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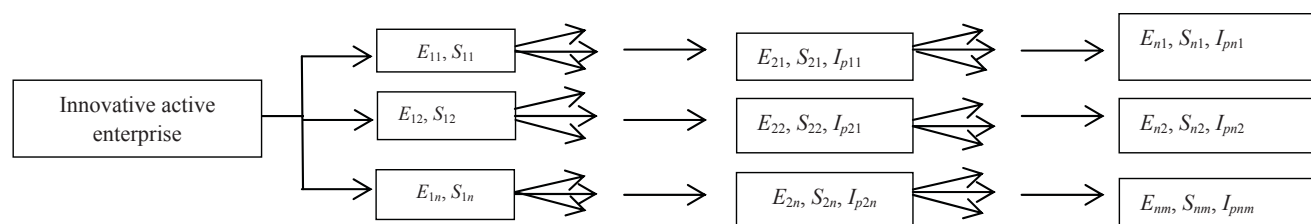
**Keywords:** *innovation development, business modeling, enterprise taxonomy method.*

The issue of national innovation systems and innovative entrepreneurship is a subject of many studies in Ukraine. In particular, Fedulova L., M. Pashuta, A. Sirko, A. Halchynskyy, V. Heyets, A. Kinakh, V. Semynozhenko, A. Chukhno, L. Melnykov, O. Duplyak and other scientists determine the role of national innovation systems in innovative development, the status of state regulation of innovative processes, analyze its individual components. In the work edited by A.I. Volkova, M.P. Denisenko, A.P. Grechan contemporary innovation potential and innovation management at various levels are analysed [7]. V. Zyanko, I.V. Pavlenko and N. Prytulyak devoted their studies to consideration of innovative entrepreneurship in the transitional period [1, 4, 5], but the problems of innovative entrepreneurship in Ukraine at the present stage of development still remain insufficiently determined.

To fulfill the objective one has to accomplish following tasks - to form a self-contained, integrated innovative system capable of extended recreation and self-development on the principles of balance. Therefore the basic principle of the innovative development of industrial enterprises in Ukraine is to develop a business model which would be balanced in inseparable system of exploiting and reproducing multifaceted resources and provide a coordinated movement according to the main strategic plans.

Recently usage of business models are widely applied to the management of enterprises and individual spheres of activity. Business modeling is the process of development of the various business models of the company (the strategy, processes, the organizational structure, resources, etc.) in order to optimize the functioning of the enterprise. There are different approaches to the definition of "business model".

One of the most common ways to build a business model is a tree (or hierarchical list), which allows you to list all the elements of the business model, to show relations (subordination, inclusion, etc.) between them and the parameters of each element. Structurally we can depict this tree as a scheme, the example of multiplying economic effect of the introduction of the business model (Fig. 1).



*Source: own developments*

The economic effect  $E_i$  after the introduction of IS leads to the effect of increasing, that means that the use of B-M  $S_i$  with defined economic effect creates innovative products  $I_p$  this process multiplies, so the economic effect  $E_{i1}$  of the first order and  $S_{i1}$  generate  $E_{i2}$  and  $S_{i2}$  in the future and generate new and innovative product [6].

So using business models in the company brings benefits not only to themselves, but also to society, creating innovative product, and with the effect of increasing from the introduction of B-M has its reflection on most effects (social, environmental, industrial).

The table is also a common way of building B-M, which allows to list all the elements of the business model (the rows) and give them detailed characteristics (the columns). The most famous example of this is the matrix (table) of shared responsibility. Perhaps the least effective way to build business models is a text description. The text is very difficult to formulate complicated business models and to track the relationship between their elements.

Best option is a combination of three methods of developing business models (graphs, tables, text), which is implemented in almost all professional products of business modeling. If a set of business models covers most of the major areas of activity and control systems at the enterprise, such set is called the integrated business model of the company [3]. Integrated business model of the company, which includes typical successful practices and solutions, typical models, documents and regulations in key areas of management and business engineering at the company is called a typical integrated business model of the company.

Building integrated business model will allow to: significantly reduce the time and costs for the project of formalization and optimization of the enterprise and other projects of organizational development; quickly and efficiently design new products / services and business processes; to implement practices into activities of the company which proved to be successfully working in the sector ; to improve the quality of service and domestic activities; to increase efficiency and quality of administrative decisions ; to link strategy with all elements and management systems at the enterprise (business processes, personnel, projects, IT etc.); to release leaders from different types of routine functions to take timely and accurate management decisions.

Integrated typical business model of enterprise is an effective tool and informational and methodical manual for the formalization and improvement of the enterprise. It is applicable for companies that start description of business processes and the formalization of activities from scratch as well as for enterprises that continue to update and improve already described business processes and other elements of the activity. The business model of the company includes successful practices and solutions, models, documents and regulations in key areas of management and business engineering at the enterprise: strategy and DSC, business processes, organizational structure and personnel, production, quality and ISO 9000 regulation and workflow, system architecture etc.

Number [3] states that the business model of the company includes 4 groups of business models according to the main control systems at the enterprise: strategic management, business process management, personnel management and organizational structure and quality management. In each group there are different business models on specific aspects submit to the control system. 5th group "of objects and resources" is composed from different auxiliary business models. However, it seems necessary to highlight this important business model as a model of innovative enterprise development. Speaking of innovative development, one must emphasize its reliance on intensive factors of knowledge, information, technology, etc., that allows to ensure a strategic competitive advantage, and that is competitiveness in the long run. Undoubted is the fact that exactly such kind of factors provide not just a quantitative growth, but qualitative change of condition of the enterprise. Here are some other essential features in the innovative development of enterprise: having a goal (development can not be aimless); systematic (management of innovative development is based on the systematic approach); inevitable nature (expressed in the pursuit of enterprise management to systematically and consistently develop it through innovations); being open to changes (the system that for some reason doesn't accept positive changes is not capable of innovative development); availability of appropriate management (management of innovative development requires the formation of an appropriate system that includes an administration, management mechanism, object management and system of forward and backward linkages).

Considering the information above, the development of an innovative enterprise should be considered in two interrelated aspects:

- as goal-oriented, steady increase of competitiveness and economic efficiency of enterprises, based on intensive development factors (knowledge, information, advanced technologies, etc.);
- as focused continuous improvement and efficiency of their own innovative enterprise.

When constructing the B-M of innovation development, special attention should be paid to business processes of innovation. To determine the content of business process of innovation activity one can use the approach to designing of any administrative business processes. This design includes a number of stages.

In the first stage, the initial position of the organization are determined by structuring the primary processes that are crucial for banking. At this point we should define the methods of administration and management mechanism of each. This task can be accomplished by the description of the products which is the result of this process, and also by identifying stages of implementation and control of operations on phasic management procedures.

The second stage gives the definition of information provision. Based on the analysis of structured primary processes they formalize the information necessary for improving the primary business processes in stages of

organization, products, technology, specific to the sale. To accomplish this task it is required to identify all possible parameters of products from primary processes, determine the factors of demand, identify relations between factors and stages of business processes, identify the control variables and the quality criteria of information, means of its control and documentation.

Third stage implies logical structure design. At this point we need to integrate the information received during the previous two stages, which would ensure proper structuring of innovative business process aimed at developing the product range, technology, organization and communication of primary processes.

The fourth stage is designing the physical structure of the business. Based on the project of the logical structure of the business process we build the organizational structure of the process with particular participants (departments and specialists) who perform specific functions for the implementation of previously identified procedures; the relationship between them; the results from the interaction of participants in the cycle of appearance and typing of the innovation. It is at this stage, when a new model of the primary process is build. It is formalized in the regulations of the technological process, making decision and performing management techniques, the evaluation of the results and incentives determined not only by the results of the primary processes, but by the result of innovation.

Finally, the final step is the standardization of innovation. Here we can see the transformation of the innovative product of this innovation process into a typical product. The process of organization and its production technology have already undergone all the necessary changes, all the iterations that are taken into account, from producing to supplying a product, and are now improved. Typification of innovation is the foundation for the transition to start a business process innovation aimed at further improving of primary business processes both in terms of results and organization, technology and promotion to the consumer.

We offered to use method of taxonomies during the first phase for the evaluation of internal indicators of business activities of industrial enterprises and identify goals, which affects the current state of the business model. The main purpose of using the method of taxonomies is to ascertain the presence or absence of uniformity of chosen objects.

The information about the properties of multivariate random variable value that belong to allocation spectrum can be accessed using taxonomic method. This method allows you to split the data that is defined and examined as an object of taxonomic research. It is through this method that we can determine a set of objects which correspond to the distribution point of the set. Analysis of homogeneity of objects can be significantly improved if we implement a selected set of appropriate indicators to assess the relative difference of our homogeneous subsets. We offered to use domestic business activity indexes for this assessment, because, in our opinion, these figures affect most components of the business model, components like: asset turnover ratio ( $x_1$ ); working capital turnover ratio ( $x_2$ ); turnover ratio of receivables ( $x_3$ ); turnover

ratio of accounts payable ( $x_4$ ); inventory turnover ratio ( $x_5$ ); turnover ratio of fixed assets ( $x_6$ ); turnover ratio of equity ( $x_7$ ); asset turnover period ( $x_8$ ); working capital turnover period ( $x_9$ ); receivables turnover period ( $x_{10}$ ); turnover period of accounts payable ( $x_{11}$ ); inventory turnover period ( $x_{12}$ ); turnover period of fixed assets ( $x_{13}$ ); turnover period equity ( $x_{14}$ ).

Constructing taxonomic index begins with forming observation matrix X (Table. 1):

$$X = \begin{pmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \dots & \dots & \dots & \dots \\ x_{i1} & x_{i2} & \dots & x_{in} \\ \dots & \dots & \dots & \dots \\ x_{w1} & x_{w2} & \dots & x_{wn} \end{pmatrix} \quad (1.1)$$

where  $n$  is number of values;

$x_{ik}$  is characteristic of value  $K$  for unit  $i$ ;

$w$  is the number of units in a matrix;

Then we standardize values of the elements of the observation matrix because these economic indexes and different values have different economic meaning. There are various methods of standardization, but they provide empirical comparison of the relative value  $x_{ij}$  with certain values ( $A$ ;  $q$ ):

$$z_{ij} = \frac{x_{ij}}{A} \quad (1.2)$$

or

$$z_{ij} = \frac{x_{ij} - A}{q} \quad (1.3)$$

They select  $x_{\max}$ ,  $x_{\min}$ ,  $x_{aver}$  or  $x_{0j}$  (reference value of feature  $j$ ), and  $q$  is a unit of standardization. In this case we standardize the indexes according to the formula (2.5), where we choose  $A$  as our Acep. Building performance indicator is used in determining of matrix elements, observations and their standardization, and then differentiation of signs must perform. All variables are divided into stimulants and depressants. This division is based on how each of the parameters affects the development and improvement of the level. Signs that positively affect the level of components are called stimulants, others (opposite) – depressants. This separation is necessary for the construction of a vector standard. The elements of the vector with coordinates  $X_{0i}$  form values of economic indicators:

$$\begin{aligned} x_{0i} &= \max x_{ij} \text{ (stimulants),} \\ x_{0i} &= \min x_{ij} \text{ (depressants),} \\ P_0 &= (P_1, P_2, \dots, P_j, \dots, P_r), \end{aligned} \quad (1.4)$$

where  $P_0$  is free standard of development;  $P_j$  is individual standard of unit  $j$ .

The next step of taxonomic index calculation is to determine the distance between the individual observations (years) and reference vector. This distance can be calculated using the following formula:

$$c_{io} = \sqrt{\sum_{i=1}^t (z_{ij} - z_{0j})^2}, \quad (1.5)$$

where  $z_{ij}$  is standardized value of index  $j$  in the period  $i$ ;  
 $z_{0j}$  is standardized value of index  $j$  in the standard.

The resulting distance is the initial value for calculating the components of the business model.

Taxonomic index ( $K_i$ ) of business model components is calculated in the following way:

$$K_i = 1 - d_i. \quad (1.6)$$

Considering that

$$d_i = \frac{c_{i0}}{c_0} \quad (1.7)$$

or

$$d_i = 1 - K_i; \quad (1.8)$$

so

$$c_{i0} = \sqrt{\frac{1}{t} \sum_{i=1}^t (c_{i0} - \bar{c}_0)^2}; (i=1, 2, \dots, t) \quad (1.9)$$

$$\bar{c}_0 = c_0 + 2 \cdot S_0; \quad (1.10)$$

$$\bar{c}_0 = \frac{1}{t} \sum_{i=1}^m c_{i0} \quad i \in \overline{1, n},$$

where  $n$  is a number of periods.

In this case,  $K_i$  will equal the number of time intervals for determining the components of the business model. The interpretation of this indicator is following: it is high at high rate of stimulants and vice versa. Its positive side is that the result will indicate the need to change, and economic indicators that should be paid attention to in order to improve components of the business model and identify a number of measures that would increase the selected economic indicators [7, 8, 9].

Implementing business model at enterprise with declining level of potential is dangerous as it can lead to reorganization of the enterprise, but sometimes the company does it to improve their image, to attract investors and to implement certain projects.

The value is calculated so that the taxonomic index synthetically describes the changes of the studied groups such as indexes of business activity, we suggested above. Its most important advantage is that now we have to deal with one synthetic sign that indicates the direction and magnitude of changes in the processes described by a set of random numbers of output characteristics.

Table 1.

#### Indicators of business activity

2 We standardize chosen parameters according to formulas (1.1 - 1.2), and summarize them in tabular form (Table 1 and 2)

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$
<b>I</b>	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065	0,00065
<b>II</b>	0,00065	0,00180	0,00227	0,03642	0,02515	0,02000	0,00059	12,00000	12,0000	14,00000	20,0000	15,00000	8,00000	12,0000
<b>III</b>	0,00040	0,00115	0,00133	0,05698	1,35000	0,00009	0,00040	53,00000	45,0000	56,00000	45,00000	12,00000	10,0000	42,0000
<b>IV</b>	0,00022	0,00080	0,00100	0,00372	0,00698	0,00059	0,00024	23,00000	48,0000	44,00000	45,00000	14,00000	7,00000	12,0000
<b>V</b>	0,00010	0,00037	0,00061	0,00075	0,00352	0,00021	0,00012	54,00000	48,0000	11,00000	47,00000	47,00000	8,00000	32,0000
$\bar{x}$	0,00	0,00	0,00	0,02	0,35	0,01	0,00	35,50	38,25	31,25	39,25	22,00	8,25	24,50

Table 2.

#### Standardized indicators of business activity

	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$	$x_{12}$	$x_{13}$	$x_{14}$
<b>I</b>	1,88	0,64	0,50	0,03	0,00	0,13	1,91	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>II</b>	1,88*	1,75*	1,74*	1,49*	0,07*	4,00*	1,74	0,34*	0,31	0,45	0,51	0,68	0,97	0,49*
<b>III</b>	1,16	1,12	1,02	2,33	3,90	0,00	1,18*	1,49	1,18*	1,79	1,15	0,55	1,21	1,71
<b>IV</b>	0,65	0,78	0,77	0,15	0,02	0,00	0,71	0,65	1,25	1,41	1,15	0,64	0,85*	0,49
<b>V</b>	0,31	0,36	0,47	0,03	0,01	0,00	0,37	1,52	1,25	0,35*	1,20*	2,14*	0,97	1,31

\* Note: The value of the reference indicator

Indicator  $C_{i0}$

$C_{i0}$	7,06
	4,20
	5,55
	6,87
	7,58

Taxonomic index dynamics

$di_1$	0,81	<b>I</b>	$Ki_1$	0,19
$di_2$	0,48	<b>II</b>	$Ki_2$	0,52
$di_3$	0,64	<b>III</b>	$Ki_3$	0,36
$di_4$	0,79	<b>IV</b>	$Ki_4$	0,21
$di_5$	0,87	<b>V</b>	$Ki_5$	0,13



## Taxonomic index dynamics

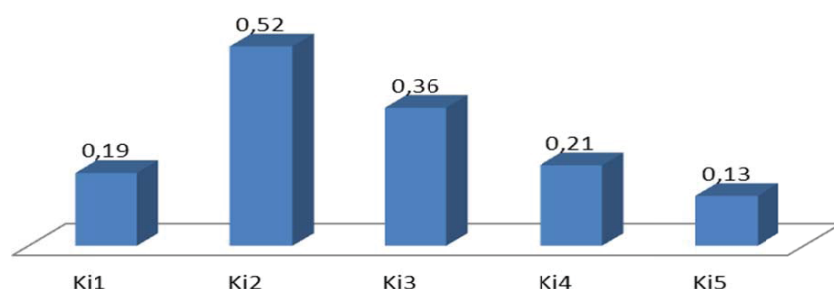


Fig. 2. The graphic expression of taxonomic index

According to the method used by us we combined three phases of building, the company will determine the initial stages whether the resources and potential are ready for the future introduction of B-M: determine what components of the enterprise are the most risky and which indicators need to be paid attention to in order to improve the readiness of the company to the possible introduction of B-M.

### 4. Conclusions

Thus, we have examined the structure of B-M and determined that it should be step-by-step and complex and innovation-oriented. We suggested that a combination of the first three stages of B-M designing into one, that is using «tree of goals» in combination with the definition of readiness indicators of business activity for the possible introduction of B-M at the enterprise.

As [5] fairly says - sustained growth and business success depends not only and not so much on great ideas and flair leaders, but on your ability to create and continuously improve the business model. In modern conditions innovation is not often focused on creating technologies or products but on the creation of the business model. This business model transforms innovation into economic value for the business. It describes in detail how the company makes money by clearly defining its place in the value chain.

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