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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

FINANCIAL PROBLEMS AND SOLUTIONS OF INDUSTRIAL INNOVATION

Specialization: 5312.01 -"Field economy"

Field of Science: 53 – Economy

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GENERAL CHARACTERISTICS OF THE WORK

Relevance of the topic and degree of development. As global transformations deepen, the conditions and basic mechanisms of the world economy are undergoing radical deformations. These processes occur in various directions, and fundamental changes are more likely to occur in science and technology-intensive industries. Thus, the trends of intensive application of high technologies, wide use of "smart" technologies, dominance of digital mechanisms and the emergence of innovative approaches to the fore attract attention. Meanwhile, one of the important directions of activity is industry, and the issues of innovation in various sectors of industry, development, mastering and application of new innovations to production (service) sectors remain relevant.

In economically developed countries of the world, hundreds of billions of dollars are spent on the development and application of new technologies, conducting scientific research, organizing innovation activities as productively and efficiently as possible, and stimulating mechanisms are applied. In recent years, these processes have also been the focus of special attention in economically developed countries. Continuous reforms are being carried out to form new sources of economic growth and added value, as well as financial sources, resources are being attracted to economic and financial circulation, regional and international cooperation is being strengthened. New approaches are being formed in the direction of using the traditional advantages of industrial sectors, the priority of applying high technologies is being increased, targeted programs are being developed and implemented to accelerate the development of individual industrial sectors.

From the point of view of the above, Azerbaijan is no exception. After the restoration of independence, new views on the development of industrial sectors in our country were formed and conceptual foundations were determined. As a result of the initiative, authorship and historical determination of the Great Leader Heydar Aliyev, it was possible to form and develop an advanced and multifunctional oil and gas industry with absolute advantages due to

the oil strategy implemented. Over the past 30 years, 320 billion dollars have been invested in the Azerbaijani economy, and about half of this is foreign investment. In total, 60% of the invested investments fall on the share of the oil and gas industry. Thanks to the invested investments, advanced management methods, high technologies, as well as new innovations have been brought to our country. The income from the oil and gas industry, which is the locomotive of our economy, has made it possible to mobilize the resources of other industries in our country, create a modern and competitive production infrastructure, and increase the volume of export-oriented production.

In this research, we have focused mainly on the development processes and characteristics of non-oil and gas industries, resource provision, and have paid more attention to the problems of innovation in our country's industries, and as we mentioned earlier, one of the fundamental problems awaiting a solution in this area is the financial problem. We would like to note with regret in advance that the empirical base of innovation activity and its actual results in Azerbaijan is weak, accurate accounting is not carried out, and the statistical data contained in official statistical publications do not reflect the current reality. However, the reality in one area is obvious, since investments and financial resources directed to innovation activity in our country are at a negligible level. Enterprises that want to engage in innovation activity do not have or lack the financial resources required for the production and marketing of innovation products. A state order system and mechanism for the production of purposeful and designated innovation products has not been formed.

On the other hand, potential investors, avoiding possible risks, are in no hurry to direct investments to innovation-oriented areas, since income forecasts often do not justify themselves or it is necessary to wait for many years for the return of invested financial resources. In Azerbaijan, there are very few or no financial industry groups, holdings, investment-innovation associations and funds operating in accordance with the conditions and terms of a modern market economy.

Our country is currently implementing large-scale economic reforms and, as a victorious country, is restoring the territories liberated from occupation. High technologies, primarily "smart" technologies and innovative approaches are at the forefront in these processes. At the same time, in line with the post-Covid-19 post-pandemic postulates, the potential of non-oil and gas industry sectors is being taken as a basis for restoring and accelerating the growth rate of the national economy. In this regard, continuous investments and large financial resources - efficient financial support mechanisms are required for the innovation of these industries.

There is a need for fundamental research, research and identification of appropriate solutions to the financial problem of industrial innovation, as one of the problems awaiting solution for the innovation of industrial sectors, the preparation of functional mechanisms related to the study and application of progressive world experience in this field, the formation and implementation of balanced state policy, the preparation and implementation of large innovation-investment projects that allow accelerating the innovation of industrial sectors. All of these are characterized as an expression of the relevance of the topic of the dissertation work.

Regarding the degree of development of the topic of the dissertation work, we can note that fundamental scientific works have been written on the solution of problems of industrial development, financial problems and directions of solution of innovation of individual industrial sectors, theoretical and methodological views have been formed.

Of the Azerbaijani scientists - academician Z.A.Samadzade, A.J.Muradov, A.A.Alekperov, A.Sh.Shakeraliyev, T.H.Huseynov, B.Kh.Atashov, M.A.Ahmadov, Z.F.Mammadov, T.N.Aliyev, Sh.T.Aliyev, Z.M.Najafov, O.A.Safarov, A.Q.Aliyev, A.D.Huseynova, V.A.Gasimli, I.A.Aslanzade, A.H.Taghiyev and others are the authors of scientific works on the problems considered in the research work. In the scientific works of foreign researchers-scientists, there are studies on the financial problems of the development of industrial sectors and their innovation. These are reflected in the scientific works of A. Smith, A. Marshall, D.

Ricardo, C. S. Mill, J. B. Say, J. M. Keynes, J. A. Schumpeter, P. A. Samuelson, P. R. Krugman, M. E. Porter, R. M. Solow, X. D. Van, D. A. Vakhovich, I. Y. Lukasevich, Z. P. Musostov, T. M. Dudayev, I. M. Vashko and others.

Along with this, we would like to note that in recent decades, the deepening of transformations in world economic processes, especially the more rapid development of industrial sectors in the field of applying high technologies, the increase in demand for innovations and the need for more financial resources for organizing innovation processes, the emergence of the need to find ways to solve problems in these areas, etc. Fundamental research and new studies are relevant in the context of these issues.

The object of the study is the non-oil and gas industry sectors and entities of the industrial sector of Azerbaijan, the processes occurring in their activities, the mechanisms and styles applied.

The subject of the study is the determination of directions for solving financial problems of innovation of industrial sectors in the modern era.

Research goals and objectives. In accordance with the structure of the research work, the main goal of the dissertation work is to investigate the financial problems of innovation in industrial sectors and identify adequate solutions. In this regard, a group of tasks has been set:

- Study and generalization of the theoretical foundations of financial support for industrial innovation;
- Identification of methodological approaches to financial problems in industrial innovation;
- Study and investigation of the possibilities of application of action mechanisms for solving financial problems of industrial innovation, which are considered more progressive examples in international practice;
- Analysis and assessment of the processes of forming the national innovation system and the current state of financial support for industrial innovation in Azerbaijan, identification of economic-organizational, legal and promotional reserve opportunities and identification of ways to effectively use them;

- Identification of other ways of solving financial problems of industrial innovation, financial support mechanisms, and financial problems in the context of post-pandemic and post-war priorities, and preparation of methodological and practical proposals and recommendations in this regard.

Research methods. In the research process, first of all, the scientific methods most commonly used in world science were applied, including scientific abstraction, analysis, synthesis, generalization, comparison, statistical analysis, etc. methods. Along with these, methodological approaches and concepts related to the development of industrial sectors, the solution of financial problems of innovation in these sectors were taken into account, and scientific works, ideas, methodological approaches of scientists and researchers from different countries and the world were taken into account.

Along with these, the main priorities of state policy in this area, relevant laws of the country, regulatory and legal documents, decrees and orders of the head of state, methodological materials of scientific and research institutes were used.

The main provisions put forward for defense are:

1. In an era of intensified application of high technologies, there is a need to formulate modern scientific and practical views on solving the problems of financial support for the innovation of industrial sectors and to identify conceptual approaches and superior methodological styles for the development of more efficient financial support mechanisms.

2. In-depth study of international experience in determining the directions of more efficient solutions to financial problems in the innovation of industrial sectors and their use will allow increasing the innovation activity of the studied sectors, and the production of new, import-substituting, export-oriented diversified products.

3. Based on current realities, there is a serious need for an objective study of the current state of the national innovation system in Azerbaijan and a complex analysis of the problems of financial support for the innovation of industrial sectors, which will ensure the

creation of a new innovative infrastructure and a reduction in the number of loss-making enterprises.

4. The assessment of the financial provision potential, which is of great importance in intensifying measures for the development and application of innovations in various industrial sectors in the country, has led to the identification of numerous reserve opportunities in this direction and the identification of ways to effectively use them.

5. Strengthening the economic, organizational and legal foundations in regulating the financial problem of innovation in the country's promising non-oil and gas industry sectors is a requirement of the time, and this will ultimately allow reducing the number of enterprises liquidated in the sub-sectors of the processing industry.

6. Renewing the financial provision mechanism in the innovation of industrial sectors in Azerbaijan, identifying ways to adequately solve financial problems in post-pandemic and post-conflict areas can yield significant socio-economic benefits in this area**.**

The scientific novelty of the study consists of the following:

- Approaching the problems of financing the development and innovation processes of industrial sectors, a block diagram of the mechanisms for state stimulation of innovations was developed there;

- The sources and types of financial support for the innovation of industrial enterprises were classified, a scheme of their methods was given, and a block diagram of methodological features for solving financial problems in the innovation of industrial sectors in modern conditions was developed;

- The structural elements, functions, objectives, properties and characteristics of the National Innovation System in accordance with the goals of the national economic development model of Azerbaijan were determined, and its block diagram was developed at the macro, meso and micro levels;

- An algorithm of interaction between the elements of the system of financing and organization of innovation of industrial sectors was developed;

- Priority directions of the Action Strategy and Concept for the innovation of chemical, petrochemical and metallurgical complexes

and the solution of their financial problems, as one of the important industrial sectors of Azerbaijan, were developed;

- In the context of new challenges, based on post-pandemic and post-war priorities, directions for solving the problem of sustainable financial provision for the innovation of industrial sectors in Azerbaijan have been identified.

Theoretical and practical significance of the research. The scientific results, proposals and recommendations obtained in the research work can be used in the development of the industrial sector of our country, in solving the financial problems of innovation of individual industrial sectors, in improving financial mechanisms, in taking complex measures in this direction. Along with these, the possibility of using the materials provided in the research in writing textbooks and teaching aids is noteworthy.

Approval and application. The topic of the dissertation work is in line with the general direction of scientific research work at Odlar Yurdu University and has been discussed and approved at scientific seminars that are currently operating as topical issues.

The applicant has 10 scientific works on the topic of the dissertation work, including 5 articles and 5 theses, 1 article and 3 theses of which have been published abroad in reputable local and foreign journals recommended by the Higher Attestation Commission.

Name of the organization where the dissertation was completed. The dissertation was completed at Odlar Yurdu University.

The total length of the dissertation in characters, indicating the size of the structural sections of the dissertation separately. The total length is 265,532 characters, including the cover and table of contents (2,608 characters), introduction (18,208 characters), chapter I (59,871 characters), chapter II (64,417 characters), chapter III (84,176 characters), conclusion (12,272 characters) and list of used literature (23,615 characters). The number of characters of the dissertation is 229,249 characters, excluding tables, figures, used literature and list of used literature.

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MAIN CONTENT OF THE DISSERTATION WORK

The introduction to the dissertation work provides the relevance and degree of development of the topic, the object and subject of the research, goals and objectives, methods, the main provisions put forward for defense, the scientific novelty of the research, theoretical and practical significance, approval and application, etc.

The first chapter of the dissertation, entitled **"Theoretical and methodological approaches to solving financial problems of industrial innovation"**, examines the theoretical foundations of financial provision of industrial innovation, identifies methodological approaches to solving financial problems in industrial innovation in the modern era and their features, and examines international experience in solving financial problems in industrial innovation.

Starting from the 30s of the 20th century, J. Schumpeter's theoretical research has been of great interest. In general, more in-depth research on the conceptual foundations of innovation activity is associated with his name. Schumpeter believed that entrepreneurs have more inventive qualities in their activities and that they form and apply new ideas in these areas by effectively using production factors. In addition, according to him, it is precisely as a result of similar processes that old approaches and technologies related to production and creativity are replaced by new ones, that is, new innovations. In terms of problems related to financing innovations, his views attached special importance to credit. For example, he believed that it is credit that provides the opportunity to attract additional resources and scientific innovations to economic circulation. At the same time, according to J. Schumpeter, new approaches and innovations can play a leading role in the development of entrepreneurship. By highlighting the role of innovation in entrepreneurship, J. Schumpeter was able to substantiate the importance of innovations and especially noted their importance in the formation and production of new products. We believe that in the current processes of economic activity, including the development of industrial sectors, the application of new

approaches and innovations remains an important issue, and in this direction, it is necessary to improve state policy, create appropriate conditions for the innovation of industrial sectors, and, in particular, determine ways to solve the problems of financial provision.

In practical activities, the state uses various tools to support the innovation activities of industrial enterprises. One of the functions of supporting innovations is to manage the formation and implementation of state-specific programs, which are reflected in theform of a mechanism in Figure 1.

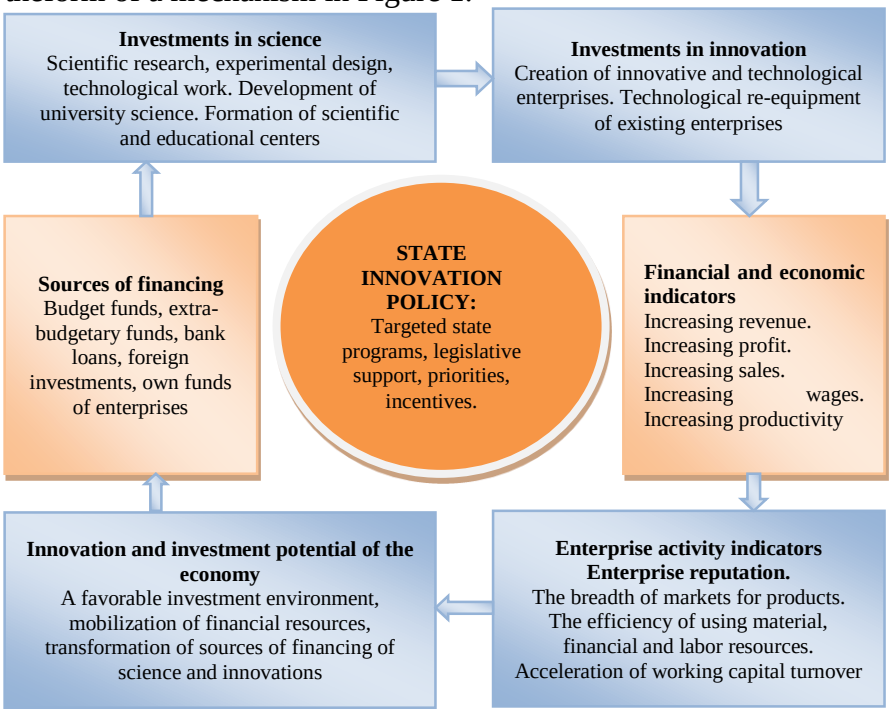

Figure 1. Cyclic model of innovative development based on the priorities of the state's innovation policy in industrial sectors and modern realities (source: prepared by the author).

The characteristics of the sources and types of financial resources required for the innovation of industrial enterprises are given in table 1.

Table 1

Classification of sources and types of financial support for innovation of industrial enterprises

Classification sign	The essence
According to the source	- budget funds allocated at different management levels; - funds from extra-budgetary funds; - companies' own funds; - funds of credit and financial institutions (banks, investment funds and companies, non-state pension funds, insurance companies); - funds of foreign investors; - resources of investment banks; - means of natural persons; - resources of local and foreign science funds; - means of public associations; - shares; - state loans.
According to the form of ownership	- the enterprise's own resources (net profit, depreciation deductions); - attracted funds (issue of shares, bonds and other securities, funds of foreign investors, venture resources, insurance, investment funds, grants, subsidies, participation in shares, special purpose state funds in the form of resources of sponsors); - debt funds (leasing, loans from financial and credit institutions).
According to the form of management	- state (state budget funds, off-budget and special funds); - sectoral (field and cross-field off-budget funds, loans from banks and international organizations); - regional (budget funds and non-budget funds of regions); - institutional (own resources of the enterprise, funds of financial-production associations, budgetary and non-budgetary funds).
Depending on the duration of the involvement of resources	- short-term (up to 1 year); – medium term (1-3 years); – long-term resources (from 3 years).
Depending on the stage of the project life cycle in the field of innovation	- financial resources invested in the development stage (own funds, state funds, venture funds); - financial resources used during the implementation stage of the project (direct state support, funds from private investors); - financial resources used in the growth phase (bank loans, funds from venture funds); - financial resources used in the stage of continuous growth (bank loans on the most favorable terms);
According to the investment subject	- financial resources of small and medium-sized business entities (companies' own funds, special-purpose sovereign funds, bank funds for innovative project development programs); - resources of large enterprises (own resources, state budget funds, state budget and extra-budgetary funds, credit resources, funds from investment, pension and venture funds, funds of foreign investors); - resources of scientific institutions (state funds, funds of foreign investors, venture funds).

Source: Compiled by the author.

It is known that there are several sources for the formation of the financial base of the innovation of industrial sectors, the most important of which are the own funds of these industries (profit and depreciation), budget funds (funds of the constituent entities of the country, municipalities), bank loans and other borrowed funds.

If we want to look at it from a global perspective and at a conceptual level, we have formed a block diagram of the features of methodological approaches to solving financial problems in the innovation of industrial sectors in modern conditions, as shown in Figure 2.

On the other hand, the innovation and financial mechanism of industrial sectors should be multifunctional and attractive enough to solve the problems of sustainable planning of activities in this direction and financing of the intended projects until they reach the level of profitability. That is, attracting domestic and foreign investments, including direct foreign investments, motivating foreign partners, and taking necessary measures in this regard are very important conditions.

The basis of the US innovation system is precisely scientific research institutes and universities. They concentrate most of the country's basic scientific research and the majority of applied research. An important role in the US innovation system is played by research universities engaged in the development of a certain field of applied science. The first science and technology park in the US was created at Stanford University, and favorable conditions were created for its operation, such as low rent, the availability of venture financing, and close cooperation with technology companies and universities. There is a developed system of interaction between universities and private companies in the US. Unlike the United States, China's science and technology sector, which is currently leading the world economy in many indicators, is quite centralized: the country has a Ministry of Science and Technology. In China, there was a tendency to outsource, involving American and European companies in cooperation and, as a result, the absorption of experience, knowledge and technology. This cooperation allowed

Chinese companies to enter global supply chains and master new technologies.

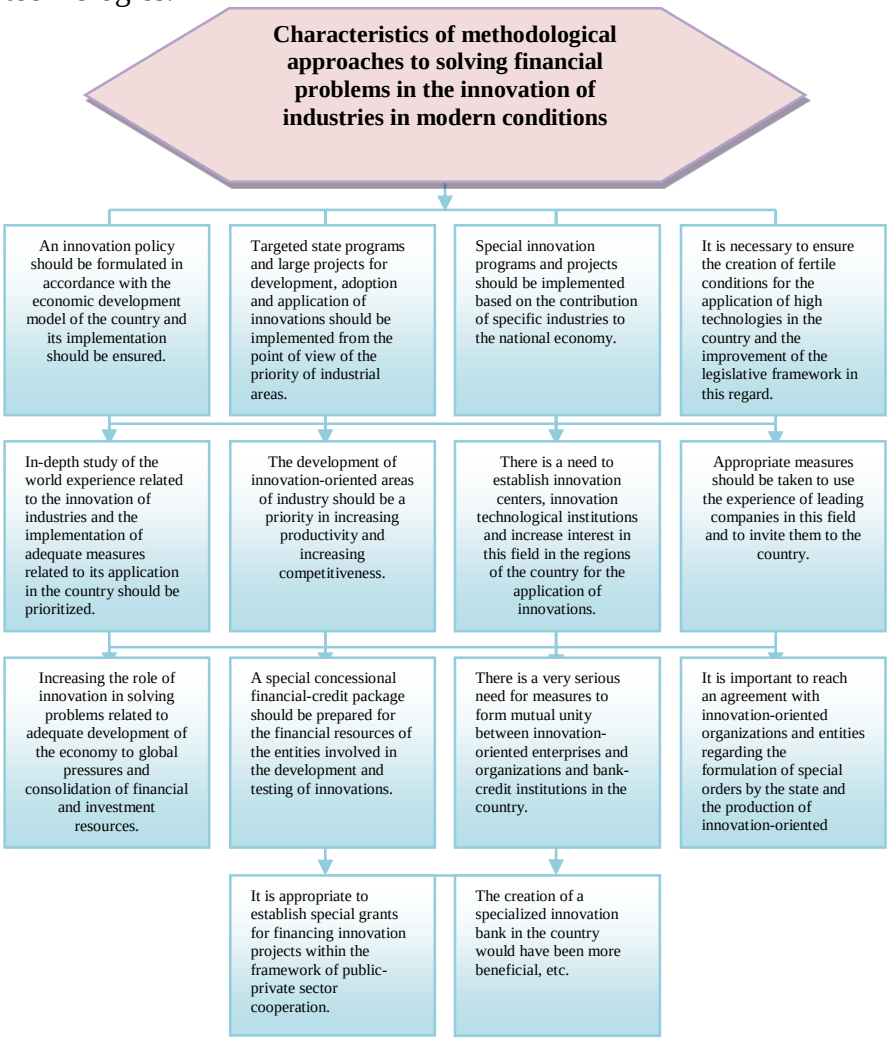

Figure 2. Block diagram of the characteristics of methodological approaches to solving financial problems in the innovation of industries in modern conditions (prepared by the author).

Recently, China has increasingly taken advantage of the opportunities to acquire assets in the United States and Europe. In

recent years, China has been actively increasing its research and development spending relative to GDP. This allows the country to develop science and invite researchers and managers from other countries. China has a unique "triple helix" model, which is used as the main concept of interaction between the state, universities and industry. Singapore's innovative development was driven by the need to ensure the country's economic competitiveness and long-term growth. In particular, Singapore has schemes where the government provides direct subsidies or co-financing with third parties or offers deductions for investment losses from taxable income. In addition: *"the government has established a system of cash grants, equity financing, business incubators, debt financing schemes and tax breaks to finance industrial innovation".*

Despite the existence of general and fundamental principles and methods of financing innovation in industrial sectors, each country has its own experience and characteristics that determine the methods of financing innovations. This difference is directly related to the institutional and structural characteristics of the economies of these states. Azerbaijan, in addition to benefiting from world experience, should formulate and implement an innovation policy for industrial sectors in accordance with the goals and resource potential of its economic development model, as well as new resource opportunities created in the liberated territories.

In the second chapter of the work entitled **"Assessment of the processes of innovation and financing of industrial sectors in Azerbaijan",** an analysis of the formation, development of the national innovation system and the processes of financing industrial sectors in the country was conducted, the current state of innovation and financial provision of industrial sectors was examined, and the potential for financial provision of the development, adoption and application of innovations in industrial sectors was assessed.

In order to determine the level of innovative activity of the country, it is necessary to have different levels of innovative knowledge, as well as functional mechanisms for the realization of the existing intellectual potential. Since the end of the 20th century, the formation of effective MIS elements has begun in Azerbaijan.

This refers to a set of economic entities that create conditions for the production, development and protection of new knowledge that will be transformed into new products, services and technologies. In general, the most important structural elements of the MIS include: state bodies, the education system, industrial organizations, state and private research organizations, the financial system, small, medium and large businesses, state corporations and consumers. The elements of MIS in Azerbaijan can be called the direct basis for the formation of innovative structures of economic growth. The main elements of MIS include the availability of human, scientific and technological, intellectual and financial resources.

The focus should be on establishing the main elements and institutional structure of the MIS in Azerbaijan, expanding and strengthening relations between various structures in innovation processes, improving mechanisms for commercialization of innovations and intellectual property objects, forming a market for scientific and technical products, and eliminating problems of financial and personnel provision for the innovative development of regions and industries. The main role in the activities of the MIS should be given to the state, which, through the establishment of a regulatory framework, determines the rules of operation and relations between the authors of the innovation process.

Figure 3 shows the dynamics of industrial production in Azerbaijan in 2012-2023.

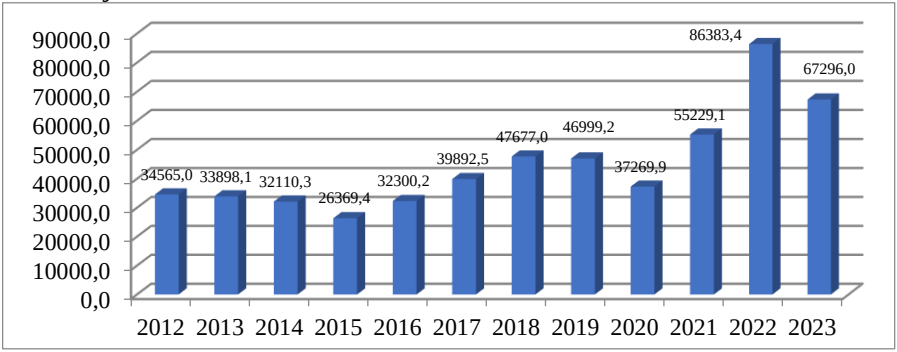

Figure 3. Dynamics of the total volume of industrial production in the Republic of Azerbaijan for 2012-2023, million manats. Source: ARDSK–https://www.stat.gov.az/.

If we look at Figure 3, we can see that in 2012-2023, the volume of industrial production increased by almost 2 times. A significant increase occurred in 2022, and this indicator amounted to 36.1% compared to 2021. However, in 2023, this indicator decreased compared to 2022 (-28.4%).

Figure 4 shows the overall dynamics of the manufacturing industry output in Azerbaijan in 2012-2023. The increase during the analyzed period was 2.63 times. In particular, in 2021-2023, a greater increase was recorded compared to previous years, and we believe that as the innovation of the manufacturing industry sectors accelerates, the dynamics of growth will intensify even more.

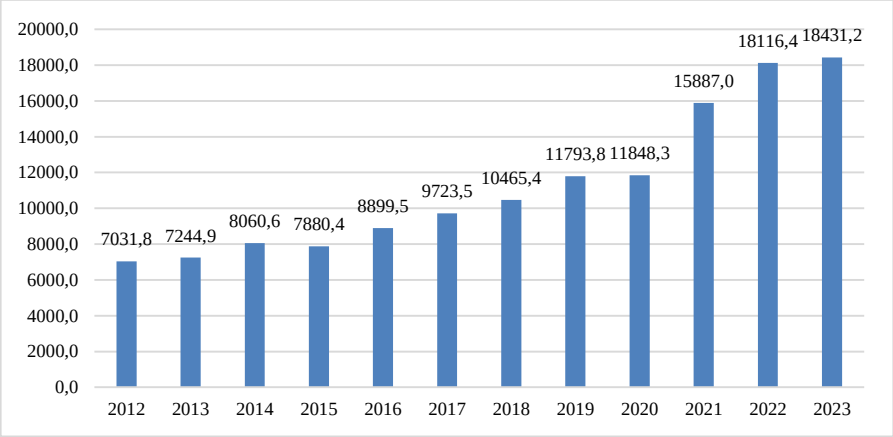

Figure 4. Dynamics of manufacturing industry output in Azerbaijan in 2012-2023, in billion manats (source: prepared based on data from the State Statistics Service of Azerbaijan Republic – https://www.stat.gov.az/.)

The chemical and petrochemical complex is of great importance as one of the export-oriented sectors of the non-oil industry with significant potential.

Figure 5 reflects the dynamics of the total volume of product production in the chemical industry of our country in 2012-2023. In recent years, product production in this sector has increased significantly, and the main reason for this is the start of operation of 2 large production facilities, the export-oriented SOCAR Polymer

and SOCAR Urea enterprises, and the increase in production volumes.

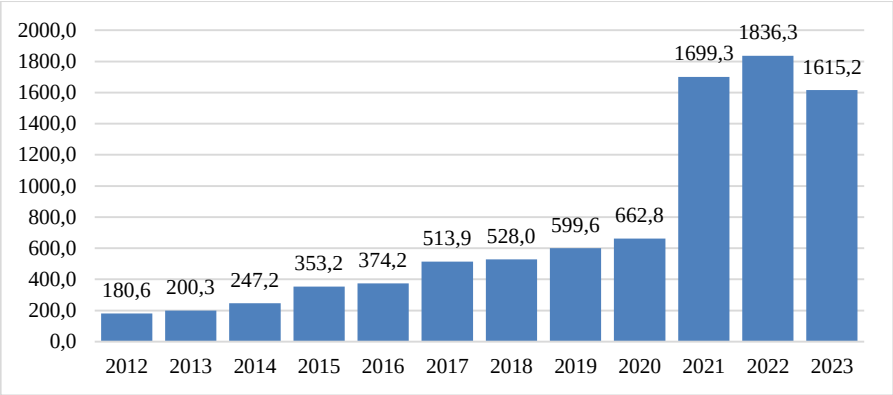

Figure 5. Dynamics of product production in the chemical industry of Azerbaijan, million manats, 2012-2023 (source: prepared based on data from the State Statistics Service of Azerbaijan Republic – https://www.stat.gov.az/.)

Figure 6 analyzes the activity of the metallurgical industry in Azerbaijan during 2015-2023, and during this period the volume of total product production increased by 4.75 times. However, we should note that the metallurgical industry in our country has wider opportunities, and in these processes there is a need for measures to develop innovation projects and identify attractive financial support mechanisms.

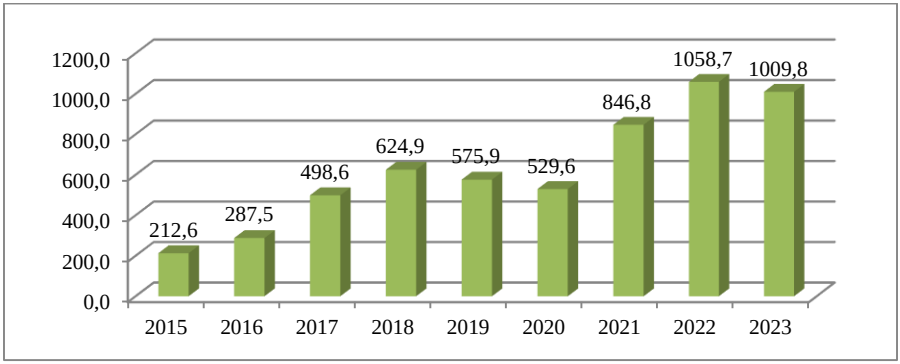

Figure 6. Production of products in the metallurgical industry in Azerbaijan, 2015-2023, million manats. Source: ARSK – https://www.stat.gov.az/.

Table 3 shows the volume of innovation products that underwent significant changes or were newly introduced in Azerbaijan in 2010-2023, by type of economic activity.

Table 3

Volume of innovation products that have undergone significant changes or have been newly introduced in Azerbaijan in 2012-2023 by type of economic activity, thousand manats

Types of economic activity	2012	2015	2016	2017	2018	2019	2020	2021	2022	2023	2012-2023: +/-
Industry - total	23052	929,7	35747	14777	28952,2	21698,1	11759,7	60977,2	72826,9	62400,8	+270,7 %
Mining industry	396,1	-	129,6	-	215,3	2495,7	2415,5	2843,4	3972,1	-	+10,1 dəfə (2022/2012)
Processing industry, including	22656	929,7	35617	14777	28736,9	19202,4	9344,2	58133,8	68854,8	62400,8	+275,4 %
Production of food products			402,5	590	831,2	328,0	-	3859,2	7307,3	2500,0	+6,2 dəfə (2023/2016)
Beverage production	18200	758	41,5	-	-	-				1919,0	-9,48 dəfə
Textile industry			12844	-	-	-	2121,3	-	-	-	-
Clothing industry			5213	-	-	-	-	-	-	-	-
Manufacture of leather and leather products, footwear			48	-	-	-	-	-	-	-	-
Wood processing and production of wood products				-	-	-	-	-	-	-	-
Production of petroleum products				-	-	-	-	-	-	-	-
Chemical industry	3049	13,4	522,4	1705	55,0	-	-	-	-	-	-
Manufacture of rubber and plastic products			171,3	-	-	-	-	-	-	-	-
Manufacture of construction materials			6586	-	-	-	-	-	-	181,8	-
Metallurgical industry			500	2176	7690,0	12560,0	2436,7	53035,2	61000,0	57800,0	-
Manufacture of fabricated metal products, except machinery and equipment			9113	-	-	-	-	-	-	-	-
Manufacture of computers and other electronic equipment	20,4			9990	19937,9	6073,2	4742,0	1239,4	547,5	-	-
Manufacture of electrical equipment				-	-	-	-	-	-	-	-
Manufacture of machinery and equipment	890,3	158,3	174,9	216	222,8	241,2	44,2	-	-	-	-
Manufacture of furniture				-	-	-	-	-	-	-	-
Installation and repair of machinery and equipment	496,8			-	-	-	-	-	-	-	-

Source: Prepared by the author based on data from the ARSK. https://www.stat.gov.az/

If we analyze Table 3, we will see that the volume of innovation output in our country is significantly low, and unfortunately, the indicators reflecting the innovation potential of the non-oil and gas sector do not attract attention. In 2020-2023, the volume of product production in this area increased relatively, but innovation projects were not implemented in most areas of the non-oil and gas sector. The main reason for this is that industrial enterprises operating in this area do not have their own funds to finance innovation projects, and credit resources are not available.

We believe that more substantiated innovation projects should be implemented in the direction of developing and applying innovations in industrial areas and with solved financial support mechanisms. In this regard, it is important to maximally improve and update the mechanisms for providing financial support for innovation problems in industrial areas.

Figure 7 shows the general dynamics of expenditures on technological innovations in industrial areas in Azerbaijan in 2012-2023 and, as we have noted, the share of private funds of enterprises.

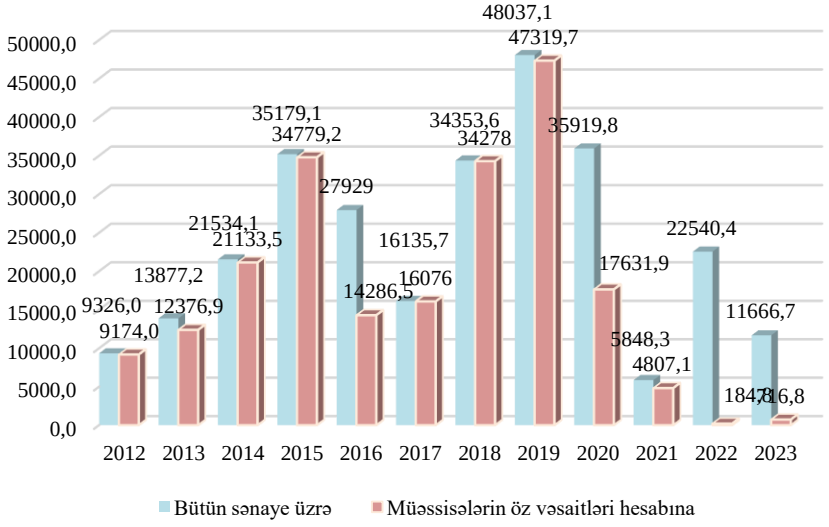

Figure 7. Expenditures on technological innovations by industry sector in Azerbaijan and the volume of own funds of enterprises in their structure, thousand manats. (Source: Prepared by the author based on ARSK data - https://stat.gov.az/source/industry/)

If we look at Figure 7, the expenditures on technological innovations in industrial sectors in our country have increased unevenly. In recent years, sharp decreases have been observed in the financing of innovations at the expense of enterprises' own funds, this indicator was at its lowest level in 2022. In that year, 184.8 thousand AZN was spent on technological innovations, which is 95.4 times less than in 2020 and 26.1 times less than in 2021. In general, 22544.0 thousand AZN was spent on technological innovations in industrial sectors in 2022, of which 0.8% was at the expense of enterprises' own funds.

The enterprises themselves spent the most on technological innovations only in 2019, 47319.7 thousand AZN, which is 98.5% of the total expenditures on technological innovations in industry. In 2023, spending on technological innovations across all industries decreased significantly again compared to 2022.

The third chapter of the dissertation entitled **"Directions for solving financial problems of industrial innovation in Azerbaijan in the context of new realities"** examined the issues of ensuring innovative development and strengthening the economic, organizational and legal foundations of regulating financial problems of industrial innovation, developed a mechanism for financial provision of industrial innovation in the country, and identified ways to solve financial problems of industrial innovation in the context of post-pandemic and post-war priorities.

We have given an approximate scheme of objects of financing industrial innovation in Figure 8.

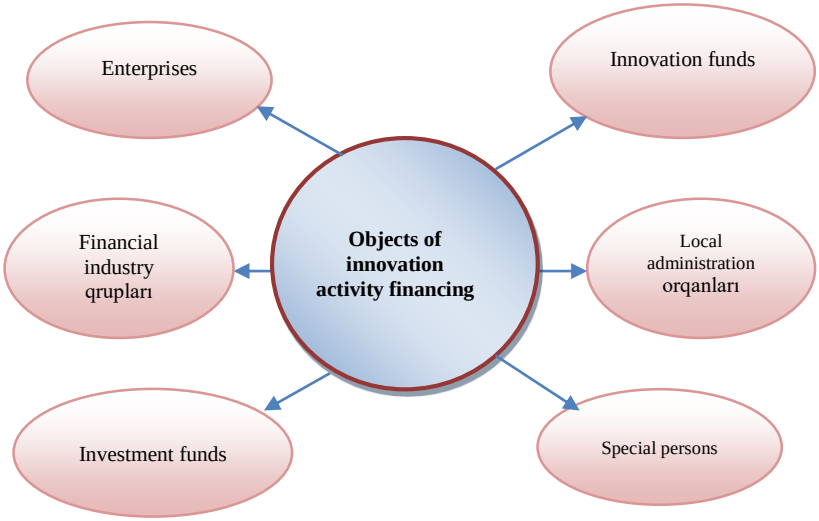

Figure 8. Objects of financing innovation in industrial sectors (Source: compiled by the author).

Among the non-oil and gas industries in our country, there is a strong production and export potential of the chemical and petrochemical complex, as well as the metallurgical complex. In addition to meeting the needs of the domestic market, the innovation of these sectors can also have a positive impact on expanding the structure and volume of exports. However, for this, financial problems must be resolved. We have noted the commissioning of large production facilities in the chemical and petrochemical complex in recent years, but these have been possible within the framework of SOCAR. There is a need to develop and implement conceptual approaches and action strategies for the development of these important industries in accordance with the conditions of a market economy.

In Figure 9, we propose an Action Strategy for the innovation of the chemical and petrochemical complex of Azerbaijan and the solution of its financial problems.

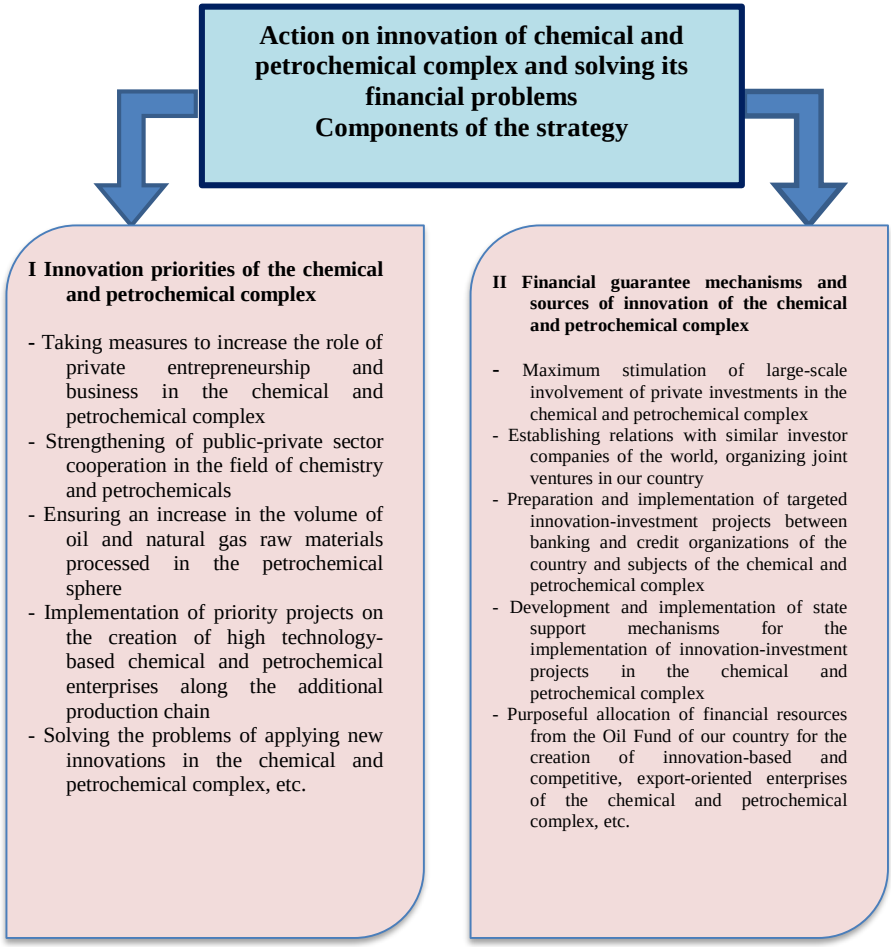

Figure 9. Block diagram of the components of the Action Strategy for innovation of Azerbaijan's chemical and petrochemical complex and solving its financial problems (prepared by the author).

We believe that the implementation of the above-mentioned priority areas of activity for intensive innovation of the chemical and petrochemical complex will allow us to achieve positive results. Similar problems are also characteristic of the metallurgical complex, which has sufficient potential and industrial traditions in our country. Unfortunately, it is difficult to say that the current development in

this area is adequate, and the processes of innovation in the sector are also insufficient.

In Figure 10, we have given a block diagram of the main priority areas of the Concept of intensification of innovation of the metallurgical complex of Azerbaijan and provision of financial mechanisms.

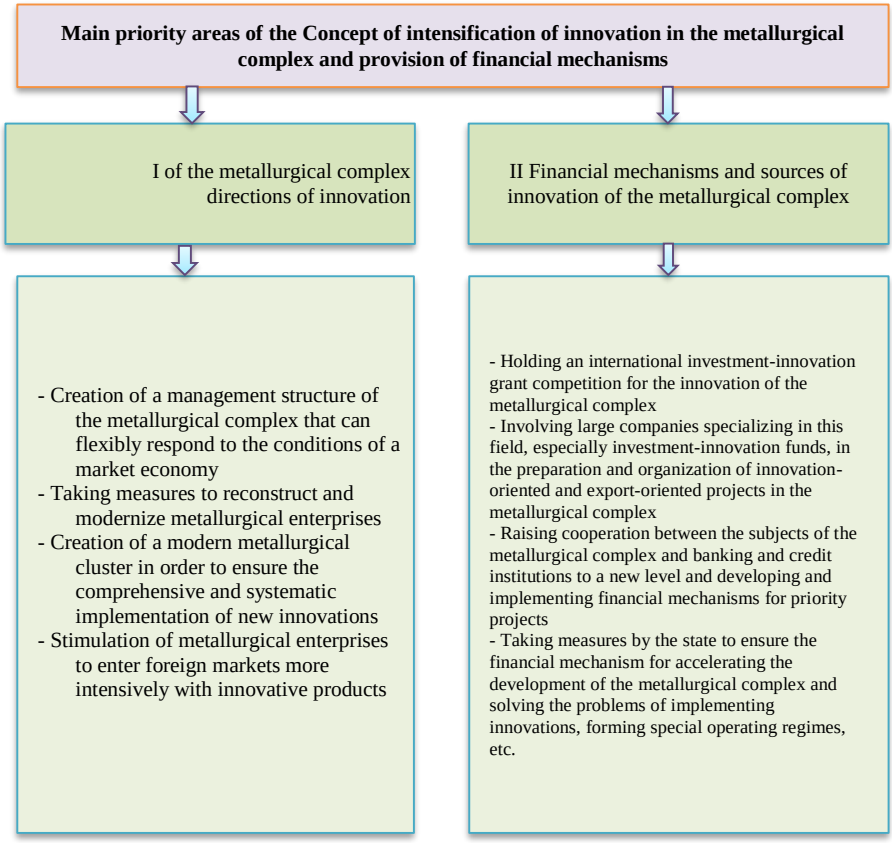

Figure 10. Block diagram of the main priority areas of the Concept for intensification of innovation in the metallurgical complex of Azerbaijan and provision of financial mechanisms (prepared by the author).

In our opinion, the innovation of the metallurgical industry of our country is also of strategic importance. Thus, in the processes of restoration of the liberated territories, there is a continuous and large-

scale need for metallurgical products. At the same time, the prospects for the formation of export potential for these products are also noteworthy.

In general, the preparation and application of financial mechanisms for the innovation of non-oil and gas industry sectors in a complex and systematic manner, as well as for the long term, can provide additional incentives for the development of these sectors, etc.

The "Conclusion" section of the dissertation provides suggestions and recommendations of scientific and practical importance arising from the essence of the research:

1. We have distinguished the following as the formation of the financial mechanism for the innovation of industrial sectors and its constituent elements: 1) methods of financial management of industrial sectors; 2) financial instruments; 3) a developed internal regulatory system in industrial sectors; 4) legal regulation and 5) information and methodological support for the financial management of industrial sectors.
2. In order to expand the structure and range of production of science and technology-intensive, innovation-oriented products, purposeful action programs and strategies should be developed and implemented in the direction of the innovation of the country's industrial sectors;
3. The reasons that slow down the innovative development of non-oil and gas industry sectors with strong potential for the application of innovations in our country should be deeply investigated, adequate measures should be taken and, first of all, the efficiency of financial support mechanisms should be increased;
4. As an industrial sector with a fairly high innovative activity in Azerbaijan, the potential of the chemical and petrochemical industry and its enterprises can be noted, and we believe that the implementation of large innovation-investment projects in this industry is possible;

5. In order for enterprises to survive in the competitive environment during the period of innovative development, it is necessary to expand innovation activity, improve its management mechanisms, set goals in the direction of bringing innovation products to the market of financially intensive technologies, and in this direction, it is important to expand the scope of state support mechanisms for processes related to innovation activity, and increase their efficiency. More work should be done to create an innovation mechanism to solve existing problems related to the introduction of innovations in the non-oil industry, where it is required to create and develop an innovation infrastructure - an operating environment that will allow innovative ideas to quickly move from a scientific laboratory to a stage where they can be used in the technological processes of companies operating in the market;

6. We believe that there is a serious need to take a number of measures to accelerate innovation processes in Azerbaijan, and in particular, a group of measures to intensify the innovation processes of industrial enterprises. The processes of forming the legislative framework for innovation activities in Azerbaijan should be completed and the Law “On Innovation Activities” should be adopted in the country.

7. We would like to highlight some areas of state activity to support venture financing: 1) Improving the legal regulation of innovative and venture activities. 2) Creating favorable economic conditions for the development of venture business. 3) Immediate resolution of legal problems arising during the creation of intellectual property objects and 4) Improving the planning of the country's scientific and technical development.

8. In order to effectively use the innovative and export potential of industrial sectors with strong potential, primarily non-oil and gas industries, and more specifically heavy engineering industries, in order to achieve the strategic goals facing the country's economy, raise the national economic development model to a new level, and form more productive sources of financial resources, it is necessary to ensure the intensification of the innovation processes of industrial sectors in general. Based on the above, we consider it

important and propose the preparation and adoption of the "State Program on Acceleration of Innovation of Industrial Sectors in Azerbaijan and Solution of Financial Provision Mechanisms in 2025-2030", etc.

THE MAIN CONTENT OF THE DISSERTATION HAS BEEN PUBLISHED IN THE FOLLOWING SCIENTIFIC WORKS:

1) Directions for strengthening financial mechanisms for the innovation of industrial sectors in the post-pandemic period. “Problems of sustainable development of the economy in the information society” / International scientific conference, SDU. December 16–17, 2021. P.375-379.

2) Theoretical and methodological aspects of financial support mechanisms for the innovation of industrial enterprises. Journal “News of ANAS”. Economics series, Baku.2021, No. 04, P. 167-176

3) Assessment of the current state of the innovation processes of industrial sectors in Azerbaijan. “Innovative Economy and Management”, AMU, Ganja, 2022, No. 04, P.277-283.

4) Strategic aspects of the financial problems of the innovation of industrial sectors in the modern era. “Geostrategy” journal, Baku, 2022, No. 06 (72), P. 166-170.

5) Problems of financial provision of innovation of industrial sectors in the conditions of global transformations. “Innovative economy and Management”, AMU, Ganja, 2023, No. 01, P. 231-238.

6) World experience in solving financial problems of innovation of industrial sectors. International Scientific Conference on “Interstate Economic Relations: Modern Challenges and Prospects” dedicated to the 100th anniversary of the birth of the National Leader Heydar Aliyev, Sumgayit State University, 25-26.05.2023, p. 204-207.

7) Main problems and ways to solve financing of innovation in industrial sectors of Azerbaijan. Journal “Financial Economy”, Moscow, 2023, No. 12, p. 273-277.

8) Ways of improvement of economic-organizational and financial mechanisms of innovative development of non-oil and gas industries of Azerbaijan. Collection of materials "World globalization: fundamental and applied aspects", Moscow, RF, 28.12.2023. - P. 40-49.

9) Modern aspects of innovation processes of industrial areas in Azerbaijan in new conditions. Proceedings of the 14th International Scientific and Practical Conference "Scientific Horizon in the Context of Social Crises". Tokyo, Japan, September 6-8, 2023, #169, p. 7-14.

10) Financial problems of innovating industrial sectors in the conditions of global financial transformations / Proceedings of the 12th International Scientific and Practical Conference «International Forum: Problems and Scientific Solutions», Melbourne, Australia, October 16-18, 2023, #174, p. 52-59.

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