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DETERMINATION OF ECONOMIC DEPENDENCE STABILITY OF REGIONAL ENTERPRISES FROM THEIR INNOVATIVE SENSITIVITY

Abstract. *The formation of the economic stability of the enterprise is the methods and means that ensure the conditions for maintaining the economic stability of the enterprise at a certain level and contribute to avoiding its decline. The loss of stability can occur for various reasons: as a result of the gradual increase in deviations from the planned indicators, due to the unexpected loss of a significant part of assets, which leads to significant losses, and sometimes to the bankruptcy of the enterprise. The values of the indicators recommended by the author can be used as justification for choosing one of the two types of innovation strategies of the enterprise (leader strategy or follower strategy). If the calculated values of the indicators satisfy the given values, then the enterprise should adhere to the leader's strategy and direct its efforts to the development of basic innovations capable of bringing the maximum return. Otherwise, it is suggested to choose the strategy of the follower and focus your attention on innovations of the improving type, and avoid unjustified expenses in radical innovations. The main advantage of the proposed approach is the use of a system of realistically defined economic indicators. Business entities will need a minimum of effort to collect the necessary initial information and actually perform the calculations of these indicators. However, the system of the proposed indicators does not cover all components of innovative receptivity and because of this it appears to us to be very truncated. This limits the possibilities of its practical application. We consider it expedient to supplement these indicators with an assessment of the impact of innovations on the main indicators of the company's financial condition and resource utilization efficiency. According to the formed model, it is proposed to evaluate the impact of innovative receptivity on the economic sustainability of the enterprise in the proposed sequence. The use of this approach will make it possible to move from an alternative opinion on innovation receptivity (dividing enterprises into innovation-active and passive) to a multivariate one (identification of levels, classes of activity) taking into account the entire spectrum of factors determining this level, findings and results of innovative activity.*

Key words: economic sustainability, innovative receptivity, component, indicator, evaluation, control.

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ВИЗНАЧЕННЯ ЗАЛЕЖНОСТІ ЕКОНОМІЧНОЇ СТІЙКОСТІ ПІДПРИЄМСТВ РЕГІОНУ ВІД ЇХ ІННОВАЦІЙНОЇ СПРИЙНЯТЛИВОСТІ

Анотація. *Формування економічної стійкості підприємства являє собою способи і засоби, що забезпечують умови підтримки економічної стійкості діяльності підприємства на визначеному рівні та сприяють уникнення її зниження. Втрата стійкості може відбуватися з різних причин: в результаті плавного наростання відхилень показників від запланованих, через несподівану втрату значної частини активів, що приводить до значних збитків, а іноді і до банкрутства підприємства. Значення рекомендованих показників автором можуть бути використані як обґрунтування для вибору одного з двох типів інноваційних стратегій підприємства (стратегії лідера або стратегії послідовника). У випадку, якщо розрахункові величини показників задовольняють приведеним значенням, то підприємству слід дотримуватися стратегії лідера і направити свої зусилля на освоєння базисних інновацій, здатних принести максимальну віддачу. Інакше пропонується вибрати стратегію послідовника і зосередити свою увагу на інноваціях поліпшуючого типу, та уникати невиправданих витрат в радикальні інновації. Основною перевагою запропонованого підходу є використання системи реально визначених економічних показників. Для збору необхідної початкової інформації і власне здійснення розрахунків цих показників господарюючим суб'єктам буде потрібно мінімум зусиль. Проте, система запропонованих показників охоплює не всі складники інноваційної сприйнятливості і через це представляється нам дуже усіченою. Це обмежує можливості її практичного застосування. Вважаємо доцільним доповнити ці показники оцінкою впливу інновацій на основні показники фінансового стану і ефективності використання ресурсів підприємства. Відповідно до сформованої моделі пропонується проводити оцінювання впливу інноваційної сприйнятливості на економічну стійкість діяльності підприємства в запропонованій послідовності. Використання такого підходу дозволить піти від альтернативної думки про інноваційну сприйнятливості (розділення підприємств на інноваційно-активні і пасивні) до багатоваріантного (виділенню рівнів, класів активності) з урахуванням всього спектру визначальних цей рівень чинників, виявів і результатів інноваційної активності.*

Ключові слова: економічна стійкість, інноваційна сприйнятливість, компонент, показник, оцінка, контроль.

Formulation of the problem. The formation of the economic stability of the enterprise is the methods and means that ensure the conditions for maintaining the economic stability of the enterprise at a certain level and contribute to avoiding its decline. The loss of stability can occur for various reasons: as a result of a gradual increase in deviations from the planned indicators, insufficient control actions on the part of the company's management to regulate the impact of various factors on the economic stability of the company's activities, due to the unexpected loss of a significant part of assets, which leads to significant losses, and sometimes and until the bankruptcy of the enterprise.

The economic sustainability of the enterprise's activity is influenced by its innovative receptivity, which can be ensured through the use of certain measures. And it is precisely the control of the influence of the innovative receptivity of the enterprise on the economic sustainability of its activity that is a more important measure of ensuring the sustainable development of the enterprise.

Analysis of recent achievements and publications. The study of issues of assessing the influence of innovative receptivity on the economic sustainability of enterprises occupies a significant place in the works of domestic [1; 2; 3] and foreign [4] scientists. However, a general approach to methods and criteria for evaluating this impact has not yet been formed.

The **purpose** of this article is to review existing approaches to solving this problem.

Presentation of the main research material. It is necessary to clearly control and manage the process of change, slow it down and accelerate it in time. If the innovation has gone far ahead and has started to generate active resistance, it is necessary to slow down this program for a while and concentrate efforts on a favorable perception and consolidation of the achieved process [1].

We assume that the control of the influence of innovative receptivity on the economic sustainability of the enterprise, depending on the economic orientation and interests of its users, can be carried out with different details and emphasis.

The procedure for controlling the impact of an enterprise's innovative receptivity on the economic sustainability of its activity includes a sequence of certain stages. The number of stages is determined by the purpose of control and the availability of the necessary information.

The first stage is preparatory. The main tasks of this stage are:

1) formation of a system of indicators for evaluating innovative potential and results of innovative activity, taking into account industry and other features of a specific enterprise;

2) creation of an expert commission from among highly qualified specialists to determine the actual values of indicators that are not quantitatively measured;

3) collection of the necessary information that is provided relevant services of the enterprise, its preliminary analysis;

4) establishment (calculation or expert assessment) of actual values of indicators of innovative potential and results of innovative activity.

The 2nd stage is the calculation of the indicator of innovation potential growth (IIPG).

This indicator is the most important component of the integral indicator of innovative receptivity in ensuring the economic sustainability of the enterprise. Its value depends mainly on the direction of change (improvement or deterioration) of the indicators that determine the state of innovation potential in the reporting period compared to the previous one [3].

The 3d stage – calculation of the indicator of current results of innovative activity (CRIA).

The indicator proposed for calculation is the second basic component of the integral indicator of innovative receptivity in ensuring the economic sustainability of the enterprise. As in the previous case, its value is determined by the nature of the change (improvement or deterioration) in the indicators of the current effectiveness of innovative activity in the reporting period in comparison with the previous one.

This stage of the analysis of innovative receptivity in ensuring the economic sustainability of the enterprise involves the calculation of the indicator of current results of innovative activity (CRIA).

It is proposed to calculate the indicator according to the formula:

$$CPIA = \frac{\sum_{i=1}^{k} I_{pi}}{k},$$

where I_{ri} – indicator of the i-th indicator of the current effectiveness of innovative activity;

k – is the number of indicators characterizing the current effectiveness of the enterprise's innovative activity;

4 stage – calculation of the indicator of economic efficiency of investment in innovation (IEII).

The next stage of the analysis is the calculation of the indicator of economic efficiency of investment in innovation (IEII). This stage is proposed to be carried out when conducting a long-term prospective or retrospective analysis based on information about the innovative projects implemented or planned by the enterprise.

In general, efficiency is understood as a relative value defined as the ratio of the result (effect) to the costs associated with its achievement.

The number and composition of indicators selected from this list for the calculation of IEII is determined by the purpose and features of the object of the analysis. To evaluate the impact of innovations on the indicators of the efficiency of the use of enterprise resources, in our opinion, such characteristics as return on capital, production per employee, mother and return should be used [2].

The system of indicators formed by us, taking into account the reduction to uniform designations, is presented in the Table 1. Moreover, its application is not limited to the analysis of innovative receptivity in ensuring the economic sustainability of the enterprise. It can also be used to compare alternative options for innovative development of the enterprise.

Based on the values of the specified indicators, the value of the indicator of economic efficiency of investment in innovation is determined by the formula:

$$IEII = \frac{\sum_{i=1}^{l} I_{ei}}{l} \times 100\%, \qquad (2)$$

where I_{ei} – is an indicator of the i-th indicator of the economic efficiency of investments in innovation;

I – is the number of indicators characterizing the economic efficiency of investment in innovation.

The value of the indicator of economic efficiency of innovative projects will vary from

Table 1

System of economic efficiency evaluation indicators investment in innovation

Indicator	Characteristic	The value of the indicator at which the corresponding indicator is equal to 1
Ie_1	Net discounted income (integral economic effect of the project)	> 0
Ie_2	Project profitability index	> 1
Ie_3	Internal rate of return	The rate of return on capital is more desirable for the investor
Ie_4	Period and return on investment	Compliance with requirements investor
$Ie_{5...1}$	The main indicators of the financial condition and efficiency of the use of resources of the enterprise	Improvement of the indicator compared to the previous period (based on comparison)

0 to 100%. At the same time, the zero value of the indicator indicates the inefficiency of the innovative activity of the enterprise. The value of IEII = 100% reflects the maximum level of innovative receptivity in ensuring the economic sustainability of the enterprise's activity in the reporting period in the analyzed area [4].

5 stage – calculation of the integral indicator of the impact of innovative receptivity on the economic sustainability of the enterprise's functioning (IRES).

This stage is the final stage in the dynamic assessment of innovative receptivity in ensuring the economic sustainability of the enterprise. For its implementation, all components of the integral indicator must be determined:

– indicator of innovation potential building (IIPB);

– indicator of current results of innovative activity (CRIA);

– indicator of economic efficiency of investments in innovation (IEII).

After calculating the values of all structural components, their importance in the general indicator of the impact of innovative receptivity on the economic sustainability of the enterprise is determined. Weighting coefficients of structural components of economic stability are also determined by the expert method.

The integral indicator of the influence of innovative receptivity on the economic sustainability of the enterprise's functioning is calculated similarly to the structural components according to the formula (3):

$$GIIR = \sum_{j=1}^{m} b_j C_j, \qquad (3)$$

where GIIR – is a generalizing indicator of the impact of innovative receptivity on the economic sustainability of the enterprise;

m – is the number of structural components;

b_j – is the weight coefficient of the structural component C_j and

$$\sum_{j=1}^{m} b_j = 1.$$

We propose to calculate the integral indicator of the influence of innovative receptivity on the economic sustainability of the enterprise's functioning according to the formula:

GIIR = 0.5 * IIPB + 0.25 * (CRIA + IEIII). (4)

When conducting operational analysis in quarterly or annual sections, as already emphasized, the calculation of IEII can be omitted in order to avoid incomparability of the components of the integral indicator due to the difference in the time intervals of the assessment. Then formula (5) will have the form:

GIIR = 0.5 * IIPB + 0.5 * CRIA. (5)

Depending on the value of the integral indicator, the level of influence of innovative receptivity on the economic sustainability of the enterprise can be characterized as low, medium and high. To do this, we will use such a method of constructing a generalizing indicator as the generalized Harrington desirability function . It is widely used in practice in various fields of science, including economic management. The desirability function is an indicator for the degree of agreement with the detailing of the processes, and allows you to compare different qualitative characteristics by transforming them into a single dimensionless scale, which is

defined in the interval [0; 1] [2]. At the same time, the values of the factors that are most favorable for the normal functioning of the system are compared with values close to one (usually from 0.6 to 1).

Factors that are considered unfavorable are given values close to zero on the scale (usually between 0 and 0.4). Therefore, the desirability function can be considered a membership function, and it can be used as an optimization criterion. The indicator value of 0.37 usually reflects the permissible limit value (Table 2).

Harrington's desirability function, we can offer the following scale of interpretations of indicators for assessing the impact of innovative receptivity on the economic sustainability of enterprise activity [2]:

1. The level of influence of innovative receptivity on the economic sustainability of the operation of the enterprise is considered low if:

$$0 \leq GIIR < 0.37.$$

This situation occurs in the event that during the analyzed period, the company paid practically no attention to the development of innovative potential, and innovative projects were practically not implemented or were characterized by low results.

This level of innovative receptivity practically deprives the enterprise of the opportunity to ensure long-term sustainability functioning.

2. The level of influence of innovative receptivity on the economic sustainability of the operation of the enterprise is considered average, if:

$$0.37 \leq GIIR < 0.63.$$

The existing situation may be the result of insufficient efforts of the enterprise to increase the components of innovative potential and increase the effectiveness of innovative activities. Or a sufficiently low level of one of the indicated manifestations of innovative receptivity is compensated by high indicators of another.

This level of receptivity creates certain prerequisites for achieving and maintaining long-term sustainable operation of the enterprise. However, guaranteed long-term stability is possible only in case of a certain increase in the level of innovative activity.

3. The level of influence of innovative receptivity on the economic sustainability of the operation of the enterprise is considered high if:

$$0.63 \leq GIIR \leq 1.0.$$

The situation is characterized by an improvement in the state of innovative potential over the analyzed period in almost all of its components, as well as an increase in the scale of innovative changes in most characteristics.

Such a level of influence of innovative receptivity on the economic sustainability of the enterprise's functioning, provided it is qualified to be evaluated and the relative stability of the environment of the enterprise's functioning, practically guarantees its long-term economic sustainability.

Conclusion. The results of the analysis made it possible to identify the strong and weak components of innovative receptivity in ensuring the economic sustainability of the enterprise's activity, which will allow the implementation of effective measures to control the influence of the innovative receptivity of the enterprise on the economic sustainability of its activity. Moreover, the presence of strengths is the basis for ensuring long-term stability, while weaknesses require increased attention in the strategic management of sustainable functioning of the organization. During the analysis, the influence of the main factors of innovative receptivity on the economic sustainability of activity and intra-economic reserves for its improvement were revealed.

Determining the limit at which the positive impact of innovative activity outweighs the negative should ensure the economic sustainability of the enterprise and is a progressive direction of research.

Table 2

Assessment of the level of influence of innovative receptivity on the economic sustainability of the enterprise based on standard desirability scale scores

Marks on the desirability scale	Qualitative assessment	Qualitative assessment of the GIIR level
1.00-0.80	Very good	High
0.80-0.63	Fine	
0.63-0.37	Satisfactorily	Average
0.37-0.20	Badly	Low
0.20-0	Very bad	

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