

on methods of choosing priority military technologies. Based on the results of the research, it was concluded that various methods are used for the selection of critical technologies, but mainly on the basis of Foresight, as a complex method, using the method of expert surveys or expert assessments. Additional methods are scientometric, patent analyzes and analysis of official forecasts. It is noted that there is no single set of methods for conducting Foresight, therefore appropriate combinations of methods are used for a specific project and opportunity. For the selection of priority military technologies, a simplified comprehensive approach without significant human and financial resources is proposed – a combination of scientometric and patent analyzes together with the analysis of official forecast documents.

Keywords: national security, critical technologies, selection methods, Foresight, complex approach.

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EVALUATION OF THE PROPENSITY FOR INNOVATION ACTIVITY OF THE REGIONS OF AZERBAIJAN

Abstract. Different approaches to the assessment of regional innovation activity were considered in the article. The characteristics of regional innovation activity were investigated. The regions of Azerbaijan were assessed in terms of propensity for innovation activity based on a new methodological approach. The ranking of regions was determined based on indices of propensity to innovation activity. Proposals regarding the development of regional innovation activity have been presented.

Keywords: innovation activity, innovation potential, propensity for innovation activity, innovation infrastructure, rating evaluation.

INTRODUCTION

Innovation plays an important role in the economic development of every country. Because one of the important conditions for increasing the country's competitiveness is to ensure the country's innovation development. For the country, innovation development means increasing productivity and stimulating economic growth, and in the long term, improving living conditions.

Increasing innovation capacity plays a central role in the growth dynamics of successful develop-

ing countries. In addition, innovation is not only a high-tech product, but also a complex innovation infrastructure with extensive educational opportunities, which allows to significantly improving the country's position in the field of innovation development.

The formation of innovative trends in the economy begins with the application of innovations in the activities of enterprises. Because a constantly updated product (business or service) is the basis of the enterprise's competitiveness and expanded

reproduction. An effective production management system involves the use of innovation mechanisms that can intensify the production process and achieve really economic and social benefits. Expanding the scope of competitive innovation products plays a key role for economic growth in the long term. For this reason, economically developed countries pay special attention to the development of scientific and technological potential and human capital. Innovations are a source of economic growth and development, therefore the question of effective use of the innovation potential of the region is considered important.

PROBLEM STATEMENT

The innovation activity of the region's economic subjects is the main feature of the region's innovation development. All elements of this economic system are indicators of readiness to accept innovations and apply them. Enterprises that actively use innovations gain sufficient technological independence, which ensures their efficiency and competitiveness. In addition, innovation activity of enterprises is closely related to direct investment activity. Investments depend on innovation, both quantitatively and qualitatively, because the profit obtained by the enterprise from innovation activity is reinvested in production. All this contributes to the economic development of the country and the improvement of the quality of life of the population, therefore innovation activity should be considered as a target indicator of the innovation policy of both enterprises and the state.

The results obtained from the evaluation of the innovation activity of the region allow to determine the correct strategic approach in the field of innovation development both at the country and regional level.

PURPOSE OF THE STUDY

It consists of determining the propensity of the regions of Azerbaijan for innovation activity, the reasons hindering the innovation activity of enterprises and making relevant proposals.

METHODOLOGY

Let's consider the methods used when assessing the propensity of regions to innovation activity. The first of these is the Regional Innovation Scoreboard - a modified version of the European Innovation Scoreboard, which has been evaluated since 2002. This methodology is designed to study the innovation activity of the region. During evaluation, most of the similar indicators are used, adapted to the characteristics of regional statistics. The methodology is used to evaluate 238 regions of 23 European Union countries [1; 2].

The Regional Innovation Report (RIR) is a comparative assessment of regional innovation development based on the methodology of the European Innovation Report (ERI). Compared to the EU, a more limited number of 18 indicators is used during this assessment. The selection of indicators in this form is due to the fact that the statistical indicators available at the regional level are less than the indicators available at the national level. The lack of some indicators at the regional level creates difficulties in ranking the regions during the assessment. At the same time, it becomes possible to group and rank regions with the same level of innovative development [3; 4]. The evaluation methodology of the region's innovation development combines 3 block indicators of innovation enablers, firm activities and innovation output. As a result of the evaluation of the innovation development level of the regions of the European Union, 5 types of innovation regions are defined: high innovators, medium-high innovators, average innovators, medium-low innovators, low innovators.

The second methodological approach is the Community Innovation Survey (Community Innovation Survey) — Assessment is conducted by conducting a questionnaire survey among business leaders in European Union countries every 2 years [5]. Participation in the surveys is voluntary, and at the end the results are summarized for each country and region. The questions include innovation product, application of innovation in production, financing of innovative product production, involved state financing and income obtained in product production, etc. information about is reflected. For example, in 2018, a survey was conducted among 75 employees of 6,098 enterprises in Germany, 2,334 in Spain, 2,082 enterprises in Austria, and 1,991 enterprises in Italy using this methodology. This methodology focuses on the application of the innovative product in production and the study of the income obtained from the sale of the innovative product.

The first step in the assessment of innovation activity is the development of a system of indicators to make the appropriate measurement. This system of indicators has been developed as the European Indicators System (EIS) for the countries of the European Union [2; 6]. From 2001 to 2003, 17 indicators were used during the evaluation. Since 2004, 19 indicators have been selected, divided into four groups. The groups are:

- 1) human resources for innovation — 5 main indicators;
- 2) creation of new knowledge — 4 main indicators;
- 3) knowledge transfer and application — 3 main indicators;

4) innovation financing, sales and markets — 7 key indicators.

Over a certain period of time, EIS had the experience of visually assessing the state of innovation processes, the dynamics of changes in innovation activity, and determining the weak and strong sides of countries based on the analysis results. In 2005, EIS further improved the indicator system. EIS-2005 covers 26 main indicators of innovation activity and consists of 5 indicator categories divided into 2 groups; the first group is input indicators; the second group is output (result) indicators of innovation [2].

Based on the reviewed methodology and evaluation methods, the article proposed a new methodological approach for the assessment of the tendency of Azerbaijan’s regions to innovation activity and formed a system of indicators.

PRESENTATION OF THE MAIN MATERIAL

The methodological basis of the issue is the formation of the system of indicators used during the evaluation of the tendency of the regions

to innovation activity. The system of indicators was developed based on international methodologies, considering the national characteristics of the country. Surveys were conducted on the online platform among business leaders operating in different sectors of the economy from each region. In the survey, the following 5 main blocks and 2 auxiliary blocks were used to measure the innovation activity of the region.

- 1) Innovation block in products and services — 2 indicators;
- 2) Innovation block in the process — 3 indicators;
- 3) Continuous innovative activity block — 1 indicator;
- 4) Innovation activity and innovation expenditure block — 3 indicators;
- 5) Block of cooperation in the field of innovation activity — 8 indicators.

The indicators on the mentioned main blocks such as innovation in products and services and innovation in the process and sustainable innovative activity characterize “innovation activity of

Table 1

Indicators for survey blocks

Blocks	Indicators
<ul style="list-style-type: none"> • “Innovation in products and services” (2) 	<ul style="list-style-type: none"> • During the last 3 years, the access of goods and services of the enterprise to domestic markets; • Access to foreign markets of goods and services of the enterprise during the last 3 years
<ul style="list-style-type: none"> • “Innovation in the process” (3) 	<ul style="list-style-type: none"> • Implementation of innovations in production in the last 3 years; • Introducing an innovative product or service to the market in the last 3 years; • The impact of innovative product or service production on the company’s income
<ul style="list-style-type: none"> • “Continuous innovative activity” (1) 	<ul style="list-style-type: none"> • Using innovative methods in the process of product or service production
<ul style="list-style-type: none"> • “Innovation activity and innovation expenditure block indicators” (3) 	<ul style="list-style-type: none"> • The existence of the enterprise’s innovation strategy; • Currently, ongoing innovation activity in the enterprise in the direction of applying innovations in the production of products and services; • Currently conducting research and development / scientific research in the enterprise
<ul style="list-style-type: none"> • “Indicators for the block of cooperation in the field of innovation activity” (8) 	<ul style="list-style-type: none"> • Conducting work to increase knowledge and experience of personnel; • Conducting trainings for the development of the work process within the enterprise; • Purchase of new technological equipment in the production of products or services in the last 3 years; • Purchase of new software for the enterprise during the last 3 years; • During the last 3 years, the enterprise received state support related to innovation activity; • Enterprise’s interest in innovation projects; • Cooperation with other enterprises and institutions related to innovation activity during the last 3 years; • Implementation of innovations in the marketing activity of the enterprise during the last 3 years

enterprises". And indicators obtained on the other two blocks such as innovation activity and innovation costs and cooperation in the field of innovation activity characterize "innovation results". Indicators for blocks are given in **Table 1**.

Surveys were conducted among medium and large enterprises selected based on selective observation among enterprise managers.

The majority of enterprises participating in the survey, i.e. 36 %, were from the city of Baku. If we look by regions, Absheron economic region 13 %, Shaki-Zagatala economic region 12 %, Ganja-Gazakh economic region 13 %, Aran economic region 4 %, Upper Kharabakh 1 %, Lankaran 7 %, Guba-Khachmaz 6 %, Daglig Shirvan 7 % participated in the survey (**Figure 1**).

The vast majority of enterprises participating in the survey for each region are enterprises op-

erating in the field of production (**Figure 2**). In our opinion, this will allow us to obtain more accurate results regarding the application block of innovations in production.

Based on the general questions asked for each block above, we reviewed the results obtained by region. Now let's move on to the assessment of the innovation activity of the regions based on the questions with "yes" and "no" answers according to the survey results. Based on the innovation activity indices obtained for each block of the questionnaire, the innovation activity propensity index of the regions was calculated. So, since the number of enterprises is not proportional for each region, we cannot make a quantitative assessment. Basically, we are able to assess trends in innovation activity in each region. Therefore, the evaluation was taken as whether there is a tendency for

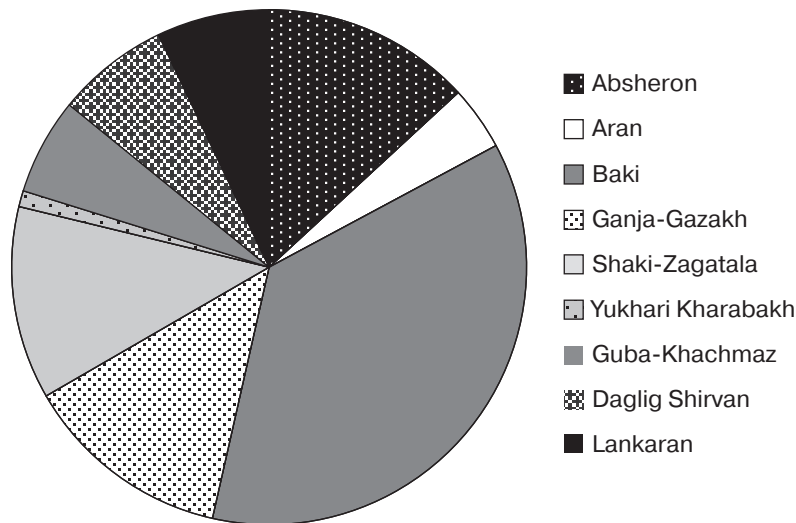


Figure 1. Enterprises participating in the survey Distribution by regions, in %

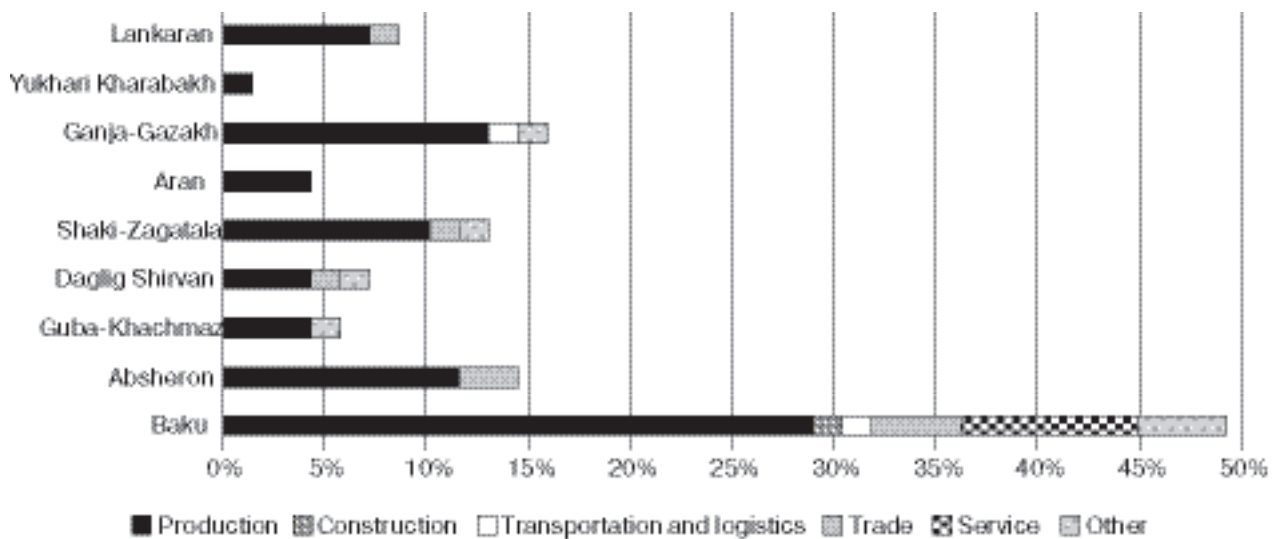


Figure 2. Main activities of enterprises, in %

innovation activity in that region for each block, and it was definitely evaluated based on the answers “yes” and “no”. The assessment was carried out in two stages:

- In stage I — innovation activity index was calculated for each block;
- In the II stage — the final innovation activity propensity index of the region was calculated based on the indices of the blocks.

In the first stage of the assessment, indexes were calculated for blocks based on the answers to the questions on each indicator. The number of questions with a “yes” answer was subtracted from the number of questions with a “no” answer, and the innovation activity index of the block was found.

$$I_{b1...b5} = S_+ - S_- \quad (1)$$

Here:

I_b — innovation activity index of the block;

$b_1...b_5$ — is the number of blocks;

S_+ is number of questions with “yes” answer;

S_- is the number of questions with “no” answer.

In the next stage, the innovation activity indices obtained for each block were collected and the innovation activity propensity index of the region was found. The formula for calculating the propensity index for innovation activity is given as follows:

$$IA_m = I_{b1} + I_{b2} + I_{b3} + I_{b4} + I_{b5} \quad (2)$$

Here:

IA_m — index of propensity to innovation activity;

$I_{b1}...I_{b5}$ — innovation activity indices for blocks characterizing the innovation development of the region.

Blocks characterizing the components of the innovation activity index of the region are given in **Figure 3**.

Table 2 shows the results of regions by blocks and innovation activity indices. As can be seen from the table, the propensity index for innovation activity in the city of Baku is 15. Among the regions,

Absheron and Shaki-Zagatala have the same index of propensity to innovation activity, which is 13, and is dominant compared to other regions. The propensity index for innovation activity in Ganja-Gazakh and Lankaran regions is 5 and 7, respectively. Among the regions, the lowest result was obtained for Guba-Khachmaz and Aran regions, –5 and –1, respectively. The propensity index for innovation activity in the Yukhari Kharabakh region of Shirvan is 1.

Based on the innovation activity propensity index obtained as a result of the evaluation, the regions were divided into 3 groups according to the level of innovation development: high, medium and low level. During the grouping, the following norm was adopted for the innovation activity index.

- $11 < |IAI| < 17$ — high level;
- $10 < |IAI| < 1$ — medium level;
- $1 < |IAI|$ — low level.

The norm applied during the grouping of regions was determined on the basis of the proportions of the answers given for the indicators of each block in the regions. As mentioned, 17 indicators for 5 blocks were used during the evaluation. Regions that answered “yes” to more than 10 out of 17 indicators were included in the group of high-level regions in terms of innovation development.

Thus, in accordance with the accepted norm was considered characteristic for the regions: the high-level regions of propensity to innovation activity for — Baku city, Absheron and Shaki-Zagatala regions; the medium-level regions — Lankaran, Ganja-Gazakh; the low-level regions — Daglig Shirvan regions, Aran and Guba Khachmaz (**Table 3**).

Absheron and Shaki-Zagatala have a high propensity for innovation activity due to the achievement of a high price index for the 5th “Cooperation in the field of innovation activity” block. The high propensity for innovation activity in the mentioned regions is related to the construction and operation of production enterprises equipped with modern

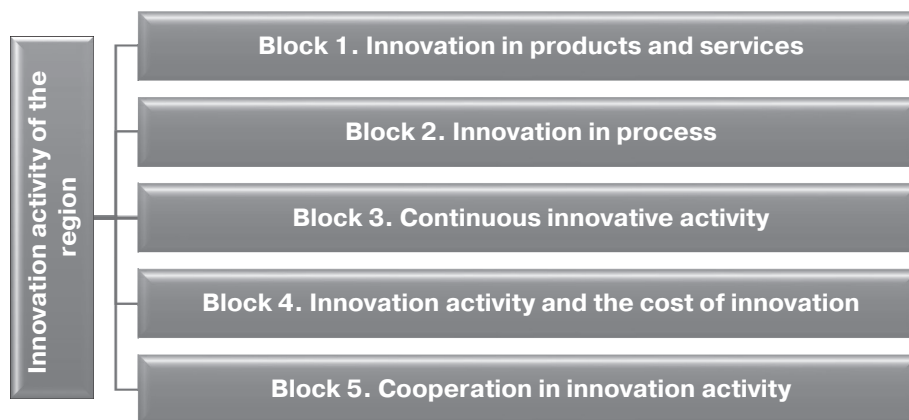


Figure 3. Innovation activity blocks

Table 2

Indexes of innovation activity of regions

Regions	Block 1 (2 indicators) Innovation in products and services i_{b1}	Block 2 (3 göste indicators rici) Innovation in process i_{b1}	Block 3 (1 indicator) Continuous innovative activity i_{b1}	Block 4 (3 göstərici) Innovation activity and the cost of innovation i_{b1}	Block 5 (8 indicators) Cooperation in innovation activity i_{b1}	The propensity index for innovation activity of region $-j_{Am}$
Baku	2	3	1	1	8	15
Absheron	2	3	1	1	6	13
Shaki-Zagatala	0	3	1	3	6	13
Lankaran	2	3	-1	3	0	7
Ganja-Gazakh	2	-1	-1	3	2	5
Daglig Shirvan	2	-1	-1	3	-2	1
Aran	2	1	-1	-1	-2	-1
Guba-Khachmaz	0	1	-1	-3	-2	-5

Note: **“0” — neutrality, that is, the number of positive and negative responses is the same, positive values reflect the presence of activity on the block, negative values reflect the absence of activity on the block.

Table 3

According to the innovation activity index of regions norm and distribution

Low level $1 < i_{ai}$	Medium level $10 < i_{ai} < 1$	High level $11 < i_{ai} < 17$
Aran	Lankaran	Baku city
Guba-Khachmaz	Ganja-Gazakh	Absheron
	Daglig Shirvan	Shaki-Zagatala

technologies in those regions in recent years, the introduction of new technologies in those enterprises, the application of innovative methods in marketing activities, and the regular increase in the qualifications of personnel. Personnel with high qualification degrees are also highly interested in new scientific results.

The main problem in regions with a medium and low level of innovation activity tendency is related to the fact that those regions show low results on the indicators included in the 3rd “Sustainable innovative activity” block. Almost no innovative methods are used in enterprises operating in these regions. At the same time, the situation on the 4th “Innovation activity and innovation costs” block in the regions included in the medium development level is slightly better than the low levels. Businesses operating in that region are trying to make changes.

The reasons that hinder innovation development in the Aran and Guba-Khachmaz regions corresponding to the low level were obtained in the

blocks “Continuous innovative activity”, “Innovation activity and innovation costs”, “Cooperation in the field of innovation activity” the results are:

- the enterprise does not have an innovation strategy;
- necessary work on increasing the knowledge and experience of personnel is not carried out;
- the process of replacing technologies with new ones is weak;
- there is no state support for innovation activity;
- innovations in marketing activities are not applied.

The blocks that we mentioned are the blocks that characterize the innovation result. From the conducted analysis, it is clear that although work is being done on the “Innovation in products and services” and “Innovation in the process” blocks that characterize the innovation potential in the Aran and Guba-Khachmaz regions, which correspond to the low level of development, they cannot be completed and the innovation result is not achieved.

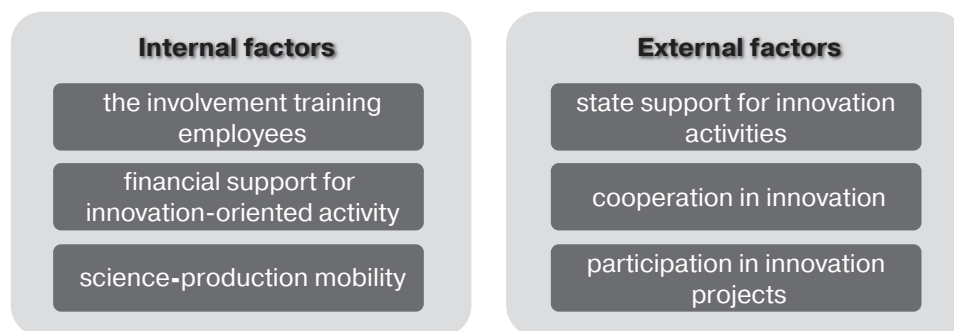


Figure 4. Factors of internal and external dependence of enterprises' implementation of innovation activity

From the analyzes we conducted in this section, we concluded that the innovation development level of Azerbaijan's regions is not encouraging. Although the regions have relatively high results on the blocks characterizing the innovation potential, the results on the blocks reflecting the innovation result are quite low. In some regions, it is absent. First of all, the reason for this is the low level of application of new technologies in enterprises operating in those regions. Because the introduction of new technologies creates conditions for increasing the efficiency and competitiveness of the enterprise's business operations, making technological changes.

In general, the conducted analysis showed the dependence of the innovation activity of enterprises on a number of internal and external factors. The internal factors include the enterprise's personnel involvement in training, financial support for innovation-oriented activities, and scientific-production mobility. External factors include state support for innovation activity, cooperation in the field of innovation, and participation in innovation projects (**Figure 4**).

CONCLUSIONS AND RECOMMENDATIONS

From the conducted research, we concluded that a system of indicators has not been formed to measure the propensity of the regions of Azerbaijan to innovation activity. For this, we defined these indicators in the article. Thus, from the results of the survey conducted among the heads of enterprises in the city of Baku and the regions, it became clear that there is a sharp difference between the innovation potential and development of innovation in the city of Baku and the regions. The main potential of the country is concentrated in the city of Baku. The main obstacle in the development of innovations is the financial factor. In this regard, in order to increase the innovation activity of the regions, it is necessary to apply different strategic approach methods and the financial support of the

state, considering the resources of the innovation potential in the regions.

We think that the main problem in the low level of innovation development of the regions of Azerbaijan in the lack of strategic goals and main priorities for the development of the field. For this, considering the greater impact of innovations on GDP, it is necessary to identify priority areas and develop the technology segment through the implementation of sectoral support measures in those areas. In this way, Azerbaijan can provide favorable conditions for business implementation, as well as access to the CIS, Middle East and Central Asian markets, and support for mass entrepreneurship by creating a joint venture with large international leading companies. Thanks to this approach, the transfer of technology and capital in our country, the widespread application of technology, the development of new business models, and Azerbaijan's entry into the global innovation system can be ensured.

- It is important to define a strategic approach to innovation development in order to increase regional economic activity;
- The level of regional innovation activity is determined by the development of innovation activity of enterprises in the region;
- For Azerbaijan, the strategy of technological orientation of innovations can give more significant results.

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ОЦІНКА СХИЛЬНОСТІ ДО ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ РЕГІОНІВ АЗЕРБАЙДЖАНУ

Резюме. У статті розглянуто різні підходи до оцінки регіональної інноваційної діяльності. Досліджено особливості регіональної інноваційної діяльності. Регіони Азербайджану було оцінено з точки зору схильності до інноваційної діяльності відповідно до нового методичного підходу. Рейтинг регіонів визначався на основі індексів схильності до інноваційної активності. Надано пропозиції щодо розвитку регіональної інноваційної діяльності.

Ключові слова: інноваційна діяльність, інноваційний потенціал, схильність до інноваційної діяльності, інноваційна інфраструктура, рейтингова оцінка.

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