude to adapt under the influence of environmental factors); synergy (for the capacity characteristic of the effect of strengthening the elements in their interaction).

It should be noted that in the process of evaluation of tax information system the key criterion is efficiency. The efficiency is characterized by the ratio of the effect to the cost of resources that ensured its receipt and achievement of the result.

For the purpose of the formal expression of the criterion of the efficiency of the information system about tax capacity of the entity, using the following indices is suggested: the concentration index which allows identifying those taxes (fees, payments) that have a significant proportion in the total amount of charges; dispersion index which determines the existence (or absence) of taxes (fees, payments) with low level of payment to the budget; erosion index which determines the degree of compliance of actual tax bases with the capacity; late collection index which determines the timely payment of taxes by the entity; the index of objectivity that determines the objectivity of the defined tax base.

2.2. The system of criteria and indicators that can be used for evaluation.

In the process of evaluation of the use of the information system by the entity, the following indicators can be used:

1. The coefficient of payment of taxes that is the ratio of actually paid amounts of taxes (fees, payments) to their accrued value;
2. The coefficient of "quality" of payment of taxes, calculated by the ratio of actual tax payments, as well as the amount of fines and financial sanctions to the planned amount of payment;
3. The coefficient of timeliness, which characterizes the timely payment of funds to the budget;
4. The coefficients of the specific weight of a particular type of taxes (fees, payments) in the total amount of assessed and paid amounts of tax payments;
5. The ratio of growth rates of proceeds from sales, financial results, cost of capital, number of staff and growth rates of taxes accrued and paid (fees, payments);
6. The coefficient of the ratio of assessed and paid amounts of personal income tax to the number of employees at the company;
7. The coefficient of the ratio of the calculated and paid amount of the company profit tax to the average cost of fixed assets.

The modern information system for organizing tax activities at the level of a business entity's activity is interrelated with a set of information data, equipment, software, staff, standards, procedures for the collection, processing, storage, provision of information in accordance with requirements arising from the activity of the company.

Methods of assessing the efficiency of the information system are classified in three groups [4]:

1. Traditional financial methods (Return on Investment, Total Cost of Ownership, Economic Value

Added);

2. Probability methods (Real Options Valuation, Applied Information Economics);

3. Tools for quality analysis (Balanced Scorecard, Information Economics).

The basis of financial methods is the classical theory of determining the economic efficiency of investments and the generally accepted financial criteria, such as net discounted value, internal rate of return, etc. The main disadvantage of their use is the limited application of such methods, since they operate with the concepts of inflow and outflow of funds that require specificity and accuracy. In particular, to determine the outflow of funds (costs of the project of the information system) can be based on the amounts specified in contracts with integrators and suppliers. However, when trying to identify the flow of money, there are problems.

The advantage of probability methods is the ability to assess the likelihood of a risk and the emergence of new opportunities (increasing reliability, reducing the risks of corruption etc.) with the help of statistical and mathematical models. At the same time, the inability to forecast the change in economic indicators of financial and economic activity of a company (volume of payment of taxes and duties, tax burden) is hindered by the complete practical use of financial and probability methods in the current economic conditions with high level of accuracy.

An important advantage of qualitative (heuristic) methods is an attempt to supplement quantitative calculations with qualitative estimates which makes it possible to evaluate all explicit and implicit efficiency factors and link them with the general strategy.

In view of this, it is expedient to substantiate the mechanism for assessing the efficiency of the information system about tax capacity of economic entities, determining its significance on the basis of the integral indicator.

It is rather difficult to achieve the best method of assessing the efficiency of the information system on the basis of traditional financial approaches, therefore, a positive advancement in this direction can be considered as meaningful detection of the effect of introducing the information system about tax capacity of economic entities, measured by certain qualitative indicators. So, it is useful to develop the concept for a mechanism for assessing the efficiency of the information system of tax capacity which is based on the prerequisites for qualitative and quantitative analysis.

The mechanism for assessing the effectiveness of the information system of tax capacity of an entity describes the following interconnected components: the main factors and criteria that determine the process of the formation of tax capacity and determine the efficiency of the application of the information system; determining the significance of the selected criteria on the basis of a preliminary expert evaluation of the groups of factors and indicators within each of the selected groups; formation of an integrated evaluation of the efficiency of the information system of tax capacity.

In the process of assessing the efficiency of the information system of tax capacity, the indicators and criteria that reflect the extent of the positive effect of the system operation are formed at the first place. The aspects are determined, on the basis of which the factors are established, the indicators of efficiency and requirements for them are determined.

The effectiveness of the functioning of the information system is influenced by time and cost criteria, as well as other non-measurable parameters.

The category of criteria influencing the length of working time include elements of the mechanism for processing data of accounting and reporting, taking into account both measurable and non-measurable factors.

Cost criteria reflect expenditure items that can be reduced through the introduction of an electronic information processing system, as well as the costs of its implementation, such as the purchase of the necessary software.

The criteria for the reliability of data include those that reduce the degree of uncertainty of information, as well as the degree of errors, increase the accuracy of calculations and extend the horizons of forecasting.

Taking into account the aggregate of the selected factors, estimated performance indicators of the information system about tax capacity of the entity are formed (Figure 1).

The formed list of indicators, based on the consideration of the above categories of factors, makes it possible to build a system (vector) of criteria requirements to ensure the effectiveness of information about tax capacity of the entity:

$$\begin{cases} T_d \to \min; T_p \to \min; T_m \to \max; T_e \to \min; T_u \to \max; \\ C_r \to \min; C_p \to \min; C_s \to \min; \\ D_a \to \max; D_p \to \min; D_r \to \max; \\ I_i \to \max; I_c \to \max; I_b \to \max \end{cases} \quad (1)$$

In order to work out the final solution, the obtained partial criteria by bringing them to an integrated evaluation of efficiency using the nonlinear compromise scheme can be analyzed [9; 12].

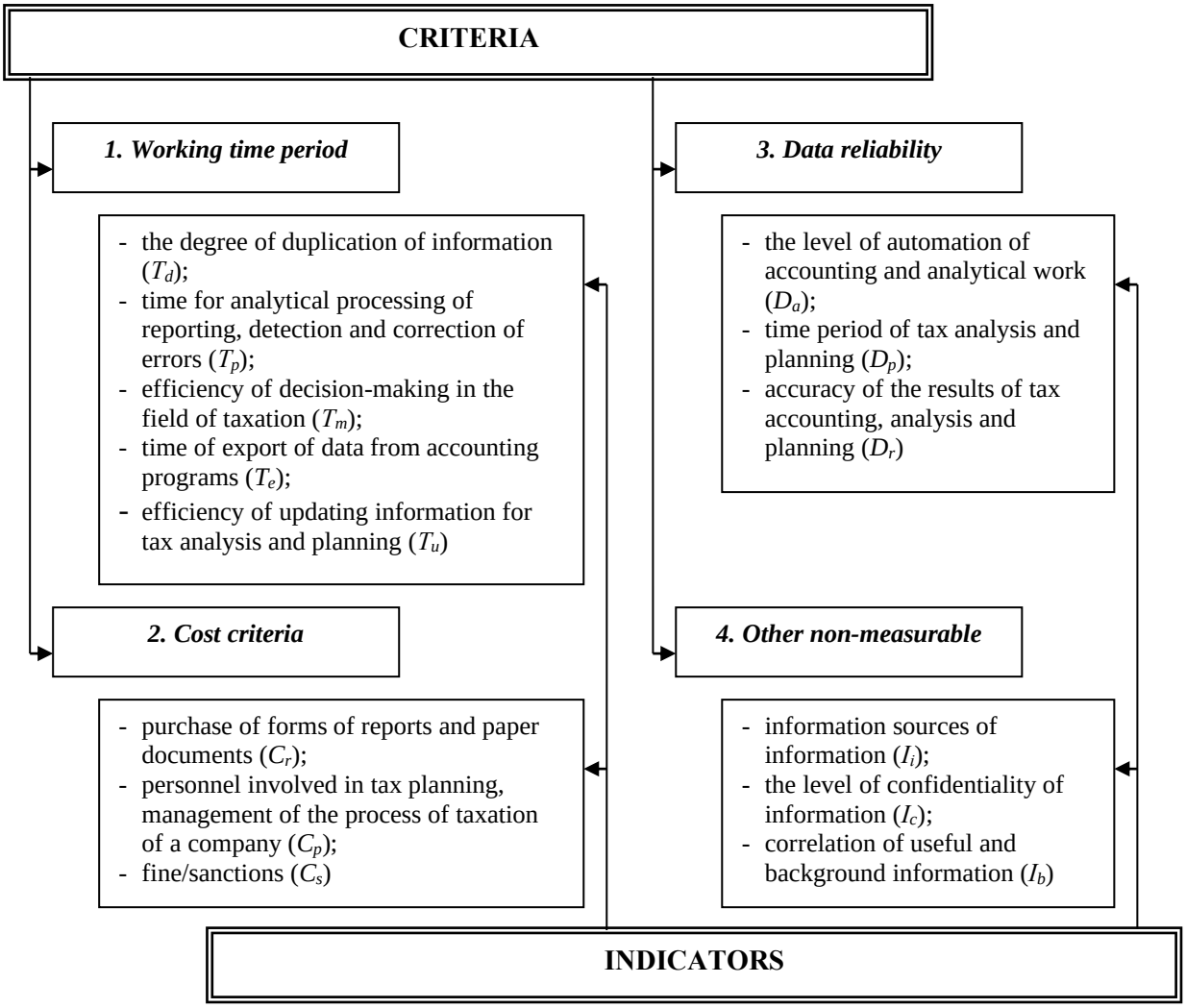

Figure 1. The system of indicators used for evaluation the efficiency of the information on tax capacity of a business entity

With this method, a discrete form of representation of the change of partial criteria is assumed. A convolution product for discretely specified partial criteria will be the following:

$$Y(y_o) = \sum_{i-1}^{n} \lambda_{o_i} \times (1 - y_{o_i})^{-1} \to \min; \quad (2)$$

where $i = 1...n$ is the number of partial criteria included into the convolution product of the system efficiency;

λ_{o_i} is the standard weight rate (provides the possibility of dominating a certain partial criterion over others);

y_{o_i} is the standard weight rate of optimality (rationing of the included in the convolution product (2; 3) parameters provides equal influence on the results of the solution of the optimization problem of each of the partial criteria (1)).

The procedure of rationing of partial criteria of system efficiency in the case of a discrete representation of them is realized relative to the sum of all values obtained for the analysis of the change of criteria:

$$\begin{cases} T = \lambda_{o_d} \times (1 - T_{o_d})^{-1} + \lambda_{o_p} \times (1 - T_{o_p})^{-1} + \lambda_{o_m} \times (1 - T_{o_m})^{-1} + \lambda_{o_e} \times (1 - T_{o_e})^{-1} + \\ \lambda_{o_u} \times (1 - T_{o_u})^{-1} \to \min; \\ C = \lambda_{o_r} \times (1 - C_{o_r})^{-1} + \lambda_{o_p} \times (1 - C_{o_p})^{-1} + \lambda_{o_s} \times (1 - C_{o_s})^{-1} \to \min; \\ D = \lambda_{o_a} \times (1 - D_{o_a})^{-1} + \lambda_{o_p} \times (1 - D_{o_p})^{-1} + \lambda_{o_r} \times (1 - D_{o_r})^{-1} \to \min; \\ I = \lambda_{o_i} \times (1 - I_{o_i})^{-1} + \lambda_{o_c} \times (1 - I_{o_c})^{-1} + \lambda_{o_b} \times (1 - I_{o_b})^{-1} \to \min \end{cases} \quad (3)$$

In determining the integrated evaluation of the efficiency of the information system by the convolution product (2), which will include generalized criteria (3), their rationing is carried out against the worst estimate (the maximum value of the indicator characterizing the partial criterion) by the expressions [9; 12]:

$$L_o = L \div \max L, \max L = \sum \lambda_{o_i} \times (1 - [\max L_i - \Delta])^{-1} \quad (4)$$

where L is generalized criteria;

L_i - the least favourable value of the partial indicator;

$\Delta = 0{,}1...0{,}3$ is the assurance coefficient which eliminates the incorrect operations while rationing.

On this basis, an integrated evaluation of the efficiency of the information system about tax capacity of an entity is formed by the expression:

$$Eff = \lambda_T \times (1 - T_o)^{-1} + \lambda_c \times (1 - C_o)^{-1} + \lambda_d \times (1 - D_o)^{-1} + \lambda_I \times (1 - I_o)^{-1} \quad (5)$$

Weight coefficients provide a flexible response to the requirements for dominating the criteria of a particular group over others and their impact on the resulting performance evaluation. In order to simplify the process of analyzing the efficiency of the system under study with an integrated evaluation (5) it is necessary to make its valuation in accordance with the expressions:

$$\begin{aligned} & Eff = 1 - (Eff \div \max Eff), \\ & \max Eff = \lambda_T \times (1 - [\max T_o - \Delta])^{-1} + \lambda_c \times (1 - [\max C_o - \Delta])^{-1} + \lambda_d \times (1 - [\max D_o - \Delta])^{-1} + \\ & + \lambda_l \times (1 - [\max I_o - \Delta])^{-1} \end{aligned} \quad (6)$$

Thus, the rationing of the integrated evaluation is carried out in relation to the worst case of the system efficiency in general. Its implementation provides the opportunity to develop solutions for the

effectiveness of the existing system of information about tax capacity of a business entity. After the rationing of the integrated evaluation, we will have its change in the range from zero to one: with the best result close to one, and the worst close to zero.

Conclusion

The considered approach to assessing the efficiency of the current system of information about tax capacity of a business entity will reduce subjectivity and assess alternative information systems in terms of the effectiveness of their implementation.

The proposed mechanism for assessing the efficiency of the current information system on tax capacity of an entity will help identify major problems in the system, focusing on improving individual factors, and reducing uncertainty in the tax planning stages. The application of weight factors makes it possible to adapt the criterion of efficiency depending on the dominance of certain factors over others in the current period of time.

Therefore, the formation of the information system on tax capacity and evaluation of its efficiency is an important task of tax management which is closely linked with the system of accounting at a company, the completeness and reliability of the information received. Currently, there are a large number of methods for assessing tax capacity, each of which has its advantages and disadvantages, expressed in precision and complexity of measurement. Among them, at the enterprise level, it is expedient to use methods involving the calculation of tax capacity, based on the official forms of tax reporting, as well as the method of regression analysis.

References

[1] Ansoff I 1999 A New Corporate Strategy. St. Petersburg : Publishing house "Peter"

[2] Balabanova L 2004 Managing the Competitiveness of Enterprises on the Basis of Marketing. Donetsk: DonGUET named after Tuhan-Baranovskyi

[3] Chepurnoy I 2002 Competitiveness of food products. (Moscow: Publishing and Book-Marketing Center "Marketing")

[4] Elashkin M 2004 How to assess the effectiveness of IT? Open systems. No 7 [Online] Available: http://www.osp.ru/os/2004/07/184997

[5] Furmanyuk O and Tartachnyk M 2003 Managing the competitiveness of the enterprise. (Irpen: National Academy of State Tax Service of Ukraine)

[6] Ivanov Yu, Tishchenko A, Drobitko N and Abramova O 2004 Competitiveness of the enterprise: evaluation, diagnostics, strategy. (Kharkiv: Publishing-house of KhNEU)

[7] Kozachenko V 2002 Management of the total cost of ownership of the KIS. Corporate Systems. No 2 pp 13-20

[8] Pavlova V 2006 Competitiveness of an enterprise: evaluation and strategy of provision. (Dnipropetrovsk: Publishing house of DUEP)

[9] Pisarchuk O 2010 Evaluation of the effectiveness of information systems according to the criterion vector. Collection of scientific works of Zhytomyr Military Institute of National Aviation University. Issue 3 pp 117-123

[10] Sidun V 2003 Business Economics. (Kyiv: Center for Educational Literature)

[11] Skrypkin K 2002 Economic efficiency of information systems. (Moscow: DMK Press)

[12] Voronin A, Ziatdinov Yu, Kharchenko A and Ostashevskyi V 1997 Complex technical and erratic systems: the method of use. (Kharkiv: Fact)

[13] Voronkova A 2000 Strategic management of the competitive potential of the enterprise: diagnostics and organization. (Luhansk: Publishing House of East Ukrainian National University)