EVALUATION OF THE LEVEL OF INNOVATIVE POTENTIAL OF THE ENTERPRISE

Abstract. The article deals with the structure of the innovative potential of the enterprise, which includes personnel, financial, material and technical and production components. The algorithm of estimation of innovative potential of the enterprise is presented, which consists of the definition of a list of indicators and their limit characteristics, evaluation of the actual state of innovation potential and determination of possible directions for its strengthening. The indicators for each of the components of innovation potential are offered and the method of their calculation is provided. The calculation of the complex indicator is made taking into account the coefficients of significance of the influence of the components of the innovation potential and relative indicators that characterize each component. Relative indicators are proposed to be calculated on the basis of the coefficients of the significance of the impact of the indicator on the corresponding component of the potential and indices that take into account the actual and normative value of the indicator. Depending on the calculated value of the complex indicator high, average and low level of innovation potential of the enterprise are determined. The scale of assessment of the level of innovation potential is proposed. The developed system of indicators allows to carry out a full and comprehensive assessment of the potential level of innovation potential. The calculated level of innovation potential of an enterprise allows managers to make decisions regarding the selection of a better strategy for innovation development.

Keywords: innovation potential, system of indicators, components of innovation potential, level of the innovation potential, enterprise.

JEL Classification D24, M21, O32, Q16

Formulas: 14; fig.: 0; tabl.: 3; bibl.: 11.
дозволяє керівникам ухвалювати рішення стосовно вибору кращої стратегії інноваційного розвитку.

**Ключові слова:** інноваційний потенціал, система показників, складові інноваційного потенціалу, рівень інноваційного потенціалу, підприємство.

Формул: 14; рис.: 0; табл.: 3; бібл.: 11.

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**ОЦЕНКА УРОВНЯ ИННОВАЦИОННОГО ПОТЕНЦИАЛА ПРЕДПРИЯТИЯ**

**Аннотация.** Рассмотрена структура инновационного потенциала предприятия, в которую входят кадровая, финансовая, материально-техническая и производственная составляющие. Представлен алгоритм оценки инновационного потенциала предприятия, состоящий из определения перечня показателей и их предельных характеристик, оценки фактического состояния инновационного потенциала и определения возможных направлений его усиления. Предложены показатели по каждой из составляющих инновационного потенциала и предоставлено методику их исчисления. Расчет комплексного показателя осуществлен с учетом коэффициентов значимости влияния составляющих инновационного потенциала и относительных показателей, характеризующих каждую составляющую. Относительные показатели предложено рассчитывать на основе коэффициентов значимости влияния показателя на соответствующую составляющую потенциала и индексов, учитывающих фактическое и нормативное значение показателя. В зависимости от рассчитанного значения комплексного показателя выделены высокий, средний и низкий уровни инновационного потенциала предприятия. Предложено шкалу оценки уровня инновационного потенциала. Разработанная система показателей позволяет провести полную и комплексную оценку потенциального уровня инновационного потенциала. Рассчитанный уровень инновационного потенциала предприятия позволяет руководителям принимать решения по выбору лучшей стратегии инновационного развития.

**Ключевые слова:** инновационный потенциал, система показателей, составляющие инновационного потенциала, уровень инновационного потенциала, предприятие.

Формул: 14; рис.: 0; табл.: 3; бібл.: 11.

**Introduction.** Today, innovative activity as a factor contributing to the competitive advantages of the global order plays a key role in shaping the modern socio-economic system. In general, the realization of an innovative economics and its management consists in fundamental re-orientation of development directions, new approaches to the substantiation of priorities, significant modernization of methods and forms resources use at all levels of the innovation system.

At present, there is a disproportion in Ukrainian economy between the availability of innovative possibilities and their practical implementation. Only a few Ukrainian enterprises are characterized by strong innovative potential, and even fewer are able to manage them effectively. The problem consists in the absence of conceptual approaches, integrated research and methodological developments to manage the enterprise innovative potential and its effective use. Based on the above, the research of the enterprise innovative potential is an actual task of current economic science.

**Analysis of research and problem statement.** To research on theoretical and applied issues of the formation and evaluation of enterprises innovative potential are devoted the scientific works of such scholars as O. Moskvina [1], V. Arterchuk [2], D. Khomutsky [3], C. Christensen [4], J. Skonieczny [5], A. Huseynova [6], T. Hryanko [7], O. Biben [8], V. Zhelezniak [9], V. Uzunov [10], A. Alekseev [11] and others. The works of domestic and foreign authors also explore the essence of
enterprise innovative potential and its key components, reveal some aspects of the formation of innovative potential and its effective use.

At the same time, with a highly positive evaluation of scientific research on this issue, some aspects of the enterprise innovation potential remain controversial and require further study. In particular, issues of methodology and methods for evaluating the level of enterprise innovative potential remain poorly researched.

According to the relevance of the chosen research topic and the revealed gaps in the domestic and foreign theory and methodology of innovation activity of enterprises, the main purpose of the article is to study the structure of the enterprise innovative potential and the methodology for its evaluation.

**Research results.** The resource base for evaluating the enterprise innovation potential is the resource component of the company, which consists of financial, industrial, intellectual (personnel) and material and technical potential. The algorithm for estimating the enterprise innovation potential is presented in Table 1.

<table>
<thead>
<tr>
<th>Stage title</th>
<th>Stage tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Describe the regulatory model of the innovation potential state through a system of quantitative and (or) qualitative requirements for resource and productive characteristics of the potential.</td>
<td>1. Determine the list of indicators and their boundary characteristics used to estimate the innovative potential of the enterprise.</td>
</tr>
<tr>
<td>2. Estimation of the actual (current) state of innovation potential (taking into account the developed normative model).</td>
<td>2. Comparative analysis of normative and actual parameters of the potential, the identification of its strengths and weaknesses.</td>
</tr>
<tr>
<td>3. Characteristics of possible directions of strengthening the enterprise innovation potential (taking into account the results of analysis).</td>
<td>3. Determine the implementation directions of innovative transformations.</td>
</tr>
</tbody>
</table>

*Source:* [1].

Objectivity of estimating the level of innovation potential of an enterprise is ensured by the correct choice of indicators system that allows to make the complex characteristics of innovation potential on various features. The list of these indicators should provide the necessary and complete information about the state of enterprise innovation potential and its individual elements.

Effective ways of obtaining information include systematic calculation and analysis of all spheres of the enterprise (production, finance, marketing, R&D, etc.). The source of quantitative indicators is the data of accounting and management calculation of the enterprise.

Evaluation of the enterprise innovative potential should be conducted in the form of calculation and comparison of the obtained coefficients’ values with the established baseline values. The basic, comparative values for the analysis include indicators of the past period, average or similar indicators of competitors. As criteria for determining the limit values of the coefficients, data from statistical surveys of innovation activity of leading Ukrainian enterprises as well as the experience of foreign companies are used.

On the basis of all components of the enterprise innovative potential analysis, the following system of necessary indicators is suggested for determining its overall level. This system allows to evaluate the current level of enterprise innovative potential since it contains the most important indicators for each component of the innovative potential, which ensures completeness and complexity of its evaluation (see Table 2).
The system of indicators for evaluating the enterprise innovative potential

<table>
<thead>
<tr>
<th>Components of the innovative potential (K — significance of the influence of component on the innovative potential in general, Ki)</th>
<th>Components indicators of the enterprise innovative potential</th>
<th>The significance of influence of the indicator on the corresponding component of innovation potential (Mi)</th>
<th>Normative value of the indicator for the researched enterprise (Ni)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial component (K1)</td>
<td>The coefficient of working capital provision by its own means</td>
<td>M1</td>
<td>N1</td>
</tr>
<tr>
<td></td>
<td>The ratio of current liquidity</td>
<td>M2</td>
<td>N2</td>
</tr>
<tr>
<td></td>
<td>The coefficient of autonomy (independence)</td>
<td>M3</td>
<td>N3</td>
</tr>
<tr>
<td></td>
<td>The coefficient of turnover of fixed assets</td>
<td>M4</td>
<td>N4</td>
</tr>
<tr>
<td></td>
<td>The return on equity</td>
<td>M5</td>
<td>N5</td>
</tr>
<tr>
<td></td>
<td>The profitability of current assets</td>
<td>M6</td>
<td>N6</td>
</tr>
<tr>
<td>Production component (K2)</td>
<td>The share of fixed assets in total assets</td>
<td>M7</td>
<td>N7</td>
</tr>
<tr>
<td></td>
<td>The share of production inventories in current assets</td>
<td>M8</td>
<td>N8</td>
</tr>
<tr>
<td></td>
<td>The coefficient of fixed assets disposal</td>
<td>M9</td>
<td>N9</td>
</tr>
<tr>
<td>Personnel component (K3)</td>
<td>The share of employees engaged in innovative activity in the total number of personnel</td>
<td>M10</td>
<td>N10</td>
</tr>
<tr>
<td></td>
<td>The share of skilled workers in the total number of personnel</td>
<td>M11</td>
<td>N11</td>
</tr>
<tr>
<td>Material and Technical components (K4)</td>
<td>The coefficient of intellectual property provision</td>
<td>M12</td>
<td>N12</td>
</tr>
<tr>
<td></td>
<td>The coefficient of mastering the new equipment</td>
<td>M13</td>
<td>N13</td>
</tr>
</tbody>
</table>

Source: proposed by the author.

The financial component of the innovation potential represented by the following indicators:
1) the coefficient of working capital provision by its own means;
2) the ratio of current liquidity;
3) the coefficient of autonomy (independence);
4) the coefficient of turnover of fixed assets;
5) the return on equity;
6) the profitability of current assets.

Coefficient of working capital provision by its own means is calculated by the formula:

\[ C_{CAP} = \frac{WC}{R + AR + CFI}, \]  

where WC — own working capital; R — the value of reserves, including VAT; AR — short-term accounts receivable; CFI — cash and short-term financial investments.

The ratio of current liquidity (coverage) reflects the projected payment capabilities of the company, subject to the repayment of short-term accounts receivable and the sale of available stocks:

\[ R_{CL} = \frac{R + AR + CFI}{SC + AP}, \]  

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where SC — short-term credits and loans; AP — short-term accounts payable and other short-term liabilities.

The coefficient of autonomy or financial independence indicates the share of equity capital in the total amount of sources formation of assets, or which part of the assets is formed at the expense of equity:

\[ C_I = \frac{EC}{B}, \]  

where EC — average value of equity capital; B — balance currency.

The coefficient of turnover of fixed assets (capital productivity) calculated as the ratio of net proceeds from the sale of products (works, services) to the average annual cost of fixed assets. It shows the effectiveness of using fixed assets of an enterprise:

\[ CP = \frac{NP}{FA}, \]  

where NP — proceeds from the sale of goods in the reporting period, excluding VAT, excises and similar payments; FA — the average value of fixed assets during the reporting period.

The coefficient of return on equity (financial profitability) characterizes the level of return on equity capital invested in the enterprise, therefore is the greatest interest for existing and potential owners and shareholders and is one of the main indicators of investment attractiveness of the enterprise, because its level shows the upper limit of dividend payments:

\[ CR_{\text{OE}} = \frac{NP}{EC}, \]  

where NP — net profit received by the enterprise in the reporting period; EC — the average value of equity capital.

The profitability of current assets is calculated by the formula:

\[ PC_A = \frac{NP}{CA}, \]  

where NP — net profit received by the enterprise in the reporting period; CA — average value of current assets during the reporting period.

To evaluate the production component of the enterprise innovative potential, it is necessary to calculate indicators such as:

1) the share of fixed assets in total assets;
2) the share of production inventories in current assets;
3) the coefficient of fixed assets disposal.

The indicator of share of fixed assets in total assets can be obtained from balance by dividing the value of fixed assets by the value of total assets.

The indicator of the share of production inventories in current assets is defined as the share of inventories and expenses in current assets. The value of this indicator can also be calculated basing on aggregated balance by the formula:

\[ \text{Share of production inventories in current assets} = \frac{\text{Inventories}}{\text{Current assets}} \]  

The coefficient of fixed assets disposal is the cost of the main productive assets that left the enterprise in the reporting period, divided by the cost of fixed assets available at the enterprise at the beginning of the reporting period. It is calculated as the ratio of the cost of funds left during the year to the cost of funds at the beginning of the year:

\[ C_{\text{disposal}} = \frac{\text{Disposed fixed assets}}{\text{Fixed assets at the beginning of the year}} \]  

To assess the personnel component of the innovative potential of an enterprise, it is necessary to calculate indicators such as:

1) the share of employees engaged in innovative activity in the total number of personnel;
2) the share of skilled workers in the total number of personnel.

The share of employees engaged in innovation activity in the total number of personnel is determined according to the formula:
The share of employees engaged in innovative activity $= \frac{N_{in}}{N_{tot}}$, \hspace{1cm} (9)

where $N_{in}$ — the number of employees engaged in innovative activity, people; $N_{tot}$ — total number of employees at the enterprise, people.

The share of skilled workers in the total number of personnel is calculated like that:

$$\text{The share of skilled workers} = \frac{N_{s}}{N_{tot}}, \hspace{1cm} (10)$$

where $N_{s}$ — number of skilled workers, people; $N_{tot}$ — total number of employees at the enterprise, people.

To calculate the material and technical component of the innovation potential, it is necessary to calculate the following indicators:

1) The coefficient of intellectual property provision
2) The coefficient of mastering the new equipment

The coefficient of intellectual property provision is calculated by the formula:

$$C_{IP} = \frac{IP}{\text{NA}}, \hspace{1cm} (11)$$

where $IP$ — intellectual property ("Intangible assets" section I of the balance sheet); $\text{NA}$ — other non-current assets of the enterprise.

The coefficient of mastering the new equipment is calculated by the formula:

$$C_{NE} = \frac{\text{Fixed assets introduced}}{\text{Fixed assets at the end of the year}}, \hspace{1cm} (12)$$

In order to calculate the value of the overall innovation potential of the enterprise (CIP), the following formula will be applied:

$$C_{IP} = \sum_{i=1}^{n} K_{i} \times Y_{i}, \hspace{1cm} (13)$$

where $n$ — the number of components of innovative potential included in the integrated evaluation; $K_{i}$ — coefficients of significance of the influence of the $i$-th component of the innovation potential; $Y_{i}$ — relative indicators that characterize each $i$-th component of the innovation potential.

In turn,

$$Y_1 = M_1 \times X_1 + M_2 \times X_2 + M_3 \times X_3 + M_4 \times X_4 + M_5 \times X_5 + M_6 \times X_6,$$

$$Y_2 = M_7 \times X_7 + M_8 \times X_8 + M_9 \times X_9,$$

$$Y_3 = M_{10} \times X_{10} + M_{11} \times X_{11},$$

$$Y_4 = M_{12} \times X_{12} + M_{13} \times X_{13},$$

where $M_1 ... M_{13}$ — coefficients that take into account the significance of the influence of the indicator on the corresponding component of the enterprise’s potential; $X_1 ... X_{13}$ — indices characterizing the degree of conformity of the indicators of financial, industrial, personnel and the material and technical component of the innovative potential to the normative values of these indicators. The index is calculated as the difference between the actual value of the indicator and the relevant normative value if the indicator has a direct influence on the level of innovative potential of the enterprise, or vice versa, if the indicator has an inverse effect.

The total significance of coefficients of all indicators within each group of components of the innovation potential is equal to 1, that is:

$$M_1 + M_2 + M_3 + M_4 + M_5 + M_6 = 1,$$

$$M_7 + M_8 + M_9 = 1,$$

$$M_{10} + M_{11} = 1,$$

$$M_{12} + M_{13} = 1.$$

Thus, in the expanded form, a integrated indicator of enterprise innovative potential can be represented by the formula:

$$C_{IP} = K_1 \times (M_1 \times X_1 + M_2 \times X_2 + M_3 \times X_3 + M_4 \times X_4 + M_5 \times X_5 + M_6 \times X_6) +$$

$$+ K_2 \times (M_7 \times X_7 + M_8 \times X_8 + M_9 \times X_9) + K_3 \times (M_{10} \times X_{10} + M_{11} \times X_{11}) +$$

$$+ K_4 \times (M_{12} \times X_{12} + M_{13} \times X_{13}) \hspace{1cm} (14)$$
Next basing on the data analysis of enterprise financial reports and the calculation of the integrated indicator of innovative potential of the enterprise, according to the formula (14), it can be concluded about the level of innovative potential formed at the enterprise up to the time of the analysis.

Depending on the estimated value of CIP, the innovation potential can be divided into the following levels:

– high innovative potential;
– average innovative potential;
– low innovative potential.

The evaluation scale of the level of enterprise innovative potential is presented in Table 3. Having a calculated level of enterprise innovation potential, managers can decide, on the one hand, on the direction and choice of a better strategy for innovative development, and on the other hand, to estimate the available resources necessary to ensure this development. That is, there is a possibility to substantiate the choice of the strategy of enterprise innovative development.

### Table 3

<table>
<thead>
<tr>
<th>Level of enterprise innovation potential</th>
<th>Value of the coefficient of innovation potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>High innovative potential</td>
<td>( C_{IP} \geq 1 )</td>
</tr>
<tr>
<td>Average innovation potential</td>
<td>( 1 &gt; C_{IP} \geq 0 )</td>
</tr>
<tr>
<td>Low innovative potential</td>
<td>( C_{IP} &lt; 0 )</td>
</tr>
</tbody>
</table>

Source: proposed by the author

The aforementioned methodology is used provided the possibility of identifying real economic indicators and is aimed at evaluating and researching the enterprise innovative resources, taking into account intellectual, personnel, property, technological, production and investment resources.

Applying this evaluation system of innovative potential as the initial formation stage of the technology development strategy, an enterprise can analyze its current infrastructure possibilities in the innovation sector even before the investment is made on the basis of a number of economic criteria. In addition, this approach also allows the company to objectively evaluate its innovative resources, according to which it can primarily make an adequate choice of further direction of innovative development, thereby avoiding losses from investment in economically unprofitable projects.

Determining the specific direction of innovative development with the use of economic and mathematical criteria allows companies to save on irrational costs bound with generating ideas, as well as the development and implementation of strategies for innovation development.

**Conclusions.** The model of innovative activity of the enterprise can be represented as a combination and effective interaction of the components of its innovative potential. The level of enterprise innovative potential is a key factor in the process of forming an effective innovative management system. Innovative potential contains a number of indicators, the evaluation of which gives the general characteristics of the enterprise innovation level. To conduct an evaluation of the level of enterprise innovation potential, it is necessary to use the relative indicators presented in the enterprise reports. In future, management on the basis of the obtained evaluation can make managerial decisions regarding the development of enterprise innovation strategy. The basis of enterprise innovative activity is an effective administration of its innovative potential.

**Література**


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References