MODELLING THE PROCESS OF FORMING THE POTENTIAL OF ECONOMIC DEVELOPMENT OF AN INDUSTRIAL ENTERPRISE

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Abstract. The work is a study of patterns of forming the potential of economic development of industrial enterprises. The essence and components of the potential of economic development of an enterprise have been defined. A model of forming the potential on the basis of building a hierarchy of factors, that constitute it, has been offered.

Keywords: potential, economic development, formation, an industrial enterprise, factor.

Introduction

In a dynamic market environment, which is defined by a high level of competition, ensuring an adequate level of economic efficiency requires that enterprises implement measures of their economic development. At present, many industrial enterprises of Ukraine are characterized by poor financial condition, including low business activity and profitability. One of the reasons for this phenomenon is that the owners and managers do not fully imagine possible directions of their economic development. Therefore, development of measures of economic development of industrial enterprises requires prior assessment of the potential of such development, which, in its turn, should be based on modelling the formation process of this potential.

Essence and Components of the Potential of Economic Development of an Enterprise

The question of estimating the value of economic potential of an enterprise and its individual components is the subject of many scientific studies. In particular, scientists provide a detailed analysis of the nature and components of the economic potential of enterprises (Bilokonenko, 2012; Vasylkivsky, 2014), present approaches to its evaluation (Lesyk, 2014; Hvorostov, 2011) and management (Tolpezhnikov, 2012).

Separate emphasis should be also laid on publications dedicated to the issue of evaluating and managing strategic business potential, as it is this kind of economic potential of business subjects that characterizes possibilities of their economic development. Thus, T. Kalinesku et al. offered a comprehensive approach to establishing an efficient mechanism of

forming the strategic potential of an enterprise (Kalinesku, 2007), and A. Maslak and L. Kvyatkovska developed methodological foundations for evaluating this potential (Maslak, 2012).

Regarding the direct study of the potential of economic development of entities, the problem of its evaluation is also in sight of a number of scientists. Namely, V. Kuntsevych suggested a method of measuring the financial component of the potential (Kuntsevych, 2004), and R. Feshchur and M. Tymoshchuk made a successful attempt to systematize indicators of its assessment (Feschur, 2006). At the same time, researchers pay particular attention to the necessity to establish the most generalizing indicator for measuring the economic potential of enterprises, including the potential for their development. In this regard, a number of scientists, including I. Maksymenko and V. Bokiy (Maksymenko, 2008), justify the importance of applying the indicator of the market value of enterprises as an integral indicator for evaluating their economic opportunities.

To understand the nature of the potential of economic development of an industrial enterprise with consideration of the approach to determining the total economic potential of an entity stated by Lesyk L. (Lesyk, 2014), we will consider its two varieties, namely: 1) the existing economic potential of an enterprise by a chosen objective (objectives) and activities, which means the total of available resources and competences of employees, that enable the company, under certain conditions of the environment, to achieve the best (usually the maximum possible) quantitative level of the selected objective (objectives) of the activities; 2) strategic economic potential of an enterprise by a chosen objective (objectives) and activities, which means the total of its existing and possible to be attracted resources and competences of employees, that enable the company an opportunity, under a certain condition of the environment, to achieve the best (usually the maximum possible) quantitative level of the selected objective (objectives) of the activities.

Then the potential of the economic development of an enterprise by a chosen objective (objectives) and kinds of activities will be a combination of additional resources and competences of employees, attraction of which will enable the enterprise to move from its existing to strategic economic potential by a selected objective (objectives) and kinds of activities. Accordingly, evaluation of the potential value of economic development of an enterprise requires prior determination of the size of its existing and strategic economic potential.

Difficulty of forming the potential of economic development of an industrial enterprise is conditioned by the presence of a number of components of this potential. In particular, there should be distinguished extensive potential development and intensive potential development of an enterprise.

An important kind of intensive potential development of an enterprise is the potential for its innovative development. In its turn, the formation of potential of innovative development of an industrial enterprise requires availability of its three major subsystems of the overall system of such formation, in particular: potential building subsystem of product development, the operation of which will ensure transition of an enterprise to making new and improved products; potential building subsystem of technical and technological development, the operation of which will ensure implementation of new advanced types of equipment and technological processes at an enterprise; potential building subsystem of management development, the operation of which will ensure implementation of advanced methods of managing an enterprise, above all, new and advanced competences in the area of managing the resource provision of economic activity. In its turn, each of the three subsystems of the

overall system of potential building of innovative development of an industrial enterprise should include two components, namely: a subsystem of developing innovations by an enterprise itself, and a subsystem of searching and attracting respective innovations developed by third parties.

In addition to the system of potential building of innovative development of an industrial enterprise, the enterprise should also have a functioning system of potential building of its economic development, which has non-innovative nature. This system should consist of three subsystems: subsystem of upgrading worn-out main means; subsystem of adjusting a production program of an enterprise by including additional products which do not belong to innovative ones, and a subsystem of managing other factors of economic development of an enterprise that are not innovative, but contribute to qualitative changes in the economic potential of an entity.

It should be noted that the company can develop, at least – partially, extensively, when its financial results grow due to the increase of the resources used. Accordingly, in addition to the system of potential building of intensive economic development of an industrial enterprise, there should also be a system of potential building of extensive development. This system should consist of three subsystems: a subsystem of increasing the volume of production resources to meet the growing demand for the products of the company; a subsystem of implementing measures for an enterprise to enter new markets, and a subsystem of managing other factors of extensive economic development of an enterprise.

Conceptual Bases of Forming the Potential of Economic Development of Industrial Enterprises

Consideration of patterns of building potential of economic development of enterprises should be carried out on three main levels, namely: on the level of resource support of economic activity; on the level of ability of enterprises to efficiently manage their available resources, and on the level of ability of enterprises to achieve specific results of implementation of their economic opportunities in accordance with the pre-set objective of their economic activity.

Consideration of the process of building the potential of industrial economic development on the third of the mentioned levels allows making the most comprehensive description and performing a quantitative assessment of the results of this process. In particular, we should point out the fact that growth of economic opportunities of an enterprise in the context of achieving its certain objectives may require not increase but reduction of certain types of resources. However, growth of economic potential of an enterprise almost always requires some new competence or improvement of the existing competence, what concerns managing resource support of economic activity. At the same time, the result-objective approach to evaluation and formation of the economic potential of an enterprise is characterized by a certain level of relativity, as, depending on the set goal, the required directions and amount of changes in the resource support of an enterprise may be different. Taking it into consideration, there is possible a situation, in which growth of economic potential of an enterprise by one goal will be accompanied by a decrease in its value by another goal. In this regard, important is the correct choice of goals, the achievement of which will be ensured by the growth of economic potential of an enterprise, in particular, the goal should be sufficiently general.

Considering the above stated facts, one of the main principles of evaluating the potential of economic development of an industrial enterprise is the principle of selecting the main objective of its activities, which requires prior justification of the main objective of the activities of an enterprise that will be achieved in the course of implementing its total economic potential. In particular, taking into account long-term effects of economic activity of an enterprise requires consideration of the indicator of market value of an enterprise, maximization of which will represent one of the main goals of its operation, which, in its turn, allows the use of this indicator to measure the total economic potential of an enterprise in the long run. However, the rate of the market value of an enterprise, as an indicator of evaluating the potential of its economic development, does not take into consideration the volume of investments into this development. Therefore, the most generalizing indicator of evaluating the potential of economic development of an entity is the difference between the expected value of the market value of an enterprise after the growth of its economic potential, and the sum of the present value of the market value of an enterprise and the size of the required investment into implementation of measures to increase the economic potential of a business subject.

Important principles of estimating the value of the potential of economic development of an enterprise, using a target approach should also include: the need for quantitative measurement of the value of the set goal, that, in accordance with the chosen goal, requires a specific indicator to evaluate its achievement; taking into account the availability of lower-level objectives, i.e. the existence of hierarchy of objectives of an enterprise; taking into account possible limitations to achieve the set objectives, including restrictions on available, and possible to be attracted, volumes of production and financial resources; choice of parameters for controlling the process of achieving the respective objectives of an enterprise, i.e. indicators, whose change in value influences the respective target functions; determining how to regulate parameters for controlling the process of achieving the objectives of an enterprise (including such methods as standardization and optimization of the value of these parameters).

Thus, quantitative evaluation of the potential of economic development of an enterprise should be based on prior selection of a target function, the extreme value of which, that the company can reach with existing and possible to be attracted amount of resources, will emerge as a result of quantitative measurement of economic opportunities of an entity.

Building a Model of the Potential of Economic Development of Industrial Enterprises

Considering the above stated facts, modelling of the process of forming the potential of economic development of an enterprise should take into account the following main aspects:

- objectives of the activities, which the company sets in the course of implementing the measures on ensuring economic development;

- availability of various types of economic development of an enterprise, each of which requires to be taken into account separately;

- hierarchical nature of potential of economic development of an enterprise, which is reflected in the presence of multi-level mechanism of the factors that ensure the formation of this potential;

- the need for additional resources, which the company must acquire in order to realize the potential of its economic development. Overall, it is a set of additional resources and also competences in the field of managing economic resources, attraction of which will enable an

enterprise to move from its existing to strategic economic potential by a chosen goal of activity, and will be the basis for the potential of its economic development;

- uncertainty and risk, that are inherent in most types of economic activities, and significantly influence the process of making decisions on implementation of measures on economic development of an enterprise.

Taking this into consideration, the indicator of evaluating the potential of economic development of an enterprise must be represented by the following formula:

$$P_{ed} = V_{e1} - V_{e0} - I \,, \tag{1}$$

where P_{ed} – indicator of evaluating the potential of economic development of an enterprise; V_{e1} – expected market value of an enterprise after implementation of a program of measures on its economic development; V_{e0} – market value of an enterprise before implementation of a program of measures on its economic development; I – the required amount of investment into implementation of the program of economic development of an enterprise.

Thus, if there are several versions of implementing the program of measures on economic development of an enterprise, the best one should be chosen according to the criterion of maximizing the indicator (1).

If we consider a generalizing indicator of evaluating the potential of economic development of an enterprise in the short term, in this case it is advisable to use an indicator of excess profits, that is, the difference between the value of the income of the enterprise and the product of investments into it and the rate of their profitability. Under such conditions, the indicator of evaluating the potential of economic development of an enterprise in the short term period should be represented by the following formula:

$$P_{eds} = (P_1 - I_1 \times E) - (P_0 - I_0 \times E) \,, \tag{2}$$

where P_{eds} – indicator of evaluating the potential of economic development of an enterprise in the short-term period; P_1, P_0 – income of an enterprise before and after implementation of the program of measures on its economic development, respectively; I_1, I_0 – amount of the investments made into an enterprise (value of its fund) before and after implementation of the program of measures on its economic development, respectively; E – rate of investment profitability.

The basic idea of forming the potential of economic development of an enterprise, under proposed in this paper approach to implementation of the mechanism of such formation, is that the selected generalizing indicator of evaluating the potential of economic development of an entity consistently falls into a hierarchy of lower-level indicators. At each stage of such specification some indicators-factors, that determine the value of these indicators, are considered as variables that need optimization (or finding their extreme (minimum or maximum) values)), while other suchlike indicators-factors may be taken as constants and may be analyzed at the next stage (by isolating the lower-level factors that influence them). Under these conditions, with the increasing number of levels of the described hierarchy,

accuracy of evaluating the potential of economic development of the enterprise under study will also increase.

It should be mentioned that in future there will be considered a case of building a hierarchy of indicators-factors of the potential of economic development of an enterprise without possible limitations on the volume of its activities. Such consideration will not fundamentally alter the proposed approach to modelling the process of forming the potential of economic development of an enterprise. In addition, one should take into consideration the fact that the vast majority of industrial enterprises in Ukraine currently produce output, which is well below their capacity.

Taking into account the above stated facts, let us consider the individual components of the model of forming the potential of economic development of an enterprise, if we select an excess profit indicator as a generalizing indicator of its activity. Then this indicator can be represented as:

$$P_e = P_{op} + P_{ot} - (A_n + A_e) \times E, \tag{3}$$

where P_e – excess profit of an enterprise; P_{op} – operational activity profit of an enterprise; P_{ot} – profit of an enterprise from other activities; A_n – available assets of the enterprise, necessary for performing its economic activities; A_e – assets of an enterprise that are excessive for performing its economic activities.

It should be noted that the expansion of excess profit value of the enterprise in the expression (3) allows setting reserves of its growth through disposal of excessive assets of an enterprise or, for example, by renting them out.

In its turn, indicator P_{op} may be represented as:

$$P_{op} = \sum_{i=1}^{n} (P_i - c_i) \times Q_i - C_F, \tag{4}$$

where n – number of kinds of products that a company produces or can produce; P_i – the price of i-type of products without indirect taxes; c_i – proportional variable costs of producing units of i-type products; Q_i – natural sales volumes of i-type products; C_F – fixed costs of an enterprise on the entire value of its production program.

Assuming that cost indicators in (4) are constant, then maximization of the value of this expression can be achieved through improved structure of the production program of an enterprise, i.e. optimization of values Q_i (and P_i if change of the natural sales volumes of production of an enterprise influences the price level for it).

Indicators c_i in the formula (4), in its turn, may be represented as:

$$c_i = \sum_{j=1}^{n_i} P_{ij} \times b_{ij}, \tag{5}$$

where n_i – number of types of production resources, necessary for producing *i*-type products; P_{ij} – price for a unit of j - type of resources, necessary for producing *i*-type products; b_{ij} – physical expenses of j - type of resources fro producing *i*-type of products.

If we consider the expression (5) in isolation, that is, as a target function of a lower level, the increase in the value of excess profits of the enterprise apparently requires its minimization. To this end, there should, in particular, be ensured reasonable prices for production costs and equity of indicators b_{ij} to the consumption rate of the respective resources. However, it should be noted that these norms are not constants and they depend on several factors, including the level of organizing production at an enterprise and the technology used. By expanding b_{ij} indicators into indicators that determine their value, it is possible to set reserves for decline in the value of norms of production resources. The same applies to the indicators for resource prices, as their value within certain limits can be changed by an enterprise too (for example, by choosing a supplier of materials and rationalizing costs related to their supply).

In general, expansion of a generalizing indicator of evaluating the potential of economic development of an entity into separate components that characterize the influence of certain factors on it, ultimately will lead to the question as how to identify the best parameters of managing the resources of an enterprise (including its production, as it is a resource of sales activities of an entity). The main parameters should include the following: resource volume, its consumer characteristics, resource prices and the level of managing them. As such type of managing usually requires relevant costs of its implementation, it appears necessary to optimize these costs. It should also be taken into account that the enterprise resource planning, including improvement of its consumer properties, often requires additional resources of an enterprise, including innovative (these include staff development innovation, research laboratories, etc.). Under these conditions, maximizing of the generalizing indicator of evaluating the potential of economic development of an enterprise will require managing these resources as well.

Thus, the hierarchy of factors influencing the generalizing indicator of evaluating the potential of economic development of an entity may consist of a fairly large number of levels, but this number for any enterprise is always limited (because there is a limited number of types of resources that it uses or can attract extra). It should be also noted that the results obtained at a lower level of the considered hierarchy can influence the results of the corresponding calculations at a higher level. For example, the reduction of an indicator of specific variable costs, calculated by the expression (5) may lead to changes in the results of optimization of the production program of an enterprise, the criteria of which are described by the formula (4). In this regard, justification of the best indicators-factors that determine the value of the generalizing indicator of evaluating the potential of economic development of an enterprise should be made starting with the lowest level of the hierarchy of these factors and gradually moving to its highest level.

Summarizing the above stated facts, we can conclude that the process of forming the potential of economic development of an industrial enterprise should be based on prior selection of a certain target function, the extreme value of which will act as a result of quantitative measurement of additional economic opportunities of an entity. At the same time, achieving the extreme value of the target function of the highest level will require acquisition

of extreme values of target functions at lower levels. In other words, the target function of a higher level will represent a functional from lower-level target functions. Under these conditions, the most favourable, in terms of ease and accuracy of calculation of the value of potential of economic development of an enterprise, is a situation in which the extreme value of the chain of the target functions hierarchy are defined sequentially from the lowest to the highest level. If this is not possible, the achievement of the extreme value of higher-level target function will require simultaneous optimization of the values of lower-level target functions.

It should be mentioned that a number of well-known models of optimization of some parameters of the activities of an enterprise are the target functions of a quite low level. For example, the model of managing current material stock in case of their equal consumption is based on pre-established planned annual volume of needs in materials and, consequently, the planned volumes of production. However, these amounts in general can act as the results of optimization calculations. At the same time, the aggregate minimum annual material storage costs and supply organization costs as a criterion for optimization of current stocks of materials are a non-linear function of annual manufacturing of the production. So, in general, the optimization of the volume of manufacturing production should be carried out simultaneously with finding the best size of current stocks of material at an enterprise.

Conclusions and Suggestions

1.The potential of economic development of an enterprise by a selected objective (objectives) and kinds of activities is a combination of additional resources and competences of employees, attraction of which will enable the enterprise to move from its existing to strategic economic potential by a selected objective (objectives) and kinds of activities.

2. It is reasonable to isolate the potential of extensive development and the potential of intensive development of an enterprise. An important kind of the potential of intensive development of an enterprise is the potential for its innovative development. In its turn, formation of the potential of innovative development of an industrial enterprise requires availability of its three major subsystems of the overall system of such formation - namely – subsystems of forming product, technical and technological development and management development.

3. Modelling the process of forming the potential of economic development of an industrial enterprise should include expansion of the generalizing indicator of evaluating the potential into a hierarchy of lower level indicators. At each stage of this particularization some indicators-factors, that determine the value of these indicators, are considered as variables that need optimization (or finding extreme values), while other indicators-factors can be viewed as constants and can be analyzed at the next stage (by isolating the lower level factors that influence them). At the same time, with the growing number of levels of the described hierarchy of indicators, accuracy of evaluating the potential of economic development of the enterprise under study will also increase.

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