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ASSESSMENT OF THE REGİONALİNNOVATİON ACTİVİTY

ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

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GENERAL DESCRIPTION OF THE DISSERTATION

Actuality and development of the topic: Innovation is the creation of a completely new, improved product, service, organizational and management that is beneficial to the state, society and the market by creating added value as an economic category. It is directly related to economic growth and material well-being. In modern times, countries around the world are pushing for innovation to maintain their competitiveness. They pay special attention to increasing the share of research and development (R&D) and innovation in GDP. In the new economic paradigm, scientific and technological progress and knowledge are the main factors in the development of an innovation-oriented economy.

The modern market model of the Azerbaijani economy is based on the active involvement of innovations in various areas of economic activity. From this point of view, it is important to increase the country's competitiveness in domestic and foreign markets, the country's share in the markets of high-tech products to ensure sustainable economic development and value added. The main role in solving this problem is played by the formation of a national innovation system, the reconstruction and development of national industry. All this makes it necessary to adopt a strategy for the development of innovation in the country.

It is known that in a number of strategic documents of the country, in the speeches of the President, the development of innovation-oriented economy in Azerbaijan is set as a priority. It should be noted that the Commission on Business Environment and International Ratings was established by the Order of the President of the Republic of Azerbaijan No. 2199 dated July 13, 2016. One of the working groups of the commission was established on technology and innovations. The action plan of this working group aims to improve the country's position in the international rankings of the Global Competitiveness Index and the Global Innovation Index.

By the Order of the President of the Republic of Azerbaijan dated February 2, 2021, "Azerbaijan 2030: National Priorities for Socio-Economic Development" was adopted. The strategic document sets the country the implementation of five National Priorities for the next

decade, one of which is "Competitive human capital and the space of modern innovations." In this priority, issues such as modern and strong education, modernization of higher education institutions at the international level, "lifelong learning" are brought to the fore for the competitive and long-term development of the economy. In addition, the main tasks are to ensure the technological capacity of the economy, the development of science-intensive, medium and high-tech sectors that create added value in industry.

One of the important steps to achieve these priority goals is to form a National Innovation System in the country. The ever-changing demands of a market economy make it necessary to produce high-tech products and export innovative products and services. During the Soviet era, Azerbaijan was a country that produced 70% of the equipment of the oil and gas industry. However, the modern world requires the construction of an economy based on the power of knowledge and technological solutions. It makes it necessary to use the results of the innovation process in order to increase efficiency in both the public and private sectors.

The formation of an innovation-oriented economy is an extremely important task for Azerbaijan. To produce added value, it is important for a country to define its own long-term innovation strategy. The development of innovation is possible not in the form of individual abilities, initiatives, as well as state support, but by creating a whole innovation ecosystem.

These reasons underscore the relevance of the topic by assessing the innovation activity of countries and regions, identifying existing innovation potential and the reasons that hinder the development of the industry, and the importance of defining a strategic approach to innovation development.

Goals and tasks of the research: Analysis of innovation activity of the Republic of Azerbaijan and development of strategic approaches to innovation development by assessing the level of innovation development of the regions of the Republic of Azerbaijan.

In order to achieve this goal, the dissertation has the following tasks:

- Systematic analysis and comparison of the concept of "innovation activity", existing methodologies in the field of innovation activity assessment;
- Comparative analysis of countries on innovation strategies and the system of indicators used here;
- Carrying out a comparative analysis of the level of innovation development of the countries of the South Caucasus region based on the international rating "Global Innovation Index";
- Formation of a new methodological approach and system of indicators for the assessment of regional innovation activity on the basis of the considered methodologies;
- Grouping regions by regional innovation activity index;
- Econometric assessment of the impact of indicators characterizing the development of innovation on economic growth;

The object of the research is innovation activity of the Republic of Azerbaijan and the regions of Azerbaijan.

The subject of research is analysis of innovation activity of the Republic of Azerbaijan and issues of assessment of innovation activity trends of the regions of the Republic of Azerbaijan and application to strategic approaches.

Methods of the research: The methodological basis of the dissertation is modern research methods and forms of economic science developed using the statistical data of the State Statistics Committee of the Republic of Azerbaijan (SSCRA), the World Bank (WB), as well as reports published by international organizations in this field. Systematic and comparative analysis, graphical analysis, prognostic research, econometric assessment methods, as well as complex economic analysis method were used in the implementation of the work.

The main provisions of the defense. The main provisions of the dissertation submitted for defense are as follows:
- The lack of a unified methodological approach and a system of indicators for assessing regional innovation

activity poses serious obstacles to the definition of priorities in this area;

- It is important to define a strategic approach to innovation development to increase regional economic activity;

- For Azerbaijan, the technology-oriented strategy of innovation can yield more significant results.

Scientific innovations of the research: A new methodological approach was applied to assess the tendency of regional innovation activity; Tendency of innovation activity in the regions of Azerbaijan was revealed; Directions were given to increase innovation activity in the regions; The impact of innovation development indicators on economic growth has been econometrically assessed;

Differential strategic approaches have been identified for the innovative development of Azerbaijan and its regions.

Theoretical and practical significance of the research: The theoretical significance of the research is to identify a new methodological approach to the assessment of regional innovation activity and the formation of a system of indicators. The main practical significance of the research is that it can be used to identify priority goals in the development of innovation development strategies. Also, the results obtained during the development of dissertation sections to improve the results of the indicators reflecting the country's position in international rankings were submitted to the Cabinet of Ministers of the Republic of Azerbaijan on behalf of the Ministry of Economy within the Action Plan of the Working Group on Technology and Innovation was presented.

In addition, the theoretical and practical issues developed in the framework of the research, as well as the results obtained can be used by university students, specialists, government officials and stakeholders conducting research in this area.

Approbation and application: The main provisions of the dissertation and proposals arising from the research were discussed and approved at national, regional and international scientific conferences and seminars.

Recommendations reflecting the main essence of the dissertation and scientifically substantiated were published in 8 articles, including

3 articles abroad and 5 conference materials and theses, including 2 conference materials and theses abroad.

The structure of the thesis: The thesis consists of an introduction, three chapters, conclusion, list of references, appendices and abbreviations and a list of symbols. The total volume of the dissertation consists of 117 pages, 205,000 characters and 35 graphs and figures, 17 tables, as well as a list of references, 5 appendices and included a list of abbreviations and symbols, and a total volume of 143 pages.

THE CONTENT OF THE DISSERTATION

Introductıon

Chapter I. Methodological basis of formation of innovation activity of the region

1.1. Theoretical bases of regional innovation activity

1.2. Methodological aspects of the assessment of regional innovation activity

1.3. Methods of assessing regional innovation activity

Chapter II. Comprehensive analysis of regional innovation development of Azerbaijan

2.1. The current state of the innovation ecosystem in Azerbaijan

2.2. Analysis of the legislative framework in the field of innovation in Azerbaijan

2.3. Analysis of innovation activity of the South Caucasus countries according to the Global Innovation Index rating

Chapter III. Evaluation of innovation development of regions of Azerbaijan

3.1. Assessment of innovation activity of regions in the Republic of Azerbaijan

3.2. Assessing the economic impact of innovation activity

3.3. Principles of formation of regional innovation development strategy

Result

List of used literature

Appendixes

List of abbreviations and symbols

MAIN CONTENT OF THE RESEARCH

The introduction substantiates the relevance of the dissertation topic, notes the goals and objectives of the research, indicates scientific innovations, the theoretical and practical significance of the work and approbation.

The first chapter of the work was devoted to **"Methodological bases of formation of regional innovation activity".** The chapter describes the essence of the categories related to "Innovation". This section discusses various author's approaches to the category of innovation. Some of them define innovative activity as a complex indicator characterizing the innovative activity of an object (enterprise, industry, region). Secondly, some researchers consider innovation activity as an opportunity to develop methods for assessing the level of quality and quantity of innovation activity. Third, in a number of studies, the concept of innovative activity is explained by such general characteristics as the activity of parameters, sensitivity, intensity, timeliness and mobilization. Noted that innovation activity is the initial stage of the process of implementing innovation activities using innovation potential. Innovation potential itself is an element of economic potential, including as part of innovation activity, and contributes to increasing the level of innovation activity. İnnovation activity is a characteristic of the efficient use of available resources. The interrelationship of innovation activity with innovation potential and innovation activity is reflected (Figure 1).
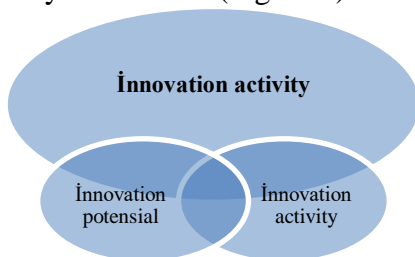

Figure 1. Interaction of innovation activity with innovation potential and innovation activity

The methods of assessing regional innovation activity and the system of indicators used in the assessment are based on international experience, most of the methodologies used to assess the innovation development

rankings of the world - Global Innovation Index, Innovation Cities Index, Innobarometer, Portfolio innovation index, Global Innovation Barometer, European Innovation Report, etc. reviewed. At the same time, the methodologies of many organizations and research institutes conducting research on innovation activities at the macro level were considered. Among them, the OECD examines the results of innovation activities in the reports of the Organization for Economic Cooperation and Development and the conditions for the development of innovation in 27 OECD countries using various quantitative and qualitative indicators. The Information Technology and Innovation Fund (ITIF) ranks innovative economies and assesses the innovative activity of countries based on 16 indicators. Bloomberg ranks the most innovative economies based on the Bloomberg Innovation Index. Based on the methodologies we have considered, we can say that, in general, the indicators used in the rating assessment of innovative development can be divided into two groups: i) indicators characterizing the development of innovations and ii) indicators that ensure the development of innovations.

This chapter also analyzes the innovative development strategies of individual countries and the system of indicators used in them. Finally, the author proposed a new methodological approach to the assessment of innovation activity in the regions of Azerbaijan.

The study examines the concept of a region at the micro and macro levels within the framework of the analysis of regional innovation activity. At the macro level, Azerbaijan was analyzed as a country located in the South Caucasus region, and at the micro level, the innovative activity of the economic regions of the Republic of Azerbaijan was assessed.

The second chapter, entitled "Comprehensive Analysis of Regional Innovative Development of Azerbaijan", explains the concept of "innovation system". The current state of the innovation ecosystem in Azerbaijan is analyzed in two aspects - the components of the "innovation system" and the "innovation support system". The innovation system is analyzed in four components - ETTKİ development, start-up development, support for localization and local entrepreneurship, application of innovations, "innovation support system" - by analyzing the components of institutions, infrastructure, working environment, labor market, identifying potential opportunities and barriers to

innovation ecosystem. This chapter also examines the current state of development of the technological sector of industry. The analysis was carried out by the State Statistics Committee of the Republic of Azerbaijan on the basis of a survey conducted to assess the innovative activity of industrial enterprises. It was concluded that the production of high-tech products at industrial enterprises is at a low level, the main costs of technological innovation are the introduction and development of new products, services, new processes and the purchase of machinery and equipment related to technological innovation, and there are also restrictions on financing innovation in industrial plants. This section presents ideas for a step-by-step approach to applying innovation in Azerbaijan.

As a result of the analysis of the existing innovation ecosystem of the country, the potential opportunities for innovation development and the reasons hindering development are summarized in the Table 1. Also, summarizing the results of the analysis conducted in this chapter, it was proposed to establish a program of innovation in our country in the areas of 1) import substitution and localization, 2) stimulation of innovation in business, 3) application of innovations by the public sector.

Table 1. Potential opportunities and obstacles of Azerbaijan's innovation ecosystem

Potential opportunities	Obstacles
• Competitive labor resources • Developed labor market; • Existing support mechanisms for entrepreneurs in the regions; • Innovation infrastructure - technoparks, agro-parks, industrial parks, industrial districts, etc .; • Favorable environment for starting a business; • Development of potential oil and gas industry to increase the share of the technology sector in exports; • High level of total capital investment.;	• Low cost of R&D; • The main part of the expenditures on R&D is covered by the state; • Whether the results of R&D are patented; • Low number of articles and references on scientific and technical topics; • "Doubtful" attitude to innovations; • Lack of funding for incubators; • Non-localization of innovations; • Mainly import of technological and scientific services; • Lack of venture financing; • Lack of legal framework in the field of innovation; • Lack of coordination between participants in innovation processes.

This chapter also provides a comparative analysis of the level of innovation development in the South Caucasus region according to the Global Innovation Index rating and the World Bank's indicators in the field of science and technology, and identifies the strengths and weaknesses of individual countries (Table 2). According to CPI-2020, the main indicators characterizing the competitive advantages of Azerbaijan in the field of innovation also reflect the strengths of the country's innovation system. These include the ease of starting a business, easy access to credit, the development of the domestic market, and the creation of ICT and organizational models. At the same time, we observe that the main problem is indicators of innovative potential, such as human capital and costs of research, development and development, and especially in terms of indicators of an innovative product-result - knowledge and technological results, a creative product. Here, the author considers their calculation methodologies for each indicator, which is considered a weakness of Azerbaijan in the Global Innovation Index.

Table 2. Results of SK countries on QII-2020 rating and its blocks

Countries	Qİİ rank	Institutions	Human capital and research	İnfrastructure	Market sophistıcatıon	Business sophistıcatıon	Knowledge and technology outputs	Creative outputs
Azerbaijan	82	59	89	85	36	96	118	65
Georgian	63	36	61	81	39	79	67	68
Armenia	61	64	94	90	68	69	45	56

Source: Compiled by the author based on the data of the QII 2020 rating report.

The third chapter is devoted to the assessment of innovation development in the regions of Azerbaijan. In this section, the regions are assessed for their scientific and educational potential on the basis of indicators provided by the State Statistics Committee of the Republic of Azerbaijan at the regional level. Made a comparative analysis of Baku and the regions. Statistical analysis shows that the main potential is concentrated in Baku, and between the regions in the Absheron and Ganja-Gazakh economic regions.The formation of a system of indicators used in the assessment of innovation activity in

the regions is the methodological basis of the issue. The system of indicators is based on international methodologies and taking into account the national characteristics of the country. The surveys were conducted on the online platform, in general, among the heads of enterprises operating in different sectors of the economy from each region. The survey used the following indicators from the following 5 main blocks to measure the innovation activity of the region (Table 3).

Table 3. Indicators on query blocks

Blocks	Indicators
- **"Innovation in products and services" (2)**	▪ Access of goods and services of the enterprise to domestic markets for the last 3 years; ▪ Access of the enterprise's goods and services to foreign markets during the last 3 years.
- **"İnnovation in the process"(3)**	▪ Application of innovations in production in the last 3 years; ▪ Launch of an innovative product or service in the last 3 years ▪ The impact of the production of an innovative product or service on the income of the enterprise.
- **"Sustainable innovation activity"(1)**	▪ Use of innovative methods in the production process of a product or service
- **"Indicators on the block of innovation activity and innovation costs"(3)**	▪ Existence of enterprise innovation strategy; ▪ At present, the innovative activity in the direction of application of innovations in the production of products and services in the enterprise; ▪ Currently conducting research and development / research in the enterprise.
- **"Indicators on the block of cooperation in the field of innovation" (8)**	▪ Carrying out work to increase the knowledge and experience of the staff; ▪ Conducting trainings to develop 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 technological equipment in the production of products or services in the last 3 years; ▪ During the last 3 years, the enterprise has received state support for innovation activities; ▪ İnterest of the enterprise in innovation projects;; ▪ Cooperation with other enterprises and organizations related to innovation activities during the last 3 years; ▪ Application of innovations in the marketing activities of the enterprise for the last 3 years.

Surveys were conducted among medium and large enterprises selected on the basis of sample observation among the heads of enterprises.

The majority of enterprises surveyed were 36% from Baku. By regions, Absheron economic region 13%, Sheki-Zagatala economic region 12%, Ganja-Gazakh economic region 13%, Aran economic region 4%, Upper Karabakh 1%, Lankaran 7%, Guba-Khachmaz 6%, Daglig Shirvan 7 % participated in the survey.
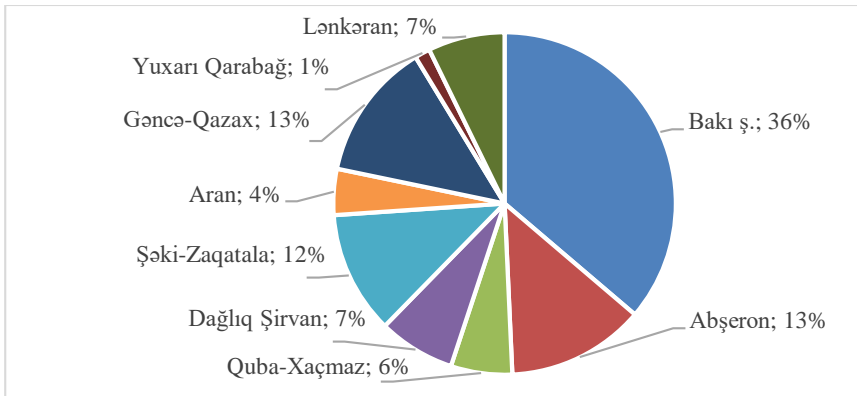

Figure 2. Distribution of enterprises participating in the survey by regions, in %

The vast majority of enterprises surveyed in each region were manufacturing.

At the initial stage, the innovation activity indices were calculated for each block of the regional questionnaire, and then the index of propensity to innovation activity of the regions was calculated on the basis of the indices of the blocks.

Thus, as the number of enterprises is not proportional to each region, we have not been able to conduct a quantitative assessment. Trends in innovation activity in each region were assessed. During the assessment, the propensity for innovation activity in the region was identified for each block. The questions were evaluated on the basis of "yes" and "no" answers. The assessment was conducted in two stages:

- In the first stage - the innovation activity index was calculated for each block;

- In the second stage - the index of propensity to the final innovation activity of the region was calculated on the basis of block indices.

In the first stage of the assessment, the indices for the blocks were calculated based on the answers to each question. The number of "no" questions was subtracted from the number of "yes" answers and the block's innovation activity index was found.

$$\dot{I}_{b1..b5}= S_+ - S_-$$

Here:
- $\dot{I}_b$- block innovation activity index;
- $b_1....b_5$ -number of blocks;
- S_+ "yes" number of questions;
- S_- "no" number of questions.

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

$$\dot{I}A_m=\dot{I}_{b1}+\dot{I}_{b2}+\dot{I}_{b3}+\dot{I}_{b4}+\dot{I}_{b5}$$

Here:
- $\dot{I}A_m$ – index of propensity to innovation activity;
- $\dot{I}_{b1}....$ $\dot{I}_{b5}$ – Innovation activity indices by blocks characterizing the innovative development of the region.

The surveys results based on the survey results are presented in Table 4.

Table 4. Regional innovation activity index

Regions	Block 1 (2 indicator) Innovation in products and services I_{bl}	Block 2 (3 indicator) innovation in the process I_{bl}	Block 3 (1 indicator) Sustainable innovative activity I_{bl}	Block 4 (3 indicator) Innovation activities and innovation costs I_{bl}	Block 5 (8 indicator) Cooperation in the field of innovation I_{bl}	Index of propensity to innovation activity in the region $-\dot{I}A_m$
Baku city	2	3	1	1	8	15
Absheron region	2	3	1	1	6	13
Sheki-Zagatala region	0	3	1	3	6	13
Lankaran region	2	3	-1	3	0	7
Ganja-Gazakh region	2	-1	-1	3	2	5
Daglıq Shirvan region	2	-1	-1	3	-2	1
Aran region	2	1	-1	-1	-2	-1
Kuba-Khachmaz region	0	1	-1	-3	-2	-5

"0" – neutrality, that is, the number of positive and negative answers is the same, positive values

The propensity index for innovation activity in Ganja-Gazakh and Lankaran regions is 5 and 7, respectively. Among the regions, the lowest results were obtained in Guba-Khachmaz and Aran regions -5 and -1, respectively. The propensity index for innovation activity in the Daglig Shirvan region is 1.

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

- 11<İAİ<17 – upper level;
- 10<İAİ<1 – average level;
- 1<İAİ – lower level.

The norm applied when grouping regions was determined on the basis of the ratios of responses to the indicators of each block by regions. As noted, 17 indicators for 5 blocks were used in the assessment. The regions that answered "yes" to more than 10 out of 17 indicators were included in the group of regions with the highest level of innovation development.

Thus, in accordance with the adopted norm, the high level of development of propensity for innovation activity for Baku, Absheron and Sheki-Zagatala regions, the average level of development of propensity for innovation activity for Lankaran, Ganja-Gazakh, Daglig Shirvan regions, innovation activity for Aran and Guba Khachmaz regions the low level of development of the propensity was considered characteristic.

Table 5. Norms and distribution of regions according to the index of propensity to innovation activity

Lower level 1<İAİ	Middle level 10<İAİ<1	Upper level 11<İAİ<17
Aran region Kuba Khachmaz	Lankaran Ganja-Kazakh Daglig Shirvan	Baku city Absheron Sheki-Zagatala

Based on the results of the survey, it was concluded that the high tendency for innovation activity in Absheron and Sheki-Zagatala is due to the high price index for the 5th block "Cooperation in the field of innovation". The high tendency for innovation activity in these regions is due to the construction and commissioning of production facilities equipped with modern technologies in recent years, the introduction of new technologies in these enterprises, the application of innovative methods in marketing activities and continuous professional development. Highly qualified personnel are also interested in new scientific results.

Reasons for the development of innovation in the Aran and Guba-Khachmaz regions, which correspond to the low level, are the results obtained in the blocks "Sustainable innovative activity", "Innovation activity and innovation costs", "Cooperation in the field of innovation activity":

- ✓ The company does not have an innovation strategy;
- ✓ Necessary work is not done to increase the knowledge and experience of staff;
- ✓ The process of replacing technology with new ones is weak;
- ✓ There is no state support for innovation activities;
- ✓ Innovations are not applied in marketing activities.

From the analysis conducted in this section, we conclude that the level of innovation development in the regions of Azerbaijan is not very encouraging. Although there are relatively high results for the blocks that characterize the innovation potential in the regions, the results for the blocks that reflect the innovation result are very low. In some regions, it is almost non-existent. This is primarily due to the low level of application of new technologies in enterprises operating in these regions. Because the application of new technologies allows to increase the efficiency and competitiveness of business operations of the enterprise, to make technological changes. In general, the analysis showed that the implementation of innovative activities of enterprises depends on a number of internal and external factors. Internal factors include the involvement of the enterprise in training, financial support for innovation-oriented activities, scientific and production mobility.

External factors include state support for innovation, cooperation in innovation, participation in innovation projects.

The third chapter also **provides an econometric assessment of the economic impact of innovation activity**. Thus, innovation itself is one of the factors of GDP growth. Several factors influence the formation of innovations. The dissertation analyzes the level of innovation development in Azerbaijan on the basis of World Bank data. This section provides an econometric assessment of the impact of indicators characterizing the country's innovation activity on economic growth. The assessment was performed by linear regression analysis using the E-views software package. Here, the indicators characterizing the country's innovation activity are taken as y-dependent variable Gross Domestic Product, x1, x2, x3, ... xn as independent variables.

The system of indicators used in the model, which characterizes the innovative development of the country, is shown below:
- GDP – nominal prices;
- X1 - trademarks, directly for non-residents;
- X2 - trademark applications, for residents;
- X3 - export of high technologies in the country (in US dollars);
- X4 - exports of high technologies (share in exports of industrial products, in %);
- X5 - patents, for non-residents;
- X6 - patent applications, for residents;
- X7- Expenditures on research and development from the state budget (in % of GDP);
- X8 - scientific and technical journal articles;
- X9 - Expenditures on education from the state budget (in % of GDP).

As noted, this section examines the relationship between economic growth and the indicators that characterize the country's innovative development, as well as the correlation between the indicators that characterize innovation activity by building multi-factor and single-factor linear regression models.

Dependent Variable: UDM
Method: Least Squares
Date: 04/15/21   Time: 12:16
Sample (adjusted): 2007 2018
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	0.794963	0.361965	2.196247	0.1592
X2	0.315571	0.356815	0.884411	0.4698
X3	-1.876605	2.189018	-0.857282	0.4816
X4	2.072090	2.213513	0.936109	0.4480
X5	0.201085	0.250605	0.802399	0.5065
X6	-0.311188	0.206201	-1.509146	0.2703
X7	-0.124048	0.415399	-0.298623	0.7934
X8	0.485703	0.385981	1.258361	0.3353
X9	0.377010	0.528227	0.713728	0.5494
C	-0.476887	0.561439	-0.849402	0.4851

R-squared	0.947203	Mean dependent var		0.459965
Adjusted R-squared	0.709614	S.D. dependent var		0.272716
S.E. of regression	0.146960	Akaike info criterion		-1.122410
Sum squared resid	0.043194	Schwarz criterion		-0.718321
Log likelihood	16.73446	Hannan-Quinn criter.		-1.272019
F-statistic	3.986735	Durbin-Watson stat		3.004770
Prob(F-statistic)	0.216583			

Figure 3. Results of a multifactor regression model

The established regression models were not adequately obtained. Thus, correlation coefficients and F-statistics are not statistically significant. This is explained by the fact that there is no correlation between the indicators that characterize innovation activity and GDP, which is taken as a dependent indicator. This is explained by the fact that the country's economic growth does not depend on technological development. This is reflected in the results of the analysis conducted in the second chapter of the work. The country's demand for high technology is met through imports. The application of local technologies is low, which is due to the low cost of science, research and development.

The results of the established model prove once again that the level of innovative development of our country is very low. We have seen this in the comparative analysis we conducted in the previous paragraphs. For example, according to the Global Innovation Index, Azerbaijan ranks 14th among the economies of 19 countries in the group of countries in North Africa and West Asia. Azerbaijan is included in the group of upper-middle income countries for innovation

performance. Given that expenditures on research, development and education from the state budget are stable at 0.2% of GDP, it is not expected that there will be a correlation between it and economic growth.

The third chapter of the dissertation also explores **the principles of forming a regional innovation development strategy**. One of the tasks set to achieve the goal of the dissertation is to determine the approach to innovation development strategy at the national and regional levels. The strategy is an action plan that assesses the current situation, a sequence of steps to be taken to achieve the strategic goals through the efficient use of available resources, and its main task is to focus on future development. This section analyzes the technological development strategies and approaches of some countries in the field of innovation.

The countries selected for the analysis are those that have recognized that development in the field of innovation depends directly on technological development and digitalization. Among them, countries such as China, Singapore and South Korea are characterized by the active participation of the state at all stages of innovation development. In developed countries such as Japan, the United States, Germany, and the Netherlands, special attention is paid to research and development of startups in the first two stages of the innovation development period. Countries such as the United Kingdom, Ireland and Australia prefer specific restrictive measures to promote private capital. If the main priority is to pursue an innovation strategy through the technology sector, then the state must actively participate in the stages of development of innovation. Countries such as China, Singapore and South Korea are examples. This approach takes into account the centralized nature of the economy, provides higher management and control, and allows for greater success. This section also discusses the goals set for the development of innovations in the country.

One of the first steps in developing an innovation development strategy at the regional or national level is to assess innovation activity. Based on this, the work assesses the level of innovation development in Azerbaijan and the innovation activity of the regions, the results of

the analysis and the strategic approaches of international countries in the field of innovation, and concludes that the main task of innovation strategy in Azerbaijan Because one of the main criteria for assessing the effectiveness of the development of innovations is the growth rate of the share of the technology sector in the economy.

Therefore, a separate strategic document must be adopted at the national and regional levels for the development of innovation. The work proposes 6 levels of development directions for the implementation of the strategic approach at the national level, mainly through the development of the technology sector and the implementation of innovation strategies for the development of the technology sector. The scheme of the state policy to support the development of innovations is given figure 4.
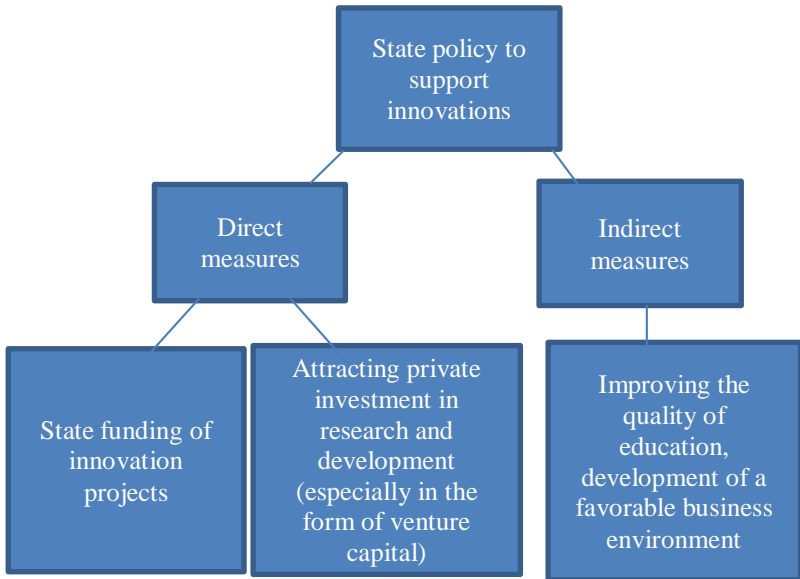

Figure 4. State policy support measures for innovation

In this work, the tendency of regional innovation activity was assessed in two ways: by indicators of development of science and education; based on the innovative activities of enterprises. Depending

on the results of the assessment, two approaches have been proposed to the regional innovation development strategy:

1. To create conditions for the development of human capital-oriented innovations in highly developed regions in terms of science and education. Thus, compared to other components of innovation potential, the quality of education in these regions is higher, and research and development skills are developed (Table 6).

Table 6. İnnovation strategy oriented human capital

Innovation strategy	Innovation strategy oriented human capital. Measures should be taken to develop human capital, create an innovative environment, promote innovative entrepreneurship and scientific activity, and encourage the population to purchase innovative products. Creating a scientific and innovative society. At the same time, the implementation of measures to promote high-cost innovative activities in the region.
Strategic goals	1. Increasing the share of scientific staff. 2. Growth the share of the population employed higher education. 3. Digital skills: increasing the level of digital skills among the population. 4. Implementation of the program to improve the quality of education. 5. Increasing the share of innovative products in the total output. 6. Increasing the share of researchers in the number of publications in scientific journals.
Upcoming tasks	1. Improving the quality of education at all levels. 2. Providing a high level of education in engineering specialties. 3. Determining the development priorities of science: analysis of trends, identification of priority areas and assessment of the impact on the economy. 4. Development of a general development plan for R&D with the participation of all stakeholders (government, business, research institutes) and approved by the government. 5. Research infrastructure development: investments in infrastructure development for applied research. 6. Formation of demand for innovations in the region.

2. We offer a strategy for enterprises to become "innovation leaders" in regions with high results in terms of innovation activity. It is necessary to make effective use of the existing innovation

infrastructure in such regions, increase state legal and financial support for the development of innovative activities of enterprises, and attract both private and public investment in the region (Table 7).

Table 7. Innovation strategy for regions with high innovation activity

Innovation strategy	Strategy for achieving innovation leadership. It is necessary to develop human capital, increase infrastructure and increase efficiency, increase legal and financial support from the state for innovation activities, and attract both private and public investment in the region.
Strategic goals	1. Development of innovative entrepreneurship. 2. Increase in internal expenditures of enterprises for research and development. 3. Expanding the production of innovative products. 4. Expansion of innovation infrastructure. 5. Creation of new technological jobs. 6. Import substitution.
Upcoming tasks	1. Increasing public-private partnership. 2. Development of state management mechanisms of innovation activity. 3. Improving the legal framework to reduce regulatory barriers to innovative development. 4. Attracting funds from the state budget to support the development of regional innovation. 5. Creation of new innovation infrastructure facilities. 6. Increasing the degree of integration of the region into the world market and competitiveness.

In the course of the research, the following conclusions and suggestions on the current situation were obtained on the basis of analysis and assessments (pp. 118):

- In the dissertation proposed a new methodological approach for assessing the innovation activity of the regions was developed and formation of a system of indicators to measure the propensity of innovation activity of the regions of Azerbaijan;
- As a result of the work it became clear that the main potential of the country is concentrated in Baku. The main obstacle to the development of innovations is the presence of a financial factor. In this regard, in order to increase the innovation activity of the regions, it is necessary to apply various strategic

approaches and financial support of the state, taking into account the resources of innovation potential in the regions;
- It is possible to significantly increase the share of the technological sector in exports by creating a chemical and petrochemical cluster on the basis of the existing oil and gas sector, as well as applying innovations in the production of plastics and rubber, basic pharmaceuticals and equipment;
- There is a serious need to improve the legal framework governing and stimulating innovation;
- Ensuring the innovative development of Azerbaijan should be carried out in stages (in 3 stages) (pp. 56-57);
- Differential strategic approaches for innovative development of Azerbaijan and its regions have not been identified;
- In order to ensure the successful development of innovations, it is necessary to focus efforts in priority economic areas that can provide more innovative growth in the medium term.

The main content of the dissertation is reflected in the following published works.

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