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ИССЛЕДОВАНИЕ РОЛИ БИЗНЕС-ШКОЛ В РАЗВИТИИ ИССЛЕДОВАТЕЛЬСКИХ УНИВЕРСИТЕТОВ МИРОВОГО КЛАССА

Исследованы сферы влияния бизнес-школ на потенциал исследовательских университетов мирового класса. Проведен анализ рейтинга 25 ведущих бизнес-школ мира и охарактеризована их деятельность. Показаны основные различия и общие черты в подходах к организации обучения на основе использования графического метода. Идентифицированы и систематизированы закономерности функционирования бизнес-школ в структуре исследовательских университетов.

Ключевые слова: сферы влияния бизнес-школ на развитие исследовательских университетов, рейтинг бизнес-школ, закономерности функционирования бизнес-школ.

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CONCEPTUALIZATION OF THE EFFECT OF TAXATION ON THE DEVELOPMENT OF SMALL ENTERPRISES

Запропоновано концепцію моделювання впливу оподаткування на розвиток малого підприємництва в Україні. В її основу покладено ідею застосування когнітивного, імітаційного та рекурсивного моделювання. Практична значущість концепції полягає у наданні можливості приймати управлінські рішення щодо удосконалення податкових інструментів у межах забезпечення інтересів як платників податків, так і держави. Досягнутий баланс інтересів у довготривалій перспективі забезпечить стабільність розвитку малих підприємств.

Ключові слова: *розвиток малого підприємництва в Україні, моделювання впливу податкового регулювання, чистий прибуток.*

1. Introduction

Structural inconsistency with new operating conditions and targeted disorientation of small enterprises restrain the processes of adaptation to environmental conditions. This leads to deterioration in their financial condition and a significant reduction in the number of small businesses on the market. Taxation also needs to be updated in accordance with the crisis situation prevailing in Ukraine. The current mechanism of taxation of small enterprises does not meet modern requirements for doing business, not from the point of view of the tax burden level, nor in the context of tax debt administration. Only subject to the establishment of an appropriate relationship between the conditions for the formation of a tax liability and market opportunities for their provision, the ability of entities to move from the state of «ensuring functioning» to the state of «development» will significantly expand. Thus, the problem of modeling the impact of taxation on the development of small businesses is urgent and requires an integrated approach.

2. The object of research and its technological audit

Small enterprises as *an object of research* are a lot of business entities which performance results simultaneously form the middle class in society, the flexibility and adaptability of the state's economic system. As a result of the dynamic development of small enterprises, new qualities are formed, conditioned by the manifestation of the system properties (Table 1) of the functioning of the subject and the taxation system, and change the vector of their further development.

In general, the properties of the taxation system are determined both by the general properties of the open system, and by the properties of taxes and their regulatory function. In addition, the properties of an open system of functioning of a small enterprise are determined by the general properties of the system and the characteristic properties. The latter determine the specifics of their type of activity, role and purpose in the market, as well as the environment from which the object is allocated for

research in a certain period. This is due to their variability with time.

Table 1

Properties of the investigated systems

Attribute	System of taxation	System of functioning of small enterprises
Goals and functions	Synergies, emergence, purposefulness, limited alternative to functioning and development, priority of global interests, robustness	Synergies, multiplicativity, purposefulness, broad alternative to functioning and development, priority of own business interests
Structure	Partially closed system, integrity, hierarchy, systemic	Open system, integrity, additivity, heterarchy, systemic
Resources, relationships with the external environment	Communicative, interaction with the external environment, stability, stability, reliability, integrativity, heredity, development	Communicative, interaction with the external environment, adaptability, instability as a condition for dynamic development, integrativity, development, self-organization

Note: the author's proposal based on [1].

However, vulnerability and hypersensitivity to changes in environmental conditions necessitate state support of entities, in particular in the area of tax regulation, within the limits of the tasks of finding a compromise between the commercial interests of taxpayers and the fiscal function of the state. Taking into account the experience of the member countries of the European Union in the use of clusters, promote cross-sectoral and cross-border cooperation, which in turn affects the development and internationalization of small and medium-sized businesses, it is advisable to pay special attention to the clusterization of small business in Ukraine [2, 3].

3. The aim and objectives of research

The aim of research is conceptualization of the taxation impact on the development of small enterprises in Ukraine based on the construction of an appropriate concept, taking into account small enterprises and the state in the process of taxation. To achieve this aim, the following tasks are set:

1. To substantiate a complex of economic and mathematical models, solve a poorly structured problem of studying the influence of factors on the development of socio-economic systems.

2. To develop a structural and logical scheme for the concept of modeling the taxation impact on the development of small enterprises in Ukraine as a research methodology.

4. Research of existing solutions of the problem

The analysis of scientific works shows that the classical approach to modeling the influence of factors on the development of small business [4] is the use of statistical and correlation-regression [5], but the limited nature of this methodology only partially provides the necessary information to the system of making managerial decisions. Taxonomic [6], cluster, factor analyzes [7, 8], methods of expert studies [9], optimization, forecasting [10, 11] are also used. However, the taxonomic approach negates the value of input data due to their normalization, and the methods of expert studies are characterized by a high degree of subjectivity. In addition, the results of cluster analysis

are important only at the time of its implementation, and factor models need constant updating of parameters. Let's note that the problem of studying the impact of taxation on the development of small enterprises is poorly structured. This is explained by the limited information on the performance of the subjects, the lion's share of which is «in the shadows». Also, the influence degree of controlling bodies on the development of small business is hidden.

This makes it expedient to use the appropriate general scientific and special methods for investigating poorly structured problems, in particular: cognitive [12, 13], system-dynamic [14] and recursive modeling [15, 16].

5. Methods of research

General scientific and special methods, namely are used in this research:
– dialectical, observations, theoretical generalization – for the study of theoretical and applied taxation provisions of small enterprises in Ukraine and abroad;
– critical analysis – to study the existing experience of solving the problem;
– system approach, synthesis – to develop a concept of modeling the impact of taxation on the development of small enterprises in Ukraine;
– an integrated assessment – to justify the assessment of the state of small business in Ukraine and its changes;
– fuzzy logic and cluster analysis – to formalize the dynamic model of cluster analysis of small business in Ukraine;
– cognitive modeling and fuzzy logic – to formalize the fuzzy cognitive model of the impact of tax regulation on the development of small enterprises in Ukraine;
– recursive modeling and regression analysis – to formalize the recursive model of the amount of reinvested net profit of small enterprises in Ukraine.

6. Research results

According to Fig. 1, the structure of the concept presupposes the achievement of the main aim – making managerial decisions to improve tax instruments in order to ensure the sustainability of the development of small enterprises in the long term. Under the stability of the development of subjects in the work, it has been accepted to achieve positive growth of the system parameters for a long period, which will allow achieving a qualitatively better level of development in the future. Directly the development of small enterprises is formed due to the external and internal spectrum of factors, where the influence of tax regulation is exerted from the external, and from the internal – reinvestment in the expansion of their own business as an instrument of self-development and self-organization of the subject.

In the first block of the concept, in order to achieve this aim, the regulatory framework of small enterprises in Ukraine and abroad is being investigated with a view to determining the many limitations of their functioning and development:

$$O^s = \{o_i^s\},$$

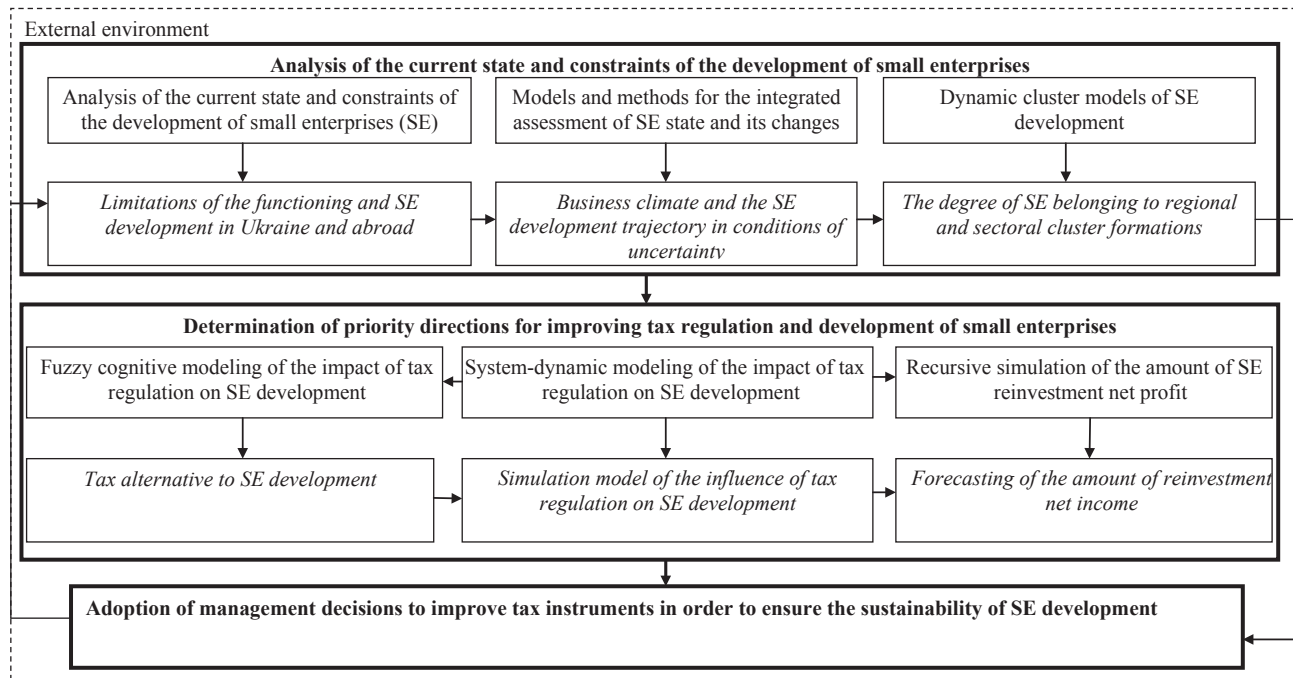where s – the level of constraints (low, medium, high); i – constraint tools.

Fig. 1. The concept of modeling the taxation impact on the development of small enterprises in Ukraine

To determine and characterize the current situation, the business climate is analyzed as a medium for the development of small business. The research is carried out on the basis of a critical evaluation of the dynamics of the corresponding index and its components. This allows to justify the additions of a set of quantitative factors for the development of small enterprises with quality ones.

In the conditions of the described situation, the integral value of the development level of small business entities of Ukraine is calculated, which is constructed on the basis of grouping the statistical data array into the following groups: labor – *x*, financial – *y*, material resources – *z*. Since the indicators characterize different subsystems of the activities of the subjects and, accordingly, are inhomogeneous values with different dimensions, the preliminary condition for calculating the integral index is their preliminary normalization.

Depending on whether the indicators are stimulants or depressants, they are normalized according to the following formulas:
– stimulants:

$$Y_i^{Norm} = \frac{Y_i - Y_{\min}}{Y_{\max} - Y_{\min}},$$

Y_i – the value of the financial resources indicator; $Y_{\min}$ – the minimum value of the financial resources indicator; $Y_{\max}$ – the maximum value of the financial resources indicator;
– depressants:

$$Y_i^{Norm} = \frac{Y_{\max} - Y_i}{Y_{\max} - Y_{\min}}.$$

At the second stage, a generalizing indicator is formed, taking into account the difference in the influence degree of individual factors on it by determining the weights of each index in the group [17]. At the third stage, let's calculate the matrix of factor loads, the eigenvalues and fractions

of the variances will be used to find the weights of the indicators of small business development in Ukraine. Let's calculate the weights in the following sequence [17]. In each row of the factor load matrix let's find the maximum in absolute value, the values of the factor load:

$$\max_{1 \le j \le m} |a_{ij}| = b_{ij}, \; i = \overline{1,m},$$

where j_s – the number of the column in which the maximum value is located. Let's calculate the products of the factor load module a_{ij} and the fraction of the total variance, which he explains:

$$\frac{\dfrac{\lambda_{j_s}}{m}}{g_i} = b_{ij} \cdot \frac{\lambda_{j_s}}{m}, \; i = \overline{1,m},$$

where λ_{j_s} – the eigenvalues of the table of factor loads; m – the number of indicators for development of small enterprises in Ukraine. Let's find the sums of the obtained products for all factors: $S = \sum_{i=1}^{m} g_i$. Let's calculate the weight of each indicator by the formula:

$$\omega_i = \frac{g_i}{S}, \; i = \overline{1,m}.$$

To calculate the indicators for the development of small enterprise for labor, let's use the integral value, the formation of which is based on the use of the additive model:

$$I_A = \sum_{j=1}^{m} \omega_j x_j^{Norm}, I \in [0,1]. \tag{1}$$

Similar calculations will be made for material and financial resources [17]. At the third stage of the integrated assessment of small business development in Ukraine, let's calculate the integral index directly. Since each of the

indicators of small business development has a different effect on the integral index, let's calculate the weights of the indicators in accordance with the previously used methodology for calculating weights [17]. Having weighed the calculated values of the indicators into their corresponding weight coefficients and using additive convolution, the integral index of small business development in Ukraine is calculated. In this case, the level of development can be determined by the Harrington scale [18], to determine the overall trajectory and the idea of the possibility of correcting the existing trend in the development of the investigated system.

The next stage of the concept is studying the development of small business using dynamic cluster analysis based on the changes in the composition of clusters built for each year in solving problems in static. Let n regions (regions) with m signs be considered for T years. In order to establish the degree of ownership of set of small business entities $M = \{m_n\}$, to regional or sectoral cluster entities, sample allocations are performed for each year t by the method of cluster analysis of k-means to l subsets (clusters), where each object $M = \{m_n\}$ is assigned a cluster number $j = \overline{1,l}$ [19]. The results of partitioning regions into clusters by T years are represented as a matrix Z with elements $z_{it} = j$. Where $i = \overline{1,n}$ – the number of the region (industry), $t = \overline{1,T}$ – the number of the year, $j = \overline{1,l}$ – the cluster number into which the region (region) i fell in the year t [19]:

$$Z = \begin{pmatrix} z_{11} & \dots & z_{1t} \\ \dots & \dots & \dots \\ z_{i1} & \dots & z_{it} \end{pmatrix}. \tag{2}$$

Thus, the column t of the matrix Z characterizes the composition of clusters of regions (regions) in year t, and row i – the numbers of clusters in which the region (region) i fell for T years. Let's denote i-th region (branch) by z_i.

Let R be a universal set consisting of all elements of the matrix $Z : R = \{z_{it}\}$, $i = \overline{1,n}$, $t = \overline{1,T}$ [19]. On the universal set R let's define the set V_{R_i}, $i = \overline{1,n}$ for t years as follows [19]:

$$V_{R_i} = (R, \delta_{it}^j), \tag{3}$$

where the membership function δ_{it}^j has the form:

$$\delta_{it}^j = \begin{cases} 1, \text{ if } z_{it} = j, \\ 0, \text{ if } z_{it} \neq j. \end{cases} \tag{4}$$

In other words, have n sets V_{R_i}, $i = \overline{1,n}$, each of which is the corresponding row of the matrix Z with the membership function for the elements of this row equal to 1, and for all other elements of the matrix Z equal to 0.

For further investigation, let's consider the fuzzy set K_j given on the universal set R_i, which has the following form [19]:

$$K_j = \{R_i | d_{K_j}(R_i)\}, \tag{5}$$

where $d_{K_j}(R_i)$ – the membership function for the fuzzy set K_j, $i = \overline{1,n}$, $j = \overline{1,l}$. Considering the above, the membership function $d_{K_j}(R_i)$ for a fuzzy set K_j is determined by the formula [19]:

$$d_{K_j}(R_i) = \frac{\sum_{t=1}^{6} \delta_{it}^j \cdot t^\alpha}{\sum_{t=1}^{6} t^\alpha},$$

$$i = \overline{1,15}, j = \overline{1,6}, t = \overline{1,5},$$
$$i = \overline{1,15}, j = \overline{1,3}, t = \overline{1,6}, \tag{6}$$

where i – the number of the type of activity of a small business; j – cluster number; t – investigated period; α – parameter by means of which it is possible to «configure» the membership function for working with short or long time series [19]. By adjusting the parameter, one can obtain the value of the membership function $d_{K_j}(R_i)$, which makes it possible to describe as clearly as possible the degree of belonging of the types of economic activity of small business entities of Ukraine to clusters in dynamics [19].

In the second block of the concept, a fuzzy cognitive model of the taxation impact on the development of small enterprises is being developed to justify an economically viable tax alternative to their development.

The fuzzy cognitive model is based on the formalization of cause-effect relationships that take place between the factors (variables, parameters) that characterize the investigated system in the form of digraph. To implement the formed digraph, an adjacency matrix $C = \|c_{ij}\|_{n \times n}$ is formed according to the following condition [11]:

$$\text{sgn}(u_j, u_i) = \begin{cases} 1, \text{ if edge } (u_j, u_i) \text{ is positive,} \\ -1, \text{ if edge } (u_j, u_i) \text{ is negative,} \\ 0, \text{ if edge } (u_j, u_i) \text{ is absent.} \end{cases} \tag{7}$$

To assess the balance of the proposed system, the relative balance of $B(K)$ is calculated for the basic definitions of the ratio between the number of positive contours of the formed digraph to the total number of them, provided that $B(K) \in [0;1]$ [11, 12]. If the value $B(K) = 1$ is obtained, the digraph is balanced, and if the obtained value $B(K) = 0$ is unbalanced [11, 12].

Since the contours of the digraph have different lengths, let's determine the relative balance measure $B(K)$ taking into account the length of the contours [11, 12]:

$$b(K) = \frac{\sum_{k=3}^{c} \frac{1}{3} p_k}{\sum_{k=3}^{c} \frac{1}{3} t_k}, \tag{8}$$

where p_k – the number of positive k length cycles; t_k – the total number of k length cycles; c – length of the longest cycle in digraph K.

The result of formalization is the representation of the system in the form of a cause-effect network, the so-called fuzzy cognitive map, which has the form [11, 12]:

$$G = \langle V, W \rangle, \tag{9}$$

where V – a number of factors (factors); W – a fuzzy cause-effect relation on the set V. Moreover, in problems of dynamic analysis, fuzzy quantities are attributed not only to constraints, but also to factors [12]. For fuzzy cognitive maps, the following modification of the impulse process model is used [20]:

$$v_i(t+1) = S\begin{pmatrix} v_i(t) + q_i(t+1) + o_i(t+1) + \\ + \sum_{j=1}^{k} T(w_{ij}, p_j(t)) \end{pmatrix}, \qquad (10)$$

where $v_i(t)$ – the value of the i-th factor at time t; $q_i(t+1)$ – external impact on the i-th factor at time $(t+1)$; $o_i(t+1)$ – control action on the i-th factor at the moment $(t+1)$; w_{ij} – intensity of influence between factors; $p_j(t)$ – change of value at time t (pulse); T – T-norm operation; S – S-norm operation (Lukasiewicz S-norm is used).

In conditions of fuzziness, initial values of factors and level of intensity of influences (low, medium, high levels, etc.) are chosen to generate alternatives. The selection of the generated alternatives is performed in accordance with the purpose of the study, where the alternative (scenario) is the vector of influences on the controlled factors obtained as a result of the analysis of the cognitive model or specified by the user [20].

It is proposed to build a fuzzy cognitive model of the taxation impact on the development of small businesses, taking into account such indicator as «time tax» and «expected changes in the financial and economic situation». By «temporary tax» let's mean the percentage of time spent by entities on registration and re-registration procedures; obtaining licenses, certificates of conformity, hygienic permits; checks by regulatory bodies.

In addition, the fuzzy cognitive model will be used as a model basis for constructing an imitative model of the taxation impact on the development of small enterprises in the Vensim environment. In the simulation model, let's propose to take into account the differences between groups of single tax payers and the payment of a social contribution, the number of employees, on the whole, forms the aggregate tax burden on the results of the activities of the subjects. As a result of imitation, the level of the tax burden will be assessed, taking into account the economic capabilities of taxpayers, while maintaining the level of tax revenue to the budget.

At the next stage of the concept, let's propose to construct a recursive model for forecasting the volumes of possible reinvested net profits of small enterprises. Let's notice, weight factors of their development act not only external factors (in particular taxation), but also internal. Recursive modeling is based on the rationale for the alternate occurrence of cause-effect relationships between factors that allows to justify a single trajectory of obtaining possible results without feedback.

Thus, Y – the last variable in the trajectory of motion, and X – the variable that determines Y, that is [15, 16]:

$$X_a \rightarrow X \rightarrow X_b \rightarrow Y, \qquad (11)$$

where X_a – the set of variables preceding X; X_b – set of variables following X; Y – dependent variable.

The recursive model is represented by recursive functions, given by recurrence formulas of the type:

$$r_k = f(k, r_{k-1}, r_{k-2}, ..., r_{k-n}).$$

However, in this case, not the period, but the previous stages in the formation of the target indicator that corresponds to the essence and economic content of the formation of net profit (loss) from the entrepreneurial

activity in accordance with the provisions of accounting standards (П(С)БО 25). The advantages of recursive modeling are that the nonlinear problem transforms into linear, so it has a simple solution.

In the last, third block of making managerial decisions, ways will be proposed for improving taxation, taking into account the results of modeling aimed at forming the tax consciousness of entrepreneurs and further development of entrepreneurial activity as a source of budget revenues.

7. SWOT analysis of research results

Strengths. The concept of modeling the taxation impact on the development of small businesses in Ukraine is built on the basis of a weak structure of the research problem. The structure of the concept is formed from phased blocks that form the author's methodology of research.

Weaknesses. As an indicator of the «development» of a small enterprise, only the volumes of reinvested net profit are investigated, only partially describes this multifaceted category. In addition, a significant part of the number of subjects is still unprofitable, so it is advisable to perform recursive development modeling also on other indicators.

Opportunities. The proposed conceptual approach can be used for various sectors of the economy due to efficiency in the conditions of information restriction and its vagueness. In subsequent studies, a model basis is planned.

Threats. Variability of the tax policy of the state makes it necessary to constantly check the model parameters for adequacy and reliability. Also, the crisis situation in Ukraine determines the formation of a stable trend for the business curtailment in a small sector of the economy.

8. Conclusions

1. The complex of economic-mathematical models is substantiated. They solve the poorly structured problem of studying the influence of factors on the development of socio-economic systems, in particular, of a small enterprise. The choice of the results of the critical analysis of the most frequently used models based on the application of correlation-regression, taxonomic, cluster, factor analysis, methods of expert research and optimization is justified. It is proved that their use is limited in conditions of weak structuring of the research problem. It is suggested to compensate for their shortcomings by using the theory of fuzzy logic, methods of system dynamics, cognitive and recursive modeling.

2. The structural-logical scheme of the concept of modeling the taxation impact on the development of small enterprises in Ukraine as a research methodology is developed. The conceptual vision of achieving this aim lies in the synthesis of the results of the phased research, namely:
   – critical analysis of the regulatory framework of small enterprises in Ukraine and abroad to determine the many limitations of their functioning and development;
   – analysis of the business climate as a medium for the development of small enterprises on the basis of a critical assessment of the dynamics of the corresponding index and its components;
   – calculation of the integrated value of development level of small business in Ukraine;
   – construction of dynamic cluster models for development of small business with the aim of determining

the degree of belonging to regional and sectoral cluster entities;

– development of a fuzzy cognitive model of the taxation impact on development of small enterprises to justify an economically viable tax alternative;

– construction of a recursive model for forecasting the volumes of reinvested net profit.

Practical implementation of the concept will allow to make managerial decisions to improve tax instruments in the framework of ensuring the interests of both taxpayers and the state to ensure the sustainability of their development.

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КОНЦЕПТУАЛИЗАЦИЯ ВЛИЯНИЯ НАЛОГООБЛОЖЕНИЯ НА РАЗВИТИЕ МАЛЫХ ПРЕДПРИЯТИЙ

Предложена концепция моделирования влияния налогообложения на развитие малого предпринимательства в Украине. В ее основу положена идея применения когнитивного, имитационного и рекурсивного моделирования. Практическая значимость концепции заключается в предоставлении возможности принимать управленческие решения по совершенствованию налоговых инструментов в рамках обеспечения интересов, как налогоплательщиков, так и государства. Достигнутый баланс интересов в долгосрочной перспективе обеспечит стабильность развития малых предприятий.

Ключевые слова: развитие малого предпринимательства в Украине, моделирование влияния налогового регулирования, чистая прибыль.

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