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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

RESEARCH ON THE ROLE OF THE ENTREPRENEURSHIP SECTOR IN THE INNOVATIVE DEVELOPMENT OF AZERBAIJAN

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INTRODUCTION

Research issue rationale and development rate. In modern times, it is observed that the competitiveness of countries that develop production technology, innovation potential and stimulate high added value sectors in international markets is increasing at the international and regional levels. The deepening of globalization and the strengthening of intercountry competition in the world economic system necessitate the transition to an economy based on intellectual resources, knowledge-intensive and information technologies. The wealth of states is no longer based on the wealth of raw materials, but rather on the development of science and technology. Developed countries have chosen the path of using constantly improving technological methods in all areas of public life, including the economy, public administration, defense systems, education, and healthcare. This direction can also be called “innovative development”. “Innovative development” is directly related to the concepts of “innovation”, “innovation process”, and “innovation systems” that have been widely discussed in economic literature in recent decades. As we have noted, the group of countries that have chosen the path of “innovative development” differs from the group of countries that want to take this path but have not yet been able to. It should be noted that being on the path of “innovative development” is not so easy for countries.

A comparative analysis of the financial resources allocated to scientific research and development in developed and developing countries gives grounds to conclude that countries with high levels of these resources also have a high level of economic development. However, it is important that the relationship between these indicators is bidirectional. Thus, the country's economic capabilities must be at a certain level so that the country is ready to meet such expenses and it seems possible to allocate funds to scientific research even if income is limited. Innovative development can be created through innovation spending. From this judgment, it can be concluded that there is a certain limit for these two indicators that stimulate each other, and a group of countries that exceed this limit can earn income from such expenses. In other words, the opportunities for the second group of

countries to move to the first group of countries are very limited.

It is impossible to claim that any increase in Research and Development (R&D) spending necessarily leads to development. As such, the extent to which these costs are used efficiently can be a matter of serious debate.

The experience of various countries shows that entrepreneurship, along with other factors, plays an important role in innovative economic development. The development of entrepreneurship in a country strengthens competition. Competition, in turn, is a motivation for the emergence of new ideas. The successful development of entrepreneurship in each country is not limited only to the creation of a regulatory legal framework. The views of society on entrepreneurship are also important. Thus, it was not possible for people living in a broad political and economic environment where entrepreneurship was prohibited for a long time and even a serious struggle was waged against it to suddenly acquire an entrepreneurial mindset. Uniting within an enterprise, or investing in the realization of any economic idea, and accepting and managing various significant risks also required knowledge and skills in the field of entrepreneurship.

Since entrepreneurship in Azerbaijan began to take shape in the period after our country gained independence, its theoretical and empirical research has also expanded in recent years. With the implementation of economic reforms, increasing the role of knowledge and information, strengthening the links between capital markets and new technologies, it has become possible to integrate the Republic of Azerbaijan into the world community and transform it into a world economic system. Because the transition of entrepreneurship to the path of innovative development in our country is becoming even more relevant.

As a result of the policy implemented by the Great Leader Heydar Aliyev, major economic reforms have been implemented in Azerbaijan and socio-economic development has been ensured. Ilham Aliyev, a worthy successor of the Great Leader, has continued structural reforms, further improved the micro and macroeconomic environment in the country, and taken successful steps to attract foreign investments to our country.

The independent Azerbaijani state has entered a new strategic

stage, which is qualitatively new in the post-conflict period and covers the years 2021-2030. In order to achieve the goals set for the state during this period and to form an appropriate policy and reform framework for this, the Decree of the President of the Republic of Azerbaijan dated February 2, 2021, Azerbaijan 2030: National Priorities for Socio-Economic Development was approved. The third of the five adopted Priorities was defined as a competitive human capital and a space for modern innovations. The above-mentioned are one of the 10-year priorities of our country in a sustainable, increasingly competitive economy, as well as the priority directions of Azerbaijan's socio-economic development for many years at the stage of building a society based on dynamic, inclusive and social justice.[1]

The emergence of innovative economic development as a research subject is also new. However, despite this, both problems have been researched separately at both the micro and macro levels to some extent. However, researching the effects of entrepreneurship on innovative economic development is of great importance for Azerbaijani economics. It should be noted that the effects of entrepreneurship as a factor on innovative economic development are among the problems that have been researched less in other countries.

Problems of entrepreneurship and innovative development in Azerbaijan have been researched separately. Problems related to entrepreneurship in various sectors of the economy have been researched by Z.A.Samadzade, A.Kh.Nuriyev, E.A.Guliyev, I.H.Ibrahimov, I.M.Abbasov, E.R.Ibrahimov, B.Kh.Atashov, R.A.Balayev, A.F.Abbasov, A.E.Guliyeva, V.H.Abbasov, A.A.Azizov and others, and problems of innovative development by Sh.M.Muradov, I.H. Aslanzade, E.A. Ibrahimov, A.M. Asadov, Z.M. Najafov, M.M.Huseynov, A.D.Huseynova, G.N.Manafov, F.H.Qasimov and others.

The importance of innovation as a key factor of development in modern times belongs to Schumpeter. However, in the researches of Janoskova K, Kral P, Svagzdiene B, Kuklyte J, Scholleova H, Rylkova

[1] Decree of the President of the Republic of Azerbaijan dated February 2, 2021, Azerbaijan 2030: National Priorities for Social and Economic Development, Baku-2021, 5 p.

Z, Mikolajczyk B, Ostraszewska Z, Tylec A, Fabova L, Janakova H, Sipos G, Majerova I, Kliestik T, Kliestikova J, Lazaroiu G, Rommer D, Zelazny R, Pietrucha J, Zygmunt A. and others, not only the necessity of innovations for economic development was substantiated, but also a comparative assessment of the levels of innovative development was carried out. Some problems related to the nature and assessment of entrepreneurship, especially innovative entrepreneurship, were researched by Stefan D., Uaasdorp P. Dahlstrand L., Stevenson, L, Szabo K., Herman E. and others. The effects of entrepreneurship on innovative economic development on the example of some countries were researched by García F., Jin B., Salomon R. and others.

While highly appreciating all the research devoted to the problems of entrepreneurship and innovative development in the case of Azerbaijan, we would like to note that the effects of entrepreneurship on innovative development have not been systematically researched in the scientific research conducted in our country over the past 30 years. The presented dissertation work can be considered a serious attempt to fill this gap.

Object and subject of research. The object of the research is entrepreneurial entities and innovative product production sectors in Azerbaijan. The subject of the research is economic relations, methods and means for increasing the role of entrepreneurship in the innovative development of Azerbaijan.

Aims and objectives of the research. The main goal was to quantitatively assess the impact of entrepreneurship on innovative economic development and to develop scientifically based proposals to increase the role of entrepreneurship in ensuring innovative development. The tasks performed to achieve this goal included the following:

- classification of different approaches to the concepts of innovation and innovative development and grouping of the main determinants;
- comparative analysis of innovation systems of developed and developing countries and assessment of the level of innovative development in Azerbaijan;
- assessment of the current state and capabilities of the innovation system in Azerbaijan;

- classification and comparative analysis of different approaches to measuring the essence of entrepreneurship and its level, determinants;
- analysis of the current state of entrepreneurship in Azerbaijan and comparison of methods for assessing the impact of entrepreneurship on innovative development;
- assessment of the impact of entrepreneurship on innovative development in the industrial sector;
- assessment of the impact of entrepreneurship on innovative development in the processing industry in Azerbaijan and preparation of proposals and recommendations in this direction.

Research methods. The algorithm chosen for the research in the dissertation work envisaged the separate research of entrepreneurship and innovative development, and then the analysis of their mutual relationship. The main reason for this is that both areas of activity are independently related to different sectors of the economy. Thus, econometric methods and comparative assessments were widely used during the research conducted in three chapters. In each chapter, empirical assessments on the example of other countries regarding the problem posed during the research were compared with the results obtained in Azerbaijan. When applying econometric methods, time series, cross-country analyses and panel analyses were used.

Basic theses for defense are as follows:

1. It is necessary to research the theoretical and methodological foundations of innovation and its impact on economic development, referring to scientific research and international experience.
2. In order to quantitatively and qualitatively assess the level of innovative development in the country, it is necessary to conduct assessments based on appropriate analyses and develop a number of mechanisms.
3. Considering the positive relationship between the GDP per capita indicator and the Global Innovation Index (GII) in Azerbaijan, there is a need to research the impact of the innovation system on economic growth.
4. The position of our country The position of the Global Innovation Index (GII) on the “expenditure” and “output” components

is weak, and it would be useful to conduct research to improve the country's rating on these indicators.

5. Analyses of the effectiveness of investment activity in Azerbaijan show that new targets should be set for the development of the entrepreneurial environment and the formation of a digital economy.

6. In both the extractive and processing industries, the sum of the volume of "substantially changed or newly introduced products" and the volume of "improved products" is less than the total expenditure on technological innovations. Nevertheless, the impact of expenditures on technological innovations on stimulating production and increasing competitiveness in the future requires justification of such investments.

7. Problems inherent in most developing countries regarding the impact of entrepreneurial activity on the processing industry also exist in Azerbaijan. Considering such issues, it is very important to improve the state support mechanism for attracting technological equipment required for the production of essential consumer goods due to the low level of entrepreneurial capital in the country.

8. Of the production sectors that dominated the expenditure on technological innovations in the processing industry in Azerbaijan in 2007-2023, only the metallurgical industry was cost-effective. In other areas, the sum of the volume of "substantially changed or newly introduced products" and the volume of "improved products" was significantly less than the total expenditure on technological innovations. In this regard, it is a subject of serious research why the expenditure on technological innovations in most areas of the manufacturing industry is not effective in the long term.

Scientific novelty of the research. The main scientific innovations of the dissertation can be grouped as follows:

- theoretical views on the innovation systems of countries in the international economy, their methodological foundations and comparative analysis were carried out;
- the level of innovative development of our country was analyzed and assessed in quantitative and qualitative terms;
- the current state of the innovation system in Azerbaijan and the stimulating mechanisms, targets, and perspective opportunities for its development were determined;

- the current state of entrepreneurship in Azerbaijan was analyzed and the entrepreneurial environment on the basis of the formation of the digital economy was assessed;

- the competitiveness and sustainability potential of the entrepreneurial sector in Azerbaijan was substantiated by the efficiency and calculation of indicators characterizing the effects on innovative economic development;

- the effects of entrepreneurship on innovative development in the industrial sector were quantitatively assessed and complex indicators were coordinated;

- the business models of technological products that increase the impact of innovative structures of entrepreneurship in Azerbaijan and innovative development in the processing industry were quantitatively assessed.

Theoretical and practical significance of the research. The results obtained in the dissertation work can be used both in expanding the activities of entrepreneurial entities and in developing a policy to support innovative development. The theoretical significance of the research work is that entrepreneurship is approached here as one of the factors of innovative economic development. The theoretical and methodological basis of the research is a comparative analysis of theoretical issues relevant to each research block and various approaches to these issues in accordance with the algorithm selected for the research. At the same time, the results of theoretical researches published in various reputable journals were summarized. The approaches adopted in economic theory regarding entrepreneurship and innovative development were used. At the same time, it should be noted that the inclusion of entrepreneurship as a factor in economic growth theories has not been accepted unambiguously. However, empirical researches show that the development of entrepreneurship can be assessed as one of the important factors of economic growth and can be included in economic theories.

Approbation and implementation. The main results of the dissertation are reflected in 6 articles published in local and international journals, as well as in 3 conference materials, including 2 theses published abroad. Among the conference materials reflecting

the main content of the dissertation are the theses "Modern development of the entrepreneurial sector in Azerbaijan" (Gomel, 2021), "Prospects for the development of entrepreneurship in the liberated territories of Azerbaijan" (Baku, 2021), "Assessment of the current state of entrepreneurship in Azerbaijan" (Moscow, 2023). During the research, the author also published the following articles: "Support mechanisms for the development of the entrepreneurial sector in modern practice" (Baku, 2020), "Conceptual foundations and characteristics of entrepreneurial activity" (Baku, 2020), "Determinants of entrepreneurship and various approaches to its measurement" (Ganja, 2022), "Innovation systems of developed and developing countries and the essence of innovative development (comparative view)" (Ganja, 2022), "Methods for assessing the impact of entrepreneurship on innovative development" (Ganja, 2022), "Assessment of the level of innovative development of Azerbaijan" (Moscow, 2022).

Name of the organization where the dissertation work was carried out. Azerbaijan Cooperation University.

The total volume of the dissertation, with the volume of the structural sections separately indicated, is in marks. The dissertation consists of an introduction, three chapters, a conclusion, and a list of references. The introduction is 14613 characters, Chapter I is 59320 characters, Chapter II is 60649 characters, Chapter III is 60022 characters, the conclusion is 9908 characters, and the list of references is 19572 characters, making the total volume 245902 characters. The character count of the dissertation, excluding tables, graphs, and the list of references, is 204512 characters.

BASIC CONTENT OF THE DISSERTATION

The introductory part of the research paper reflects the relevance and degree of development of the topic, the object and subject of the research, its goals and objectives, methods, the main provisions put forward for defense, the scientific novelty of the research, its theoretical and practical significance, as well as the approval and application of the work.

The first chapter of the dissertation, entitled **"Theoretical and methodological foundations of researching the impact of the entrepreneurship sector on innovative development,"** investigated the essence of innovative development and a comparative view of the innovation systems of countries, theoretical approaches to methods for assessing the impact of entrepreneurship on innovative development, the classification of determinants of entrepreneurship and the features of its measurement.

The deepening of globalization and the strengthening of competition between countries in the world economic system necessitate the transition to an economy based on intellectual resources, knowledge-intensive and information technologies. The wealth of states is no longer based on the abundance of raw materials, but rather on the development of science and technology.

We have tried to clarify the concepts of "innovative development" and "innovative economic development" by comparative analysis of various approaches to the concepts of "innovation", "innovation potential", "innovation process", "innovation systems", which are widely discussed in modern economic literature and are directly related to innovative development. Despite the existence of numerous researches and articles on these concepts, their precise and unambiguous definitions have not yet been formed.

The concept of "*innovation" is defined in the Merriam-Webster dictionary as "a new idea, a new method, or the introduction of something new."*[2] This dictionary uses the terms "invention" and "innovation" as synonyms. Objects, processes, and events that are considered inventions are also considered novelties. However, it is not correct to equate innovation with invention.

In general, an important difference between innovation and invention is its immediate application. Innovation has the ability to be commercialized instantly, responding to market demand in any area of social life, including the economic sphere.

Although the concept of "innovation" emerged in scientific research in the 19th century, it was only in the 20th century that it was

[2] https://www.merriam-webster.com/dictionary/innovation

consolidated as an important scientific economic category in J. Schumpeter's famous work "Theory of Economic Development" on changes in the development of economic systems. J. Schumpeter is one of the Western economists who first introduced the concept of "innovation" into economic literature. According to his approach, *innovation is the commercialization of new combinations based on the introduction of new materials and components, the introduction of new processes, the opening of new markets, and the application of new organizational forms.*[3] Based on this definition of innovation, J. Schumpeter distinguishes innovation from invention. However, according to his approach, invention is also innovation, but this is innovation at the technical level. The "Oslo Guide"[4], a document jointly prepared by the Statistical Office of the European Union and the Organization for Economic Cooperation and Development in 2006, defines the concept of *"innovation" as follows: "innovation is the introduction of any new or significantly improved product (goods or services) or process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations."* As we mentioned above, innovation is not only an invention at the technical level or the creation or improvement of new goods and services, but also a new organizational method covering various areas of public life.

The theoretical foundations of innovation, which is the scientific foundation of innovation activity, and the concept of innovation include methods for planning and organizing the application of innovation.[5]

Researchers distinguish between regional and national innovation systems in economic literature. The concept of a national innovation system is based on the idea put forward by Schumpeter, namely the importance of innovations for economic development. The essence of national innovation systems was further clarified by C.Freeman, B.Lundvall, R.Nelson, P.Patel, and K.Pavitt, S.Metcalfe. For example, in 1987, C.Freeman considered a network of institutions operating in

[3] Schumpeter Y. Theory of economic development. M. — "Exmo", 2007.
[4] http://www.cisstat.org/innovation/Oslo%20Manual%20Russian/pdf
[5] Gasimov F.H., Aliyev T.N., Najafov Z.M. Organization and management of the national innovation system. Baku: "Science and Education", 2013. p. 679.

the public and private sectors and implementing the creation, import, improvement, and diffusion of new technologies as a national innovation system.[6] B.Lundvall believes that a national innovation system consists of elements that interact with each other within the borders of the country and their interaction. These elements are the production, diffusion, and use of new and economically useful knowledge, as well as other things.[7] In B.Lundvall's approach, the national innovation system is approached as a network of institutions that interact with each other. However, this network is more related to individuals. R. Nelson also characterizes the national innovation system as a network of institutions that interact and determine innovative activity.[8]

According to the definition given by P. Patel and K. Pavitt, the national innovation system is the national institutions that determine the speed and direction of technological knowledge in the country, or the volume and composition of changes that strengthen the activity, as well as their incentive structures.[9] The definition given to the national innovation system by S. Metcalfe in 1995 does not differ significantly from the definitions mentioned above. Thus, S. Metcalfe also approaches the national innovation system as a network of institutions for the creation and diffusion of new technologies. The main distinguishing feature of this definition is that the author includes the contribution of the institutions in the national innovation system, jointly or separately, to the creation and diffusion of new technologies, as well as the role of this system as a network for the state to influence the innovation process.[10]

Thus, in the scientific literature, depending on the field of social

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[6] Freeman, C 1987. Technology Policy and Economic Performance: Lessons from Japan. London: Pinter.

[7] Lundvall, B-A ed. 1992. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. London: Pinter

[8] Nelson, R. R 1993. National Innovation Systems: a Comparative Study. New York: Oxford University Press

[9] Lundvall, B-A ed. 1992. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. London: Pinter

[10] Nelson, R. R 1993. National Innovation Systems: a Comparative Study. New York: Oxford University Press.

activity, they distinguish different types of innovation: a) technological innovations; b) social innovations; c) product innovations; d) organizational innovations; e) marketing innovations. Each of these types of innovations can quickly spread to other countries, since it increases efficiency in the areas where it is applied. Why and at what speed such a spread occurs is a serious theoretical issue and is known in the scientific literature as the “theory of diffusion of innovations”.

In paragraph 1.2 of Chapter I, entitled “Methods for Assessing the Impact of Entrepreneurship on Innovative Development”, a comparative review of the approaches to the relationship between the categories of “innovation” and “entrepreneurship”, which were considered separately in the first and third paragraphs, was carried out and the relationship between these two indicators was considered. The methodologies used in various researches to assess the impact of entrepreneurship on economic growth and innovative development were comparatively analyzed.

In paragraph 1.3 of the research, entitled “Determinants of Entrepreneurship and Different Approaches to Its Measurement”, various approaches to the category of “entrepreneurship” are comparatively analyzed. Here, based on comparative analysis, the characteristics of entrepreneurship researched by Schumpeter are taken as the basis. Among these characteristics, the characteristics that “create a new product or create a new quality of any product”, “create a new technology for the production of a product”, “create a new market”, “discover new sources for the supply of raw materials or partially manufactured products” are important. In other words, entrepreneurship is not just “starting a business for oneself”, but the main place in this activity is occupied by initiative, innovation and the presence of a commercialized idea. Therefore, it is not correct to equate “self-employment” with entrepreneurship.

The results of the research suggest that the Global Innovation Index (GEM) should be preferred as a reliable indicator for comparing the level of "innovative economic development" of any country. However, various indicators are used to quantitatively assess the level of entrepreneurship, including the GEM index, "self-employment rate", "number of startups", "number of newly created enterprises", and other indicators.

The Kauffman Index of Entrepreneurial Activity, which has been used since 2006, is also considered one of these indicators.[11] This indicator calculates the share of adult non-business owners who create a new business per 100,000 population each month, and such businesses may also have employees. The Entrepreneurship Database (WB, 2023)[12], developed by the World Bank Group to measure the level of entrepreneurship, shows the dynamics of new private enterprises created each year around the world.

Thus, from the researches conducted, it can be concluded that the use of this type of data is considered more convenient for several reasons. First, it covers all countries of the world. Second, it is accessible and data for most countries can be obtained for several years. Third, it covers a more suitable indicator for measuring the level of entrepreneurship, the number of newly created enterprises. Fourth, this database also allows measuring the density of new businesses.

Chapter II is devoted to the analysis of the current state of entrepreneurship in Azerbaijan and the assessment of the level of innovative development. In paragraph 2.1, entitled "Analysis of the current state of entrepreneurship in Azerbaijan", the classification of entrepreneurial entities in our country is given. Undoubtedly, during such an assessment, Schumpeter's main features of entrepreneurial activity were not taken into account and only the classification of the ARDSK was taken as a basis. In this regard, the classification of entrepreneurial entities in Azerbaijan as micro, small, medium and large entrepreneurial entities was used. Nevertheless, assessments of the volume of investments allocated by entrepreneurial entities in Azerbaijan for R&D give reason to conclude that such expenses are very small.

Micro-entrepreneurs in Azerbaijan almost do not allocate funds to the R&D field. The funds allocated by small entrepreneurial entities are not significant for the development of science. Only medium and large entrepreneurial entities allocate funds in a volume that can play

[11] Fairlie, Robert (2006). Kauffman Index of Entrepreneurial Activity: National Report, 1996-2005. Ewing Marion Kauffman Foundation

[12] WB, 2023. World Bank's Group. The Entrepreneurship Database. https://www.worldbank.org/en/programs/entrepreneurship

a certain role in the development of science and innovative ideas. However, the small number of such enterprises in the country also leads to a low total amount of funds allocated to the R&D sector.

In order to solve the existing problems in the above-mentioned areas and integrate into international standards, the “Azerbaijan 2030: National Priorities for Socio-Economic Development” were recently approved by the Decree No. 2469 of the President of the Republic of Azerbaijan dated February 2, 2021. Based on these priorities, in order to ensure the implementation of the National Priority “Great Return to the Liberated Territories” reflected in the “Strategy for Socio-Economic Development of the Republic of Azerbaijan in 2022–2026”, the “I State Program on the Great Return to the Liberated Territories of the Republic of Azerbaijan” was approved by the Decree No. 3587 of President Ilham Aliyev dated November 16, 2022. The priorities set within the State Program are aligned with the Sustainable Development Goals and their relevant targets, based on principles such as "universality", "integrated approach" and "leaving no one behind".

By Order No. 2303 of the President of the Republic of Azerbaijan dated November 24, 2020, a Coordination Headquarters was established to resolve socio-economic, humanitarian, organizational and other urgent issues in the liberated territories of the Republic of Azerbaijan, as well as to coordinate activities in this area, and an Interdepartmental Center was formed under it to perform secretarial and communication functions, as well as to provide analytical and organizational support.

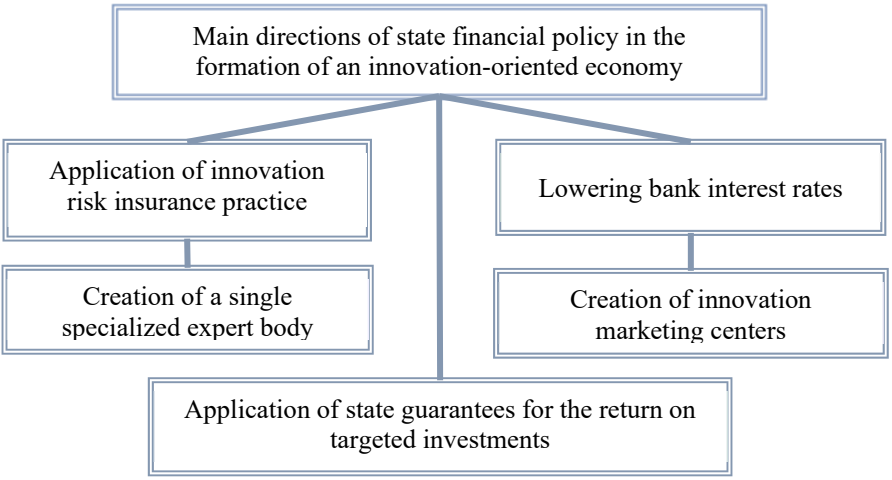
Based on international experience, the settlement of the historical population of these territories has begun with the construction of settlements that meet high standards, as well as new modern villages and cities based on the "Smart City" and "Smart Village" concepts. Thus, the Agali village of the Zangilan region has been transformed into a modern settlement within the framework of the "Smart Village" project in accordance with international standards. Currently, the resettlement of the population to their native lands is being carried out extensively in Agdam, Jabrayil, Fuzuli, Gubadli, Lachin and Shusha, as well as in other territories liberated from occupation.

A number of proposals are being prepared and implemented to

accelerate the revitalization of individual sectors of the economy in the liberated territories and increase investment attractiveness, create modern production, trade and service infrastructure, involve industrial potential in economic circulation through the application of innovative technologies, and form regulatory and incentive mechanisms and a favorable business environment.

It is no coincidence that 2.2 billion manats in 2021, 2.7 billion manats in 2022, and 3.0 billion manats in 2023 were allocated from the state budget of the Republic of Azerbaijan for the restoration and reconstruction of the liberated territories in order to implement the projects set forth.

The second paragraph of Chapter II, entitled "Assessment of the Digital Entrepreneurship and Business Environment", analyzes the innovation system and the factors affecting it. Here, the belief that expenditures on technological innovations will stimulate production and increase competitiveness in the future creates great confidence in the increase in the frequency of their return on such expenditures. The main directions of the state's financial policy for the development of monetary and credit relations for the formation of innovative entrepreneurship are the following (pic. 1):



Picture 1. Block diagram of the main directions of state financial policy in the formation of innovative entrepreneurship.

Source: compiled by the author

- application of the practice of insurance of innovation risks. The mentioned direction allows to increase incentives for the adoption of science-intensive technologies by the entrepreneurial sector;

- creation of a single specialized expert body;

- reduction of bank interest rates, since investments in venture capital can be carried out at a time of low interest rates, which in turn increases the value of equity capital and increases the amount of profit that the company can receive from this activity;

- creation of large innovation marketing centers for the promotion of science-intensive products on the basis of existing national companies with international experience in high-tech product markets;

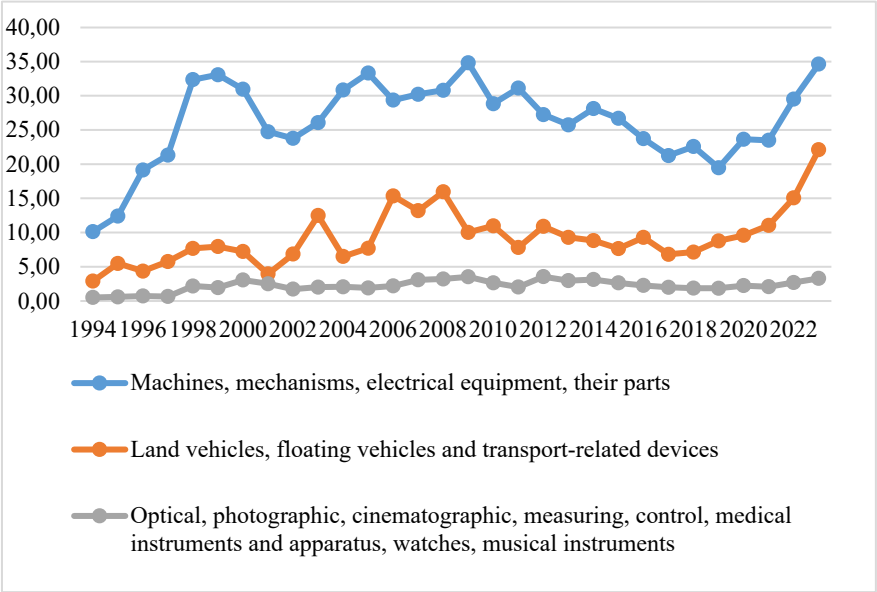
- application of state guarantees for the return of targeted investments in banks and investment funds designated for high-tech enterprises of priority industries, for example, mechanical engineering, chemistry, metallurgy, light, etc.

Especially considering that a certain part of these expenses is spent on research and development, it cannot be claimed that such expenses are inefficient.

In Azerbaijan, the production of innovative products is less than 0.05%. In the mining industry, which has a significant weight in the country's economy, this share is even lower (0.003%). In the processing industry, where the application of innovative technologies is easier and there is a higher demand for innovative products, this share is around 0.2%. In the processing industry, which includes the production of computers and other electronic equipment, and in the textile industry, 5.2% and 1.8% of the products produced in the period from 2007 to 2023 can be considered innovative products, respectively. Thus, the market for innovative products that affects the national innovation system in Azerbaijan is mainly supplied by imported goods, and the market share of local innovative products is very small.

As can be seen from Graph 1, when we pay attention to the structure of goods imported to Azerbaijan, it becomes clear that the innovative and knowledge-intensive goods groups imported to our country, such as “Machines, mechanisms, electrotechnical equipment, their parts”, “Land vehicles, floating vehicles and transport-related devices”, as well as “Optics, photography, cinematography, measurement,

observation, medical instruments and apparatus, watches, musical instruments", have a high share in imports. Although their share in total imports for these goods groups has decreased to 35% in recent years, it was more than 40% in 1998-2017. Importing knowledge-intensive and innovative products has expanded the application of technological innovations in the country. However, it is desirable for our country to be not only a consumer of new technological and innovative products, but also a producer.



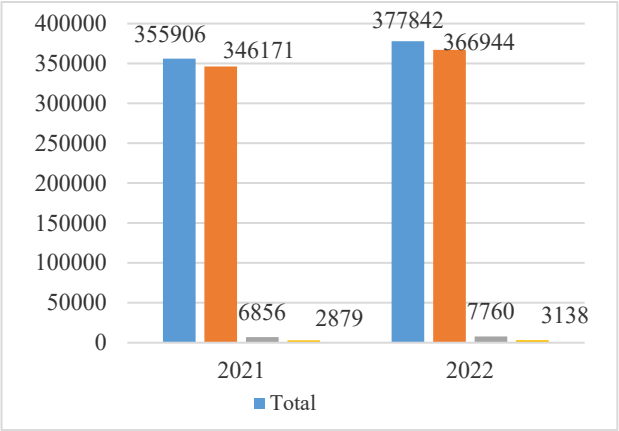
Graph 1. Volume of knowledge-intensive product imports in Azerbaijan, (1994-2023)

Source: Compiled by the author based on data from the ARSK.

In paragraph 3 of the second chapter, the level of innovative development in Azerbaijan was assessed and a comparison was made with other countries based on the Global Innovation Index (GII). The research comparatively analyzed the methodologies related to the effects of GII on economic growth.

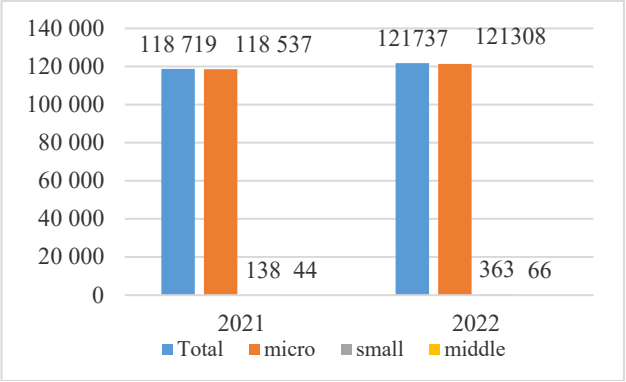
One of the important factors affecting the development of entrepreneurship is the fiscal policy implemented by the government

in the country. The volume of taxes applied to entrepreneurial entities and the business environment created for them are of great importance. However, regardless of their size, the same approach to entrepreneurial entities can lead to the creation of a monopolistic structure in the country. Taking this into account, as in other countries, in Azerbaijan, entrepreneurial entities are divided into four types depending on their size: “micro”, “small”, “medium” and “large” entrepreneurial entities.



Graph 2. Number of entrepreneurial entities in Azerbaijan
Source: Compiled by the author based on ARSK data.

The number of entrepreneurial entities in Azerbaijan is increasing year by year. It should be noted that not all of the entrepreneurial entities created are active. An enterprise can be created, operate for a certain period of time, and then cease its activities. On the other hand, the number of entrepreneurial entities also changes depending on the areas of economic activity. Graph 2 shows the number of such enterprises in 2021 and 2022. As can be seen from the charts, a significant part of entrepreneurial entities in Azerbaijan (approximately 97%) is micro-sized. Newly created small and medium-sized entrepreneurial entities accounted for less than 3% of the total number of entrepreneurial entities in 2021-2022. There are not many newly created ones among such entrepreneurial entities.



Graph 3. Number of newly established micro, small and medium-sized enterprises in Azerbaijan

Source: Compiled by the author based on ARSK data.

The data provided in Graph 3 on the number of newly established micro, small and medium-sized enterprises in Azerbaijan show that an overall increase was observed from 2021 to 2022. Thus, while there were a total of 118,719 business entities in 2021, this figure reached 121,737 in 2022. The largest increase occurred in micro-business entities; their number increased from 118,537 to 121,308. The number of small business entities increased relatively more sharply, increasing from 138 to 363. There was also an increase in the number of medium-sized business entities, increasing from 44 in 2021 to 66 in 2022. These indicators indicate that there is a certain development dynamic in Azerbaijan, especially in the field of small and medium-sized businesses.

The ranking of countries according to the Global Innovation Index for 2007-2023 shows that developed countries significantly outperform developing countries in this indicator. Until 2011, according to the GII methodology, scores were calculated on a 10-point scale. In subsequent years, the methodology was changed and scores were calculated on a 100-point scale. Therefore, instead of the dynamics of the GII for the period 2007-2023, the study used the dynamics for the period 2011-2023. It should be noted that the one-hundred-point scale allows for a clearer expression of the differences between countries in the GII (table 1).

Table 1

Comparison of Azerbaijan's Gİİ ranking with countries in the maximum and minimum positions

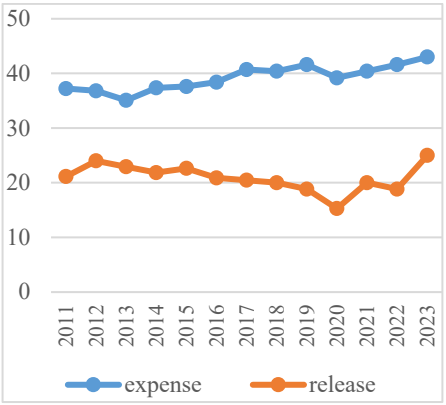
	Azerbaijan	Ranking	Maximum Position	Country	Minimum Position	Country	Number of Countries
2011	29,17	88	63,82	Switzerland	19,79	Algeria	125
2012	30,4	89	68,2	Switzerland	16,8	Sudan	141
2013	28,99	105	66,59	Switzerland	19,32	Yemen	142
2014	29,6	101	64,78	Switzerland	12,66	Sudan	143
2015	30,1	93	68,3	Switzerland	14,95	Sudan	141
2016	29,64	85	66,28	Switzerland	14,55	Yemen	126
2017	30,58	82	67,69	Switzerland	15,64	Yemen	127
2018	30,2	82	68,4	Switzerland	15,04	Yemen	126
2019	30,21	84	67,24	Switzerland	14,49	Yemen	129
2020	27,23	82	66,08	Switzerland	13,56	Yemen	131
2021	28,04	80	65,5	Switzerland	15	Angola	132
2022	21,5	93	64,6	Switzerland	11,6	Guinea	132
2023	23,3	89	67,6	Switzerland	10,3	Angola	132

Note: compiled by the author

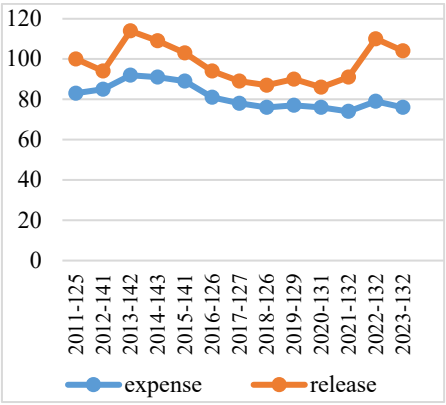
The Gİİ consists of “expenditure” and “output” components. The “expenditure” component includes the sub-indices of 1) institutions; 2) human capital and research; 3) infrastructure; 4) market complexity and 5) business complexity. The “output” component includes the sub-indices of 1) knowledge and technological products; 2) creative products. Of course, the “expenditure” and “output” components are related to each other. Studies conducted for 2023 show that there is a high linear relationship between these two components.

Depending on the nature of the relationship between the “expenditure” and “output” components of the Gİİ, one can draw conclusions about the efficiency of the innovation system. Thus, if the indicator of any country is less than the root mean square indicator, then it can be considered inefficient. Unfortunately, the indicator of Azerbaijan for 2023 is less than the root mean square relationship.

Dynamics of Azerbaijan's Gİİ by "Expenditure" and "Output" components (graph 4, graph 5).



Graph 4. Azerbaijan's Gİİ scores on the "expenditure" and "output" components



Graph 5. Positions of Azerbaijan's GDP on the "expenditure" and "output" components

Note: Compiled by the author based on ARSSC data.

The dynamics of the calculated scores of the "expenditure" and "output" components of the Gİİ and the dynamics of our country's position on these components give grounds to say that our country's position on both components is not at the desired level. Our country's position on these components has varied between 74-92 and 86-114, respectively, over the past 10 years. Considering that this study involved a little more than 140 countries only in 2012-2015, it becomes clear that Azerbaijan's position is significantly lower. Thus, the weak scores and position on both components of the Gİİ and the improvement of our country's rating on these indicators are of great importance. For this purpose, there is a need to monitor the dynamics of the sub-indices included in both components separately and to identify the weak and strong sides of our country on these sub-indices.

Chapter III of the dissertation is dedicated to **"Assessment of the improvement of the entrepreneurship sector on innovative development"**. In paragraphs 1 and 2 of this chapter, entitled "Main directions of the impact of the entrepreneurship sector on innovative economic development in Azerbaijan", a quantitative assessment was carried out and the relevant prospective development directions were

identified. Based on the results obtained, it can be argued that the costs incurred on product innovation in the industrial sector differ significantly from the costs incurred on process innovation. Such differences also vary depending on the type of activity in the industrial sector. For example, in the processing industry, the costs incurred on technological innovations constitute 75% of the total costs of the industrial sector. In these costs, the costs incurred on product innovations (230,738.7 thousand manats) exceed the costs incurred on process innovations (104,126.6 thousand manats) approximately twice.

A significant part of the research is related to the effects of both entrepreneurship and innovation on economic growth. The positive impact of both phenomena on economic growth gives grounds to conclude that there is a mutual and bidirectional effect between them. The difficulty in conducting empirical research dedicated to the direct relationship between these two indicators is related to the direct quantitative assessment of these indicators. Thus, both innovative economic development and entrepreneurship in the country are more qualitative in nature and their quantitative assessment depends on the assessment criteria. In many cases, depending on the assessment criteria and methodology, it is difficult to establish the dynamics of development. Such methodological difficulties are inherent in almost all qualitative indicators. For example, when assessing the suitability of the business environment in a country, it is possible to say only comparatively which country has a more favorable business environment than others. As a result of such difficulties, the methodologies developed by the World Bank's Doing Business Research Group have changed several times in the last 10 years. Due to the changes, it is much more difficult to establish the dynamics of indicators for the long term. Similar problems are observed in assessing the level of innovative development in countries through the Global Innovation Index.

We can note that the same problems exist for the Global Entrepreneurship Monitor (GEM) index, which allows for a comparative assessment of the level of entrepreneurship in different countries. Thus, when conducting assessments on entrepreneurship,

surveys are conducted both among the elderly population and among a group of national experts. Based on the surveys, assessments are carried out based on a special methodology.

Azərbaycan üzrə belə qiymətləndirmələr aparılmadığına görə biz öz tədqiqatımızda həm sahibkarlığın və onun innovasiyalı inkişafla əlaqəsinin qiymətləndirilməsi, həm də sahibkarlığın bu və ya digər aspektini əhatə edən göstəricilərindən istifadə edilmişdir. Məsələn, belə göstərici olaraq, Azərbaycanda sahibkarlıq subyektlərinin sayını götürə bilərik. Hətta mikro, kiçik və orta sahibkarlıq subyektlərinin sayını ayrı-ayrılıqda götürmək olar.

If we characterize the efficiency of expenditures on technological innovations as the ratio of the sum of the volume of "substantially changed or newly introduced products" and the volume of "improved products" in the industrial sector to expenditures, then we can calculate the average efficiency for the total industrial sector (TI), extractive sector (EI) and processing industry (PI) for the period 2007-2023 as follows:

Tİ=300761,9/447274,9=0.67

Eİ=26518,1/65208,9=0.41

Pİ=274243,8/334865,3=0.82

Calculations show that the sum of the volume of “substantially changed or newly introduced products” and the volume of “improved products” in both the extractive and processing industries is less than the total expenditure on technological innovations. Nevertheless, the belief that expenditure on technological innovations will stimulate production and increase competitiveness in the future justifies such expenditure. Especially considering that a certain part of these expenditures is spent on research and development, it cannot be claimed that such expenditures are inefficient.

The results obtained (table 2) prove that the number of business entities in Azerbaijan does not affect the volume of technologically innovative product production in the processing industry.

Table 2.

Regression analysis of the relationship between the volume of technologically innovative product production in the processing industry and entrepreneurship

	$ioutput1_t$	$ioutput2_t$
R^2	0.200284	0.511928
Number of observations	15	15
β_1		
coefficient	-24510.51	-17761.53
Standard error	28322.86	6211.340
t- statistics	-0.865397	-2.859532
p- price	0.4053	0.0155
β_2		
coefficient	-0.034421	6.19E-07
Standard error	0.404341	0.088674
t- statistics	-0.085129	6.98E-06
p- price	0.9337	1.0000
β_3		
coefficient	-0.467198	0.085589
Standard error	0.732242	0.160584
t- statistics	-0.638039	0.532987
p- price	0.5365	0.6046
β_4		
coefficient	21.54807	9.851383 3
Standard error	13.82511	.031913
t- statistics	1.558618	3.249230
p- price	0.1474	0.0077
Coefficient Durbin-Uatson	1.352312	1.984235

Source: calculated by the author using the eViews software package

In our opinion, the costs incurred for product innovations and process innovations also do not have a significant impact on the volume of production, and there may be several reasons for this. First of all, since the financial resources of business entities are small, they achieve the acquisition of new technologies only to a certain extent. In most cases, such technologies are already morally obsolete in developed countries or the period of their installation and commissioning is extended, so such enterprises cannot be competitive. The lack of sustainability of the

production of innovative processed products and the fact that the costs incurred are mostly spent on the purchase of equipment, not on personnel training, negatively affect the sustainability of their use. In particular, the fact that the absolute majority of enterprises are based on private property and are interested in increasing the competitiveness of the products and services produced at that enterprise strengthens the impact of entrepreneurship on technological innovations. It should be noted that the number of individuals engaged in individual entrepreneurial activity in the processing industry and its sub-sectors is increasing year by year (table 3).

Table 3.

Number dynamics of individuals engaged in individual entrepreneurship in the processing industry and its sub-sectors

	Total in the processing industry				Beverage production				Textile products			
	Total	State	non-governmental	Individual entrepreneurship	Total	State	non-governmental	Individual entrepreneurship	Total	State	non-governmental	Individual entrepreneurship
2015	1778	144	1634	15711	120	3	117	224	68	14	54	135
2016	1775	140	1635	16009	119	3	116	218	66	14	52	136
2017	1826	117	1709	17154	110	-	110	222	67	12	55	157
2018	2034	118	1916	17988	120	1	119	228	74	13	61	168
2019	2330	124	2206	19842	126	1	125	235	80	14	66	182
2020	2515	117	2398	22957	131	1	130	260	89	13	76	215
2021	2777	110	2667	24898	146	1	145	255	93	13	80	247
2022	3023	116	2952	29478	158	2	156	269	98	12	86	253
2023	3534	128	3320	35143	169	2	167	280	108	14	94	278

Source: Compiled based on data from ARSSC

Although individual entrepreneurship is more flexible and new ideas are more likely to emerge, the realization of such ideas, as well as their entry into the market, is much more difficult.

In our opinion, organizational models (industrial parks, business

incubators, etc.) that have been successfully applied in world practice to support manufacturing entrepreneurship should be created, and for this purpose, institutions providing continuous, systematic services in various directions should be organized.

Based on the research materials, the **results,** new scientific approaches, **proposals** and **recommendations** can be summarized as follows:

1. As the share of Research and Development (R&D) expenditures in GDP increases, the country's income also increases significantly. This confirms the impact of developed countries prioritizing R&D expenditures on economic growth.
2. Developed countries dominate in the R&D expenditure per capita indicator, which indicates that scientific research is the basis for economic development.
3. Analysis of financial resources allocated to scientific research in developed and developing countries shows that when funding is high, the level of economic development also increases.
4. The countries ranked in the top 25 in the Global Innovation Index in 2023 have maintained these positions over the past decade. This indicates that innovations have made a continuous contribution to attracting new investments and economic growth.
5. Although Azerbaijan's performance on the Global Innovation Index has increased somewhat over the period 2007-2023, weak results were achieved in both main components - "spending" and "output". It is important to ensure progress in these areas.
6. It is important to develop a national innovation strategy to ensure the long-term innovative development of the Azerbaijani economy. This strategy should support scientific research, technology transfer and the development of innovative entrepreneurship, and be strengthened by legislation and state policy.
7. In addition to increasing spending on innovations from the state budget, we consider it appropriate to introduce tax breaks and incentive mechanisms for the active participation of the private sector in this area. Special grant programs and innovation funds should be created to support startups.

8. We consider it important to establish innovation centers and science and technology parks outside Baku. In our opinion, these issues can contribute to the diversification and sustainable development of economic activity by attracting the economic potential of the regions into circulation.

9. Implementation of more advanced export promotion programs and international trade missions to introduce local innovative products to foreign markets can benefit the development of entrepreneurship in this area.

10. The national innovation system in developing countries is mainly based on the use of technologies created in developed countries. This reveals the need to strengthen independent innovation potential.

11. In Azerbaijan, the production of innovative products accounts for less than 0.05% of the total production volume, which indicates the weak innovation activity in the economy. In particular, these indicators are low in the mining and processing industries. Therefore, we consider it important to increase state support for this area.

12. The level of self-employment is low in high-income countries (less than 20%). Thus, the indicator leads to high incomes in developed countries, where wage earners have a larger share in the economy.

13. The main part of the expenditures on technological innovations in the industrial sector is realized at the expense of enterprises' own funds. This necessitates increased state support and foreign investments.

14. Among the expenditures on technological innovations in the processing industry during 2007-2023, the metallurgical sector stands out for its efficiency. The application of experience in this field to other industrial sectors may also yield positive results.

The main provisions of the dissertation, the results obtained and the proposals made are reflected in the following published works of the author:

1. Aliyev A.N. Support mechanisms in the development of the entrepreneurial sector in modern practice // – Baku: News of the National Academy of Sciences of the Republic of Azerbaijan. Series of Economic Sciences, 2020, No. 6. – pp. 240-247.

2. Aliyev A.N. Conceptual foundations and characteristics of entrepreneurial activity // – Baku: "Cooperation" Scientific-Practical Journal, 2020, No. 4 (59). – pp. 77-82.

3. Aliyev A.N. Modern development of the entrepreneurial sector in Azerbaijan // – Gomel: Economic and Legal Perspectives of the Development of Society, State, and Consumer Cooperation. Collection of Scientific Articles of the III International Scientific-Practical Online Conference, March 31, 2021. – pp. 94-97.

4. Aliyev A.N. Perspectives of entrepreneurship development in the territories of Azerbaijan liberated from occupation // – Baku: International Scientific-Practical Conference dedicated to the 98th anniversary of National Leader Heydar Aliyev, titled "Global Economic Challenges: Main Directions of Socio-Economic Development in Azerbaijan's Liberated Territories", May 6, 2021. – pp. 314-316.

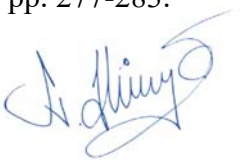
5. Aliyev A.N. A comparative view of innovative development in developed and developing countries // – Ganja: Azerbaijan University of Technology, "Innovative Economy and Management" Journal, 2022, No. 1. – pp. 58-66.

6. Aliyev A.N. Determinants of entrepreneurship and different approaches to its measurement // – Ganja: Azerbaijan University of Technology, "Innovative Economy and Management" Journal, 2022, No. 3. – pp. 29-35.

7. Aliyev A.N. Evaluation of the level of innovative development in Azerbaijan // – Moscow: "Economics and Entrepreneurship". 2022, No. 11 (148). – pp. 1293-1296.

8. Aliyev A.N. Evaluation of the current state of entrepreneurship in Azerbaijan // – Moscow: Scientific Forum: Economics and Management: Collection of Articles from the LXVII International Scientific-Practical Conference, February 23, 2023. – pp. 22-25.

9. Aliyev A.N. Methods of assessing the impact of entrepreneurship on innovative development // – Baku: Western Caspian University, Scientific News 2024, No. 3. – pp. 277-283.



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